



# **Bhopal Smart City Development Corporation Limited (BSCDCL)**

## **REQUEST FOR PROPOSAL**

for

**Selection of Concessionaire for Design, Development, Implementation, Operation and Maintenance of Smart Parking Solution for three Multilevel Parking Sites for Bhopal Smart City on PPP Model**

## **Volume 2 – Scope of Work**

**RFP Number: XXXX**

**Date: XXXX**

**Last date for Bid Submission: XXXX**

Invited by

Bhopal Smart City Development Corporation Limited (BSCDCL)

Kalibadi Rd, Near Natraj Petrol Pump, Sector A, Berkheda,  
462023

Bhopal, Madhya Pradesh

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## **Disclaimer**

The information contained in this Request for Proposal document (“**RFP**”) whether subsequently provided to the bidders, (“**Bidder/s**”) verbally or in documentary form by Bhopal Smart City Development Corporation Limited (henceforth referred to as “**BSCDCL**” in this document) or any of its employees or advisors, is provided to Bidders on the terms and conditions set out in this Tender document and any other terms and conditions subject to which such information is provided.

This RFP is not an agreement and is not an offer or invitation to any party. The purpose of this RFP is to provide the Bidders or any other person with information to assist the formulation of their financial offers (“**Bid**”). This RFP includes statements, which reflect various assumptions and assessments arrived at by BSCDCL in relation to this scope. This Tender document does not purport to contain all the information each Bidder may require. This Tender document may not be appropriate for all persons, and it is not possible for the Chief Executive Officer, BSCDCL and their employees or advisors to consider the objectives, technical expertise and particular needs of each Bidder. The assumptions, assessments, statements and information contained in the Bid documents, may not be complete, accurate, adequate or correct. Each Bidder must therefore conduct its own analysis of the information contained in this RFP and to seek its own professional advice from appropriate sources.

Information provided in this Tender document to the Bidder is on a wide range of matters, some of which may depend upon interpretation of law. The information given is not intended to be an exhaustive account of statutory requirements and should not be regarded as a complete or authoritative statement of law. BSCDCL accepts no responsibility for the accuracy or otherwise for any interpretation of opinion on law expressed herein.

BSCDCL and their employees and advisors make no representation or warranty and shall incur no liability to any person, including the Bidder under law, statute, rules or regulations or tort, the principles of restitution or unjust enrichment or otherwise for any loss, cost, expense or damage which may arise from or be incurred or suffered on account of anything contained in this RFP or otherwise, including the accuracy, reliability or completeness of the RFP, and any assessment, assumption, statement or information contained therein or deemed to form part of this RFP or arising in any way in this Selection Process.

BSCDCL also accepts no liability of any nature whether resulting from negligence or otherwise howsoever caused arising from reliance of any Bidder upon the statements contained in this RFP. BSCDCL may in its absolute discretion, but without being under any obligation to do so, can amend or supplement the information in this RFP.

The issue of this Tender document does not imply that BSCDCL is bound to select a Bidder or to appoint the Selected Bidder (as defined hereinafter), for implementation and BSCDCL reserves the right to reject all or any of the Bidders or Bids without assigning any reason whatsoever.

The Bidder shall bear all its costs associated with or relating to the preparation and submission of its Bid including but not limited to preparation, copying, postage, delivery fees, expenses associated with any demonstrations or presentations which may be required by BSCDCL or any other costs incurred in connection with or relating to its Bid. All such costs and expenses will remain with the Bidder and BSCDCL shall not be liable in any manner whatsoever for the same or for any other costs or other

expenses incurred by a Bidder in preparation for submission of the Bid, regardless of the conduct or outcome of the Selection process

## Glossary

Abbreviations and Acronyms	Description
BEC	Bidders Evaluation Committee
BG	Bank Guarantee
BOM	Bill of Material
BoQ	Bill of Quantity
BMC	Bhopal Municipal Corporation
BSCDCL	Bhopal Smart City Development Corporation Limited
CCTV	Closed Circuit Television
CEO	Chief Executive Officer
DD	Demand Draft
ECS	Equivalent Car Space
EMD	Earnest Money Deposit
ESI	Employee State insurance
FRS	Functional requirement Specification
GIS	Geographical Information Systems
HLD	High Level Design
ICT	Information and Communication Technology
ICT	Information and Communication Technology
INR	Indian Rupee
IT	Information Technology
LED	Light Emitting Diode
LLD	Low Level Design
LoI	Letter of Intent
MLCP	Multi-level Car Parking
O&M	Operation and maintenance
OEM	Original Equipment Manufacture
PBG	Performance Bank Guarantee
PF	Provident Fund
RFP	Request for Proposal

Selection of Concessionaire for Design, Development, Implementation, Operation and Maintenance of Smart Parking Solution for three Multilevel Parking Sites for Bhopal Smart City on PPP Model

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RoW	Right of Way
SLA	Service Level Agreement
TQ	Technical Qualification
UAT	User Acceptance test

## Definitions

1. **“Acceptance of System”** The system shall be deemed to have been accepted by the Authority, subsequent to its installation, rollout and deployment of trained manpower, when all the activities as defined in Scope of Work have been successfully executed and completed to the satisfaction of Authority as mentioned in the RFP Volume II.
2. **“Applicable Law(s)”** Any statute, law, ordinance, notification, rule, regulation, judgment, order, decree, bye-law, approval, directive, guideline, policy, requirement or other governmental restriction or any similar form of decision applicable to the relevant party and as may be in effect on the date of the execution of this Agreement and during the subsistence thereof, applicable to the Project.
3. **“Authority”** means the Bhopal Smart City Development Corporation Limited. The project shall be executed in Bhopal and shall be owned by Bhopal Smart City Development Corporation Limited.
4. **“Bidder”** shall mean organization/consortium submitting the proposal in response to this RFP.
5. **“Concessionaire”**- Organization (Lead bidder in case of consortium) to be appointed by BSCDCL for implementation and maintenance of Smart parking. The agency shall carry out all the services mentioned in the scope of work of this RFP.
6. **“Concessionaire’s Team”** means Concessionaire along with all of its Consortium Members (if any), who have to provide Goods and Services to BSCDCL under the scope of this Agreement. This definition shall also include any and/or all of the employees of the MSI, Consortium Members, authorized partners/agents and representatives or other personnel employed or engaged either directly or indirectly by the Implementation Partner for the purposes of this Agreement.
7. **“Contract”** means the Contract entered into by the parties with the entire documentation specified in the RFP.
8. **“Contract Value”** means the price payable to concessionaire under this Contract for the full and proper performance of its contractual obligations.
9. **“Commercial Off-The-Shelf (COTS)”** refers to software products that are ready-made and available for sale, lease, or license to the general public.
10. **“Data Centre Site”** means the Data Centre sites including their respective Data Centre space, wherein the delivery, installation, integration, management and maintenance services as specified under the scope of work are to be carried out for the purpose of this contract.
11. **“Document”** means any embodiment of any text or image however recorded and includes any data, text, images, sound, voice, codes, databases or any other electronic documents as per IT Act 2000.

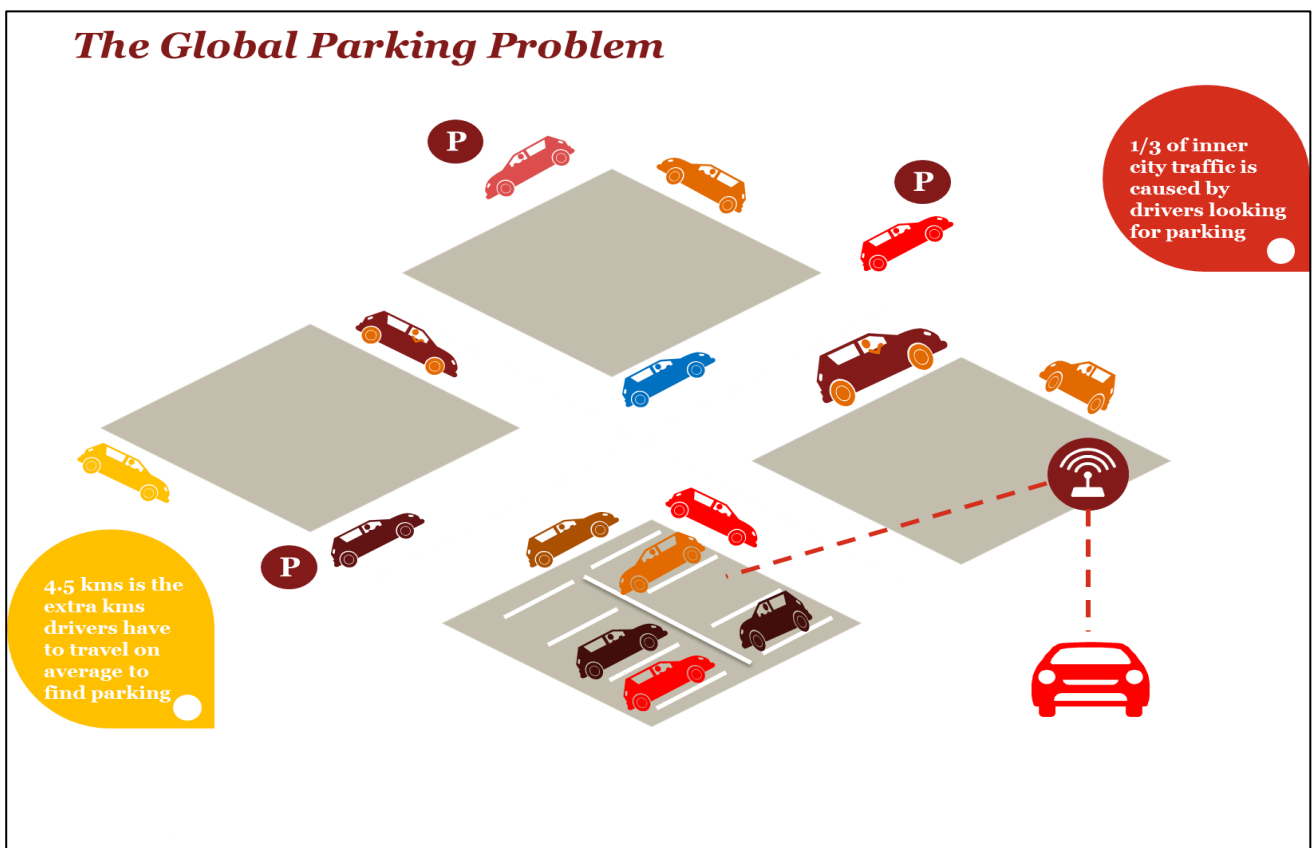


12. **“Effective Date”** means the date of commencement of Work, executed by the parties hereto.
13. **“Goods”** means all of the equipment, sub-systems, hardware, software, products accessories, software and/or other material/items which concessionaire is required to supply, install and maintain under the contract.
14. **“Integrated Command and Control Centre” OR “ICCC”** means the centre from where BSCDCL/BMC would have a centralised command and monitor of smart parking.
15. **“Intellectual Property Rights”** means any patent, copyright, trademark, trade name, service marks, brands, proprietary information whether arising before or after the execution of this Contract and the right to ownership and registration of these rights.
16. **“Go- Live”** means installation, testing, commissioning of project, and commencement of all smart parking components, including training as per scope of work mentioned in RFP. Bidder should have the approval from Authority for user acceptance testing.
17. **“Notice”** means: a notice; or a consent, approval or other communication required to be in writing under this Contract.
18. **“OEM”** means the **Original Equipment Manufacturer of any equipment/system/software/product** which are providing such goods to the Authority under the scope of this RFP.
19. **“Consortium”** means the entity named in the contract for any part of the work has been sublet with the consent in writing of the Authority and the heirs, legal representatives, successors and assignees of such person.
20. **“Sub-Contractor”** shall mean the entity named in the contract for any part of the work or any person to whom any part of the contract has been sublet with the consent in writing of the Authority and the heirs, legal representatives, successors and assignees of such person.
21. **“Services”** means the work to be performed by the agency pursuant to this RFP and to the contract to be signed by the parties in pursuance of any specific assignment awarded by the Authority.
22. **“Server Room”** or **“Data Center”** shall have the same meaning.

# 1. Introduction

Big cities face big traffic concerns. Population increases and a rise in commuters lead to serious traffic chaos, misuse of parking resources, the inability to properly detect parking violators and enforce parking restrictions, and emissions issues. The growth of personalized vehicles and growing congestion due to limitation on road space have made the provision for parking an important aspect of transportation planning. Assessment of existing parking spaces and of other important locations in Bhopal corroborated that more efficient parking system along with new parking space is required in Bhopal.

ICT based Smart Parking is an important intervention for making parking more efficient and user friendly. Smart parking system is Intelligent Parking Systems that delivers safe and efficient parking management with unparalleled customer service satisfaction. The intelligent parking system informs, directs, guides and assists the users with the parking space availability while reducing the time and stress spent to find a parking place.



Major challenges being faced in absence of smart parking are:



### 1.1. Overview of Project

BSCDCL hereby invites bids for Selection of a Concessionaire for Design, Development, Implementation, Operation and Maintenance of Smart Parking Solution for 3 multi-level designated parking spaces (four wheelers and two wheelers) in Bhopal area on PPP model for the concession period of Five (5) years (excluding six month implementation period) extended up to 5 years based on the mutual consent between the Concessionaire and Authority.

**The Concessionaire will be responsible for the following:**

#### *Smart Parking*

- To provide and install necessary hardware and software for parking operation, management and guidance system for Multi-Level Car Parking Facilities at three locations

- To provide and install necessary LED signage. LED signage will be for guidance to public regarding availability of parking spaces and other necessary information, at locations adjacent to each parking facility.
- Provide the necessary software and API support to enable the Integration with the existing Integrated Command and Control Centre of Bhopal and Citizen Service Delivery Application i.e. Bhopal Plus App for maximum outreach.
- Shall undertake minor civil repair works, cabling works and signage marking works, if required, in the parking facilities as per BSCDCL requirement from time to time.
- Provide necessary hardware and software for viewing, analyzing, storing and retrieval of the CCTV feed and monitoring and managing of Smart Parking at ICCC/Data Centre.
- Integration of parking mobile app development by concessionaire with Bhopal Plus city App.
- Integration of parking payment system with upcoming Bhopal Smart card and Smart Payment system, if any.
- Comprehensive operation and maintenance of all hardware and software installed for this project throughout Concessionaire period.
- Install EV Charing points based on the availability and convenience and collect revenue.
- To manage the facilities and collect revenue as per tariff fixed by Bhopal Smart City Development Corporation Limited for all the parking facilities (multi – level parking) throughout Concessionaire period as defined in this RFP.
- To pay BSCDCL a concession fee every quarter based on the revenue sharing model as percentage of revenue collected or minimum offset fees whichever is higher by the Concessionaire till the expiry of the concession period with minimum guaranteed revenue. Additionally, Concessionaire would be expected to pay a fix amount upfront against the security of the expected revenue share at the starting of each operational year. This fixed upfront fee should not be confused with the Performance Bank Guarantee (PBG) which concessionaire would be submit at the time of LOI.
- Mobile app & online portal for citizens to view parking and doing the required reservation.
- Concessionaire would be required to adhere all the policy related regulation being publish by the city, state or national level authority.

### ***Advertisement Board***

- Install the advertisement boards at the facilities. The preferred locations for installing the advertisement boards inside and outside (façade) the facility can be chosen by the concessionaire.
- Collect revenue for the advertisement spaces from the facilities. Concessionaire is free to subcontract the advertisement spaces for the concession period. However, sole ownership of the advertisement boards would rely with BSCDCL for and above the concession period.
- Authority i.e. BSCDCL can instruct the agency to either install or erect the existing advertisement boards during the concession period in the interest of the project.
- The Concessionaire and its sub-contractor for Advertisement Spaces is free to innovate in the advertisement spaces including but not limited to dynamic advertisement boards in the interest of the project. However, all the expenses for the capital expenditure, operations and management must be borne by the bidder, if required.
- The Concessionaire would share the quarterly and yearly revenue report, agreements and other related documents with BSCDCL.

- Concessionaire would be required to adhere the MP Outdoor Media Rules 2017 or any update notification/regulation released by Government of Madhya Pradesh.

## 1.2. Overview of the Smart Parking

The objective of Smart Parking is to:

- To develop a user friendly and adaptable system that can be implemented in a MLCP facility to ease the parking hassles.
- To create an impact and experience with integrated smart parking solutions this enables quick, faster accessibility with single space detection, parking guidance on real-time and allow guests to reserve the parking slot.
- Provide smart solution which reduces the travel time, carbon emission, search time, traffic congestions in the city. In addition, it improves traffic flow within the parking lot with efficient design and creating a safer ecosystem for the guests.

## 1.3. Challenges with Conventional Parking

Bhopal Municipal Corporation has various on-street parking lots under its jurisdiction. All of these parking lots are located near public places like market and commercial place, government office, parks, lakes, bus stands etc. These on-street parking lots have been converted into smart parking facilities. However, three Nos MLCP facilities at New Market Area, MP Nagar Area and Bairagarh Area which have been constructed by Bhopal Municipal Corporation has been handed over to Bhopal Smart City Development Corporation Limited (BSCDCL). All of these three parking facilities have a single entry/exit point and a couple of these kept under video surveillance, feeds for which are stored locally. The parking lots cater to 2-wheeled and 4-wheeled vehicles. Most of these parking lots have no barricading or gates and attendants follow incoming vehicles to hand-out parking receipts. The parking receipts are usually pre-printed, and at none of the locations tickets are issued using electronic machines. The parking lot is used by citizens and tourists for day-to-day activities. Presently, these parking MLCP facilities are being operated and maintained by BSCDCL.

Current Challenges:

1. Physical Infrastructure
  - a. Sheds are temporarily setup to house the ticket collection and enforcement staff. No formal gateway for entry/exit with IT infrastructure. The civil developer has installed the entry exit boom barriers which is nonoperational in nature presently.
  - b. Camera CCTV are installed only in Multi-level parking lot are either non-operational or feed is stored in local servers which are not integrated with ICC.
  - c. No accountability of any organization/people to maintain the existing infrastructure. BSCDCL has is operating the MLCPs presently until the concessionaire is onboard for furtherance.
2. People
  - a. People's willingness to park their vehicle in the parking lot is limited.

- b. No incentive to follow the process of queuing up for DIY payments when there is no gating or barricade.
  - c. Residents in the vicinity of the parking lot may not want to pay for parking their vehicle for fundamental things like buying vegetables.
3. Process: Enforcement of disciplined parking habit is a challenge
- a. There is a single combined entry and exit point for 2-wheeled and 4-wheeled vehicles in most parking lots which makes parking charges enforcement a challenge; any smart parking solution would require that the entry and exit for 2-wheeled and 4-wheeled vehicles be made separate and ideally entry and exit not be combined.
  - b. Few vehicles remain in the parking facility for months without the facility to have them removed from the parking premises. Some of these vehicles may have been abandoned. This limits the number of parking slots available.
  - c. The operations and maintenance of a number of parking facilities is already with BSCDCL. Implementation of a new solution in these parking facilities would be required.

#### **1.4. Smart parking value propositions to key stake holders**

##### **1. To City municipal corporation/Managements Team/ Clients:**

- Enhanced quality of life for the citizen.
- Improvement in their parking experience & satisfaction
- More efficient use of parking and increased revenue
- Reduces illegal parking
- Reduces revenue leakages
- Reduces Man power cost in operation.

##### **2. Citizens:**

- Reduces travel time and traffic congestion
- Easy & Faster to locate a slot, park and exit
- Multiple modes of payments with simple process
- Assured parking with pre booking facility
- Enhanced experience

## 2.Scope of Work

The overall scope of work for Design, development, operation and maintenance of MLCP Facilities which will be taken care by the concessionaire. Following are the detailed scope in each section.

### 2.1. Scope of Work for Concessionaire

The envisaged solution should be automated, cost effective, scalable, secure, environment friendly, energy efficient and must entail minimum human intervention for day-to-day parking management. The following scope of work has been envisaged for this project:

#### *Smart Parking Spaces*

- Post takeover of each parking space from BSCDCL, civil work and mechanical work (only in to enable the parking space smart, no construction of parking facility is to be done by concessionaire), maintenance of the parking slots, cleanliness of parking facility, coordination with Traffic police for no parking area Challans and towing, Advertisements and their management is the responsibility of the concessionaire.
- Provision and management of trained manpower for operating parking slots is the responsibility of the concessionaire.
- Concessionaire will be responsible for complete operations and maintenance of all the parking facility post takeover from BSCDCL.
- To provide and install sensors at each of the parking slot for Cars & Bikes for MLCP parking facility. All parking facility including the floors, entry exits etc. should be individually and clearly covered with appropriate camera coverage. All sensors, devices and equipment should have the capability to communicate back and forth with the central control centre for information and feedback through a RF/ Wi-Fi/ GPS/ any combination of them enabled system;
- To provide and install necessary complete hardware and software solutions, such as but not limited to boom barriers, auto pay station, handheld devices, porta-cabins, switches, gateway, and guidance system, for MLCP Facility parking system.
- Provide Parking Management and Parking Guidance System to direct drivers to available parking slots at each floor through LED signage and also through mobile app. Provide and install necessary LED signage which also includes variable messages sign board for guidance to public regarding availability of parking spaces and other necessary information.
- Citizen App for parking services: App shall show the available slot on real time basis, booking of parking space, payment mechanism through various modes of payment, reservation for specially-abled citizens, facility for extension of pre-booked parking space.
- Comprehensive operation and maintenance of all hardware and software installed for this project throughout Concessionaire period.
- Unique identification of each vehicle entering any of the parking lots through barcoded tickets, NFC enabled Smart Cards, QR Coded entry etc. as applicable. Integration with the upcoming smart card and smart payment system of Bhopal will be required.
- To manage and collect revenue as per tariff fixed by BSCDCL for all the parking lots defined in this RFP as mentioned in section 6 of vol-1 RFP.
- Using the data generated through the parking solution software for analytics purposes, such as time based (hourly/ daily/ weekly/ monthly/ annually) trends, area specific trends, vehicle



(car – SUV/sedan/hatchback, scooter, etc.) specific trends, usage and vacancy periods, premium parking demand etc. for the purpose of better management of parking.

- The solution must integrate with e-Vahan/ National Vehicle Registration Database along with any other stolen vehicle database proposed in the future.
- The Smart card that will be implemented through a separate process will also be integrated with the smart parking solution for various payment in city including Parking fee Payments.
- The selected concessionaire (parking Vendor) need to enable the acceptance of Payments through Bhopal Plus App through necessary integration. JSON/RESTFUL API formats will be provided by BSCDCL to concessionaire for integration of services for monthly pass booking and payment services etc.
- Integration with Asset Management system to keep a track and maintain identity of all assets used in this project.
- Shall undertake minor civil repair works, cabling works and road marking works, if required, in the parking lots as per BSCDCL requirement from time to time.
- Provide concessions to the Students, senior citizens and any other at the discretion of the authority for the usage of the facility. The concession would be provided on the monthly passes' charges. The revenue loss due to concessionaire from pass concession activity would be sufficed from the deduction from the overall revenue to be shared with BSCDCL.

### **Advertisement Board**

- Install the advertisement boards at the facilities. The preferred locations for installing the advertisement boards inside and outside (façade) the facility can be chosen by the concessionaire.
- Collect revenue for the advertisement spaces from the facilities. Concessionaire is free to subcontract the advertisement spaces for the concession period. However, sole ownership of the advertisement boards would rely with BSCDCL for the and above the concession period.
- Authority i.e. BSCDCL can instruct the agency to either install or erect the existing advertisement boards during the concession period in the interest of the project.
- The Concessionaire and its sub-contractor for Advertisement Spaces is free to innovate in the advertisement spaces including but not limited to dynamic advertisement boards in the interest of the project. However, all the expenses for the capital expenditure, operations and management must be borne by the bidder, if required.
- The Concessionaire would share the quarterly and yearly revenue report, agreements and other related documents with BSCDCL.

**NOTE:** List of parking facility and details is attached in **Annexure-1**.

## **2.2. Key Components of a Smart Parking,**

- Parking Managements System : Off Street Parking ( MLCP Facility)
  - Entry Stations - Automated ticketing system
  - Exit parking systems
  - Auto pay stations/ Central Pay stations
- Parking Guidance System
  - Off Street Parking ( Open & Covered parking lots) -facility guidance systems

- Web Portal and Mobile app for consumers
  - Parking Identification, Pre booking, payment and navigation
- Control and command center
  - Integration with Bhopal Integrated Command and Control Center system
  - Data management, analytics and Business Intelligence on real time basis
  - Monitoring of real time transactions, parking availability, pre booking, season parking and parking enforcement
  - Management of Equipment status and alarms on real time basis
  - Dash boards and reports

**NOTE:** Detailed Functional and Technical Specifications are provided in **Section 3.4 and 3.5** of this RFP.

### **2.3. Project Engagement Model**

The Engagement model is bifurcated into following two stages-

- Implementation Stage
- Operation and Maintenance Stage

#### **Implementation Stage:**

- Implementation of smart parking solution in Phases.
  - Within six months from the date of handing over of all parking facility, complete smart parking solution is to be implemented and operationalize as per scope defined in this RFP document.
  - During implementation phase of 6 months, the revenue generated until go-live of the project would be collected by BSCDCL and concessionaire would seek no revenue during this period.

#### **Operation and Maintenance Stage:**

- Total Concession period is five (05) years from the date of Go-Live of all parking lots as per the signed concessionaire agreement.
- The Concessionaire will start operation and maintenance of all parking lots from the date of Go Live of parking lots by BSCDCL to the concessionaire.

The Concessionaire shall operate, maintain and manage the complete parking solution as designed and built under this RFP document, throughout the concession period in accordance with this RFP document.

The Business model as follows:

1. Parking charges are to be collected by the concessionaire by using payment device based mechanism from the date of handing over of the parking lots by BSCDCL to the concessionaire on as and where basis.
2. Advertisement Charges are to be collected by the concessionaire and share the details like the signed agreement, agreed paid value by the subcontractor/owner with BSCDCL.

3. The concessionaire shall quote Fixed Yearly Concession Fee payable to BSCDCL as per commercial Format given in volume I. The concessionaire has to quote Fixed Yearly Concession Fee higher than Minimum Yearly Guaranteed Concession to be H1 bidder. This payment could either be month on month basis or quarterly basis based as per the instructions released by BSCDCL.

## **2.4. Operation and Maintenance (O&M) Guidelines**

The concessionaire shall follow the following Operation and Maintenance guidelines:

- The concessionaire has to adhere to the operation and maintenance policies and procedures, to be defined in SOPs to be developed by Concessionaire within 3 month from engagement in consultation with BSCDCL, BMC and Consultant of BSCDCL, for managing and operating the Project. This includes (but not limited to) approach related to manpower, resources, vendor management, security, customer service, repair and maintenance and other primary functions, user manuals, technical manuals, financial management, risk management, life/safety management, employee management and administrative policies and procedures. It also includes the key elements of a management plan for this project to include considerations for customer service improvement, enhanced economic impact generation which is the key to this project operation.
- Concessionaire will be responsible to deploy on-field resources for appropriate up-keeping, maintenance, and operation of all equipment, hardware, and software components, and ensure smooth functioning of the project throughout the entire concession period of Five (05) years. The Bidder has to manage all the three MLCP facilities and collect revenue.
- The comprehensive Operations and Maintenance (O&M) period for all sensors, devices, equipment and its related hardware, software, electrical and network infrastructure components supplied and installed for this project including configuration of servers, desktops, routers, switches, firewall, LED signage, parking sensors and various other active and passive components along with repair, replacement of parts, sensors, providing spare parts, updating, security alerts and patch updating, regular backup of the data etc. shall be upto a period of Five years from the date of handing over of all agreed Parking lots to the concessionaire. The concessionaire shall provide comprehensive on-site warranty for all the hardware items and peripherals throughout the concession period.
- The concessionaire shall depute adequate manpower as full time dedicated onsite team. The team shall be deputed to identify, acknowledge, troubleshoot, manage, replace and repair the hardware/ system software. The team shall undertake day-to-day troubleshooting and maintenance requirements for this project.
- The team shall be also be responsible for regular monitoring of all the equipment, proactively perform warranty checks, and generate Service Level Agreement reports from the SLA monitoring tool.
- The team shall be required to take regular backup of the application data as per the frequency defined by BSCDCL. Security and safety arrangements for safe custody of the backup data shall also be the responsibility of concessionaire.
- The concessionaire shall ensure that the team has appropriate skill-sets for managing networking, hardware and application software tools.
- All patches and updates to any software and hardware devices shall be provided by the Bidder without any additional costs throughout the tenure of the Concession Agreement.
- Periodic Revenue audit & Quality Audits to be performed every quarter by BSCDCL team.

- There has to be Functional and Behavioral Training to be provided to the staff once a year by the concessionaire and relevant report to be submitted to the authorities of BSCDCL. These reports will be part of the quality audit reports.
- Insurance coverage for the Parking facility for each parking facility covering the damage or theft of the vehicle and injury to a personnel in the parking facility. Any claim related to damage or theft of the vehicle and injury to a personnel in the parking facility are responsibility of the concessionaire.
- Relevant number of fire extinguishing equipment has to be installed and necessary clearance to be taken by Concessionaire.
- All statutory compliances like Labor License, Professional Tax registration, Coverage of all applicable employees under ESI and PF act to be taken care by the concessionaire.
- General maintenance, upkeep and cleanliness of the parking lots is the responsibility of Concessionaire.
- Concessionaire has to replace the hardware, software or manpower in case of fault, Malfunction etc. within the concession period.

## 2.5. Team Composition & Qualification Requirements for the Key Personnel

The Bidder shall deploy a multi-disciplinary Project Team for this assignment, consisting of the following key personnel:

S.No	Profile	Minimum Number of deployment	Basic Qualification Criteria	Min. Experience Required
1	Project manager	01	As mentioned in Volume 1	As mentioned in Volume 1
2	Smart parking Expert	01	As mentioned in Volume 1	As mentioned in Volume 1
3	IT Infrastructure Expert	01	As mentioned in Volume 1	As mentioned in Volume 1
4	Parking Attendants	As mentioned in BoQ (one shift of 8 hour)	SSC/10 <sup>th</sup> Pass	Overall industry experience of 6 months to 1 Year
5	Security Guards	As mentioned in BoQ (one shift of 8 hour)	7 <sup>th</sup> Standard Pass	Overall industry experience of 1-2 Years

**NOTE:** Bidder is required to submit profiles of key resources as defined in technical evaluation criteria of this RFP.

## 2.6. Milestone, Deliverables, and Time Duration

During project the bidder shall submit the deliverables as mentioned below as per the timelines mentioned below.

S. No.	Project Implementation Milestones	Timelines	Deliverables
1.	M1	T+1 Months	<ol style="list-style-type: none"> <li>1. Project Plan</li> <li>2. Risk Management &amp; Mitigation Plan</li> <li>3. Site survey Report</li> </ol>
2.	M2	T+2 Months	<ol style="list-style-type: none"> <li>1. System Requirement Specification Document</li> <li>2. Function Requirement Specification Documents</li> <li>3. Requirement Traceability Matrix</li> </ol>
3.	M3	T+4 Months	<ol style="list-style-type: none"> <li>1. Final BoQ</li> <li>2. HLD Documents</li> <li>3. LLD Documents</li> <li>4. Application Architecture Documents</li> <li>5. Network Architecture Documents</li> <li>6. GUI Designs</li> <li>7. SOP documents</li> <li>8. Change Management Plan</li> <li>9. Logical and Physical Database Design</li> <li>10. Data Dictionary and data definitions</li> <li>11. IT and Non IT Installation and commissioning Report</li> <li>12. Test Cases and Plans</li> </ol>
4.	M4		
5.	M5		
6.	M6	T <sub>1</sub> =T+6 Months	<ol style="list-style-type: none"> <li>1. UAT Report</li> <li>2. Application Deployment and Configuration Report</li> <li>3. Integration Testing Report</li> <li>4. Go-Live Report</li> </ol>

**T is effective date of contract i.e. Commencement of Work**

**T<sub>1</sub> is Date of Handover of Parking Lot**

## 2.7. Responsibilities of BSCDCL and Concessionaire

### **BSCDCL**

- BSCDCL will provide permission in writing, for electric supply provision, civil works , flooring of the parking facilities, toilet facilities.
- Minimum space required for installation of Gateway, Switches, Routers, Cameras, LED/LCD displays etc. for smart parking services will be provided free of cost by BSCDCL.
- BSCDCL will provide support for integration with ICCC.
- At the end of the concession period, all rights given to the Concessionaire, shall be terminated automatically.
- BSCDCL shall provide single window clearance, where BSCDCL has full control and jurisdiction, to the Concessionaire for the purpose of this RFP document.

- BSCDCL shall undertake major civil repair works, resurfacing and marking works, if required, in the parking lots as requested by the concessionaire and approved by BSCDCL from time to time.

### **Concessionaire**

- Design, develop, provide, install, manage, operate and maintain the smart parking system as defined under BoQ section as mentioned in Annexure I of this volume, as per the Service Level Agreement (SLA) throughout the concession period. Penalty will be imposed as per SLA in the Penalty Clause of this RFP document for non-adherence of the terms and conditions of the RFP.
- Operate, maintain and manage all hardware, software and services covered in this RFP document throughout the concession period.
- The Concessionaire will be responsible for all civil and installation work related to network connectivity, power supply extensions to devices, installation of devices and equipment, and any other networking, communication, and infrastructure requirements related to any work under this RFP document.
- Watch and ward of the assets/ services created in this project. The Concessionaire has to replace the material(s) / equipment(s) /device(s) in case of any theft or loss due to any other reasons, which affects the services/ assets under this project.
- Erect suitable steel structures at its own cost for installation of LED signage for parking guidance and management system. These structures/ poles shall be of stainless steel, and aesthetically designed and structurally stable and as per BSCDCL specifications. The concessionaire shall also indemnify BSCDCL for any damage due to such structures.
- BSCDCL will be the owner of all dismantled existing equipment from the parking facility and all such equipment shall be handed over to BSCDCL/BMC, not later than a fortnight from date of such dismantling along with the detailed report of the dismantled equipment's under the presence of the BSCDCL representative.
- Mark all the boundaries of each parking slot in the MLCP facilities under this RFP document
- Provide adequate battery bank to ensure uninterrupted power supply to all hardware (equipment, devices, etc.) covered under this RFP document.
- Make sure that lift is in good working condition and operational for 24X7. Concessionaire has to make sure that the lift should not stop working for more than 7 days at maximum and get it repaired. At the end of the concession period, the lift should be handed over to authority in the working condition in good shape.
- All physical assets created under this RFP as per Bill of Materials (BoM), will become the property of BSCDCL at the end of Concession period or at termination of the concession, whichever is earlier, and the Concessionaire will not have any legal right on these assets.
- At the end of the concession period of Five (05) years of O&M, the Concessionaire has to hand over all physical assets belonging to BSCDCL in proper working condition. In case of any deficiency noticed at the time of such handing over, the Concessionaire has to get it rectified at his own cost within 15 days of such handing-over, otherwise, BSCDCL will get it rectified at the risk and cost of the Concessionaire. Performance guarantee of Concessionaire will be released only after successful handing over of the all physical assets in working condition to BSCDCL.
- Any damage to other services arising due to installation or execution or repair or maintenance work by the Concessionaire, shall have to be made good by the Concessionaire within 72 hours

of such damage, failing which BSCDCL will issue a notice to concessionaire asking for justification. Concessionaire will be required to respond to such notice within 3 working days. In case it is found out that the current issue at hand is out of control of Concessionaire then problem will be solved jointly by BSCDCL and Concessionaire based on their agreement. Else, Concessionaire will be required to do the needful within 72 hours of the decision made by BSCDCL.

- The location of Parking facility and area given under this RFP document is based on preliminary survey. Area may change while preparing detailed design and execution of this project. During the Concession period, new parking lot(s) (for On-Street, Off-Street or MLCP Facility) may be added by BSCDCL and the Concessionaire has to cover such lot(s) under the scope of this project with the agreed Parking Tariff.
- For any complaint registration by users, provisions shall be made by the concessionaire in Citizen App and web portal. Dedicated WhatsApp number/ Help line number shall be provided to citizens for any complaints/suggestions/feedback with regards to parking. The same shall be monitored by the concessionaire and adequate responses shall be delivered to citizens within 48 hours. The concessionaire shall provide a weekly report to the Chief Executive Officer, BSCDCL every Fortnightly on the number of complaints received during the previous 2 weeks (Monday to Sunday) and the number of replies furnished by it to the complainants along with number of complaints on which no response has been made by the concessionaire.
- Provide concessions to the Students, Senior Citizens and others at the discretion of BSCDCL for the usage of the facility. The concession would be provided on the monthly passes' charges. The revenue loss due to concessionaire from pass concession activity would be sufficed from the deduction from the overall Fixed Yearly Concession Fee to be shared with BSCDCL.
- The concessionaire shall honour the 'Parking Passes/Stickers' issued by BSCDCL and other Government Duty Vehicles of BMC/BSCDCL and will not charge any parking fees from the user of such vehicles. Such non-charging of parking fees by the concessionaire shall have no interference on concession fees to be paid by the concessionaire to the BSCDCL, and the concessionaire cannot make any claim on the account of non-charging of parking fees from such vehicles. Such 'Parking Passes/Stickers' shall be valid on calendar year basis, and maximum number of such passes/stickers issued by BSCDCL should not exceed 50 numbers every year. BSCDCL shall provide the database of passes/stickers (Vehicle Number, pass/sticker No., Type of Vehicle – Car, Scooter, Motorcycle etc.) issued by it to the concessionaire in the software provided by the concessionaire for this purpose on real-time basis.
- The Concessionaire shall take metered electricity for parking sensors, gateway, router/switches, LED signage / displays, Parking guidance system and all systems for underground/over ground parking equipment etc. and for all equipment installed in Central Control Centre.
- The Concessionaire shall integrate the parking mobile app and the web portal with the BSCDCL App, and with the BSCDCL Integrated Command & Control Center, as and when such Command and Control Centre will be set-up by the BSCDCL by itself or through any other concessionaire.
- At the time of completion of implementation period (i.e. six months from the date of handover of the parking lots to the concessionaire by BSCDCL), the Concessionaire shall inform the

BSCDCL in writing for the same along with a list of all the assets (details of equipment, software, services etc.) deployed during the implementation period under this RFP document, including their costs. The Concessionaire shall update such assets list on yearly basis throughout the concession period.

- Ensure that all the vehicles will be parked in the space defined for each vehicle in the parking lot. The parking attendant will ensure proper parking of vehicles in each slot.
- The concessionaire shall be responsible for any theft/ damage/ loss of vehicles parked in parking lots and shall be responsible for settlement of the dispute, if any, including under the Court of Law, and also follow all instructions and guidelines issued by Bhopal Police / statutory rules & regulations / BSCDCL for prevention of misuse of parking lots, including usage by anti-social elements, terrorist(s) etc.
- Undertake all measures for Cyber security, protection of information and communication technology systems of this project from cyber-attacks that are purposeful attempts by unauthorized persons to access ICT systems in order to achieve the target of theft, disturbance, damage, or other illegal actions. The Concessionaire will detect, analysis and do mitigation of vulnerabilities and protect Central Control Centre including Data Centre from cyber-attacks throughout the concession period.
- Propose additional measures to increase occupancy of parking lots. However, the Concessionaire will be required to take approval from BSCDCL before implementation of any measures to improve the parking efficiency.
- Ensure at all times that the parking lots are utilized by cars, cabs, two- wheelers, and other small vehicles, but no heavy or medium commercial vehicles are parked in specified parking lots unless the parking slot / lot is dedicated to buses.
- The Concessionaire will provide necessary support, data and other required information for integration of smart parking solution with Integrated Command and Control Centre of BSCDCL, as and when such Command and Control Centre will be set-up by BSCDCL by itself or through any other concessionaire in future.
- Responsible for and provide security at the parking lots, and shall report crimes in parking lots to Bhopal Police and BSCDCL without fail.

## **2.8. Proposed Parking Lots for concessionaire**

Bhopal Smart City Development Corporation Limited (BSCDCL) presently owns three MLCP facilities which was constructed and handed over by Bhopal Municipal Corporation. Presently, all three MLCPs are operational in nature and BSCDCL takes cares of its operations through employed manpower via manual intervention.





Details of the MLCPs are given below:

Name of parking lot	Address	Floors	ECS for 4W	ECS for 2W	Type
MP Nagar MLCP	MP Nagar Zone 1	5	800	500	MLCP
New Market MLCP	Near Rangmahal Talkies, New Market	5	775	700	MLCP
Bairagarh MLCP	Near Sant Hirdaram Market, Bairagarh	5	400	450	MLCP

All the parking facilities are presently in operational phases with conventional ticketing technique. The ramps and lift infrastructure is in place and operation condition. The photographs of the MLCP facilities are attached below for reference purposes. Bidders are advised to visit site and conduct required assessment and survey for the preparation of the bid response.

### ***MP Nagar MLCP Facility***



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***New Market (TT Nagar) MLCP Facility***





***Bairagarh MLCP Facility at Sant Hirdaram Nagar***



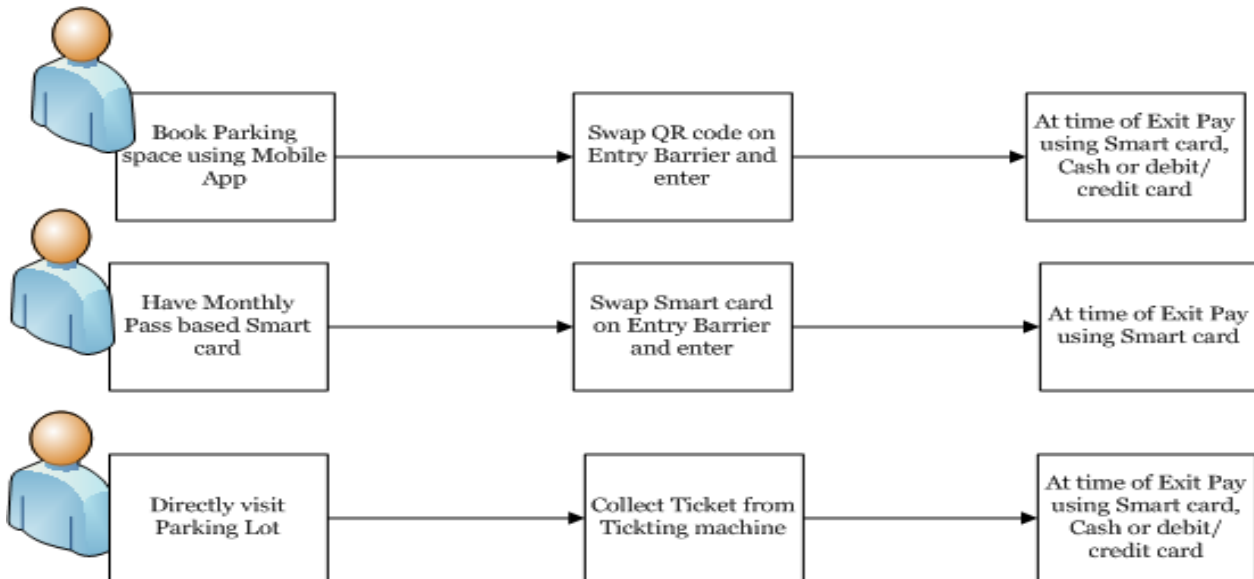
Selection of Concessionaire for Design, Development, Implementation, Operation and Maintenance of Smart Parking Solution for three Multilevel Parking Sites for Bhopal Smart City on PPP Model

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All Parking lots will have facility for parking of 2 wheeler and 4 wheelers. However, ability to book parking slots in advance using mobile App or Portal would be allowed only for 4-wheeled vehicles only.

The user will be able to use the parking facility in three ways:



## 2.9. Integrations

- The centralized smart parking solution will be integrated with the Integrated Command and Control Center (ICCC) and provide real-time statistics and data along with control to the operators and other stakeholders in the ICCC.
- [Integration with City Mobile Application i.e. Bhopal Plus has to be integrated with the proposed solution. This integration should be API based whereas two way communication with Bhopal Plus application shall be provided to book the ticket, payment, and analysis.](#)
- The Smart Parking solution needs dedicated Wi-Fi connectivity as enabler for communication layer for all data communication from Sensors to parking servers.
- The solution must integrate with e-Vahan/ National Vehicle Registration Database along with any other stolen vehicle database proposed in the future. Support for integration with e-Vahan would be provided by BSCDCL.
- The upcoming Smart card and smart solution that will be implemented through separate tender will also be integrated with the smart parking solution.
- The parking solution also needs to be integrated with City Mobile apps for allowing online slot reservations and payments.
- Integration with Asset Management system to keep a track and maintain identity of all assets used in this project.



## 2.10. Proposed To-Be Intervention

The smart parking system informs, directs, guides and assists the users with the parking space availability while reducing the time and effort spent to find a parking place.

Smart Parking system is a parking guidance and payment system that helps drivers make smart decisions in order to reduce congestion, make the most of available spaces, and increase the profitability of parking facilities. This system assists motorists in finding available parking in multiple parking zones— allowing them to decide where they will park long before they reach critical intersections. In addition to guiding the motorist to these open bays, Smart Parking achieves the goal with minimum effort in the shortest time possible.


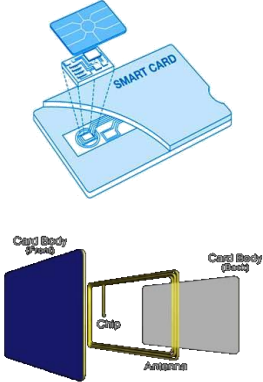
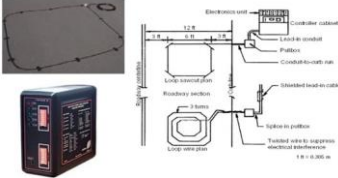

The Smart Parking System will includes the following five basic elements:

- **Parking facility monitoring subsystem:** Monitors the ingress and egress of vehicles at the parking facilities.
- **Parking information signs:** Provides parking facility occupancy and directional information to drivers at decision points
- **Communications subsystem including vehicle detectors:** Facilitates communication between the central computer, vehicle detector system, and the parking information signs.
- **Central computer system:** Calculates lot occupancies from vehicle detectors, commands signs to show required message and allows operator intervention.
- **External interfaces:** Facilitates communication between the central computer and external systems.






Component	Component Name	Description
	<ul style="list-style-type: none"> <li>• Entry/Exit barrier with loop detection For Parking And Vehicle Access Remote Control</li> </ul>	<ul style="list-style-type: none"> <li>• Generally Installed at Entry / Exit barriers, these are unmanned station which allows entry / exit based upon the information logged in scanner installed nearby</li> </ul>
	<ul style="list-style-type: none"> <li>• Handheld Ticket Dispenser</li> </ul>	<ul style="list-style-type: none"> <li>• A hand-held device to dispense ticket to incoming users along-with other necessary details</li> </ul>







Selection of Concessionaire for Design, Development, Implementation, Operation and Maintenance of Smart Parking Solution for three Multilevel Parking Sites for Bhopal Smart City on PPP Model

	<ul style="list-style-type: none"> <li>• Automatic Ticket Dispenser</li> </ul>	<ul style="list-style-type: none"> <li>• A Do-It-Yourself machine which enables users to print ticket themselves as per their convenience</li> </ul>
	<ul style="list-style-type: none"> <li>• Smart Cards &amp; Readers</li> </ul>	<ul style="list-style-type: none"> <li>• The SMART cards are cards that can be loaded and reloaded with money</li> <li>• It includes an embedded integrated circuit (IC) chip that can be either a microcontroller with internal memory or a memory chip alone</li> <li>• The card connects to a reader with direct physical contact (i.e. a contact smart card) or through a remote contactless electromagnetic interface (i.e. contactless smart card)</li> </ul>
	<ul style="list-style-type: none"> <li>• Inductive Loop Detector</li> </ul>	<ul style="list-style-type: none"> <li>• Physical Loops installed to capture the count of vehicles crossing over a designated line / area</li> </ul>
	<ul style="list-style-type: none"> <li>• Variable Messaging Displays</li> </ul>	<ul style="list-style-type: none"> <li>• To be installed outside Parking Lot in visible Public Areas displaying Real Time Availability in one or more Parking Lots</li> </ul>

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	<ul style="list-style-type: none"> <li>• CCTV Camera</li> </ul>	<ul style="list-style-type: none"> <li>• Use of Camera and relevant Video Software to capture designated area of Parking virtually</li> </ul>																
	<ul style="list-style-type: none"> <li>• Car wheel lock</li> </ul>	<ul style="list-style-type: none"> <li>• Enforcement Device for users who haven't paid the dues or parked in non-designated Area</li> </ul>																
	<ul style="list-style-type: none"> <li>• Payment Kiosk</li> </ul>	<ul style="list-style-type: none"> <li>• A Do-It-Yourself machine which enables users to pay for parking usage by themselves through cash or card as per their convenience</li> </ul>																
 <table border="1" data-bbox="179 986 313 1173"> <thead> <tr> <th>Level</th> <th>Available Spaces</th> </tr> </thead> <tbody> <tr> <td>LEVEL 6</td> <td>279</td> </tr> <tr> <td>LEVEL 5</td> <td>320</td> </tr> <tr> <td>LEVEL 4</td> <td>437</td> </tr> <tr> <td>LEVEL 3</td> <td>FULL</td> </tr> <tr> <td>LEVEL 2</td> <td>257</td> </tr> <tr> <td>LEVEL 1</td> <td>199</td> </tr> <tr> <td>GROUND</td> <td></td> </tr> </tbody> </table>	Level	Available Spaces	LEVEL 6	279	LEVEL 5	320	LEVEL 4	437	LEVEL 3	FULL	LEVEL 2	257	LEVEL 1	199	GROUND		<ul style="list-style-type: none"> <li>• Parking Management and Guidance Solution</li> </ul>	<ul style="list-style-type: none"> <li>• To Guide the vehicle owner about the parking slots availability etc</li> </ul>
Level	Available Spaces																	
LEVEL 6	279																	
LEVEL 5	320																	
LEVEL 4	437																	
LEVEL 3	FULL																	
LEVEL 2	257																	
LEVEL 1	199																	
GROUND																		
	<ul style="list-style-type: none"> <li>• Controller</li> </ul>	<ul style="list-style-type: none"> <li>• High Performance TCP/IP intelligent vehicle counting system Controller with display to indicate available parking slots &amp; other accessories, Capable of connecting with multiple displays, loop sensors, Enclosed in Tamper</li> </ul>																

Selection of Concessionaire for Design, Development, Implementation, Operation and Maintenance of Smart Parking Solution for three Multilevel Parking Sites for Bhopal Smart City on PPP Model

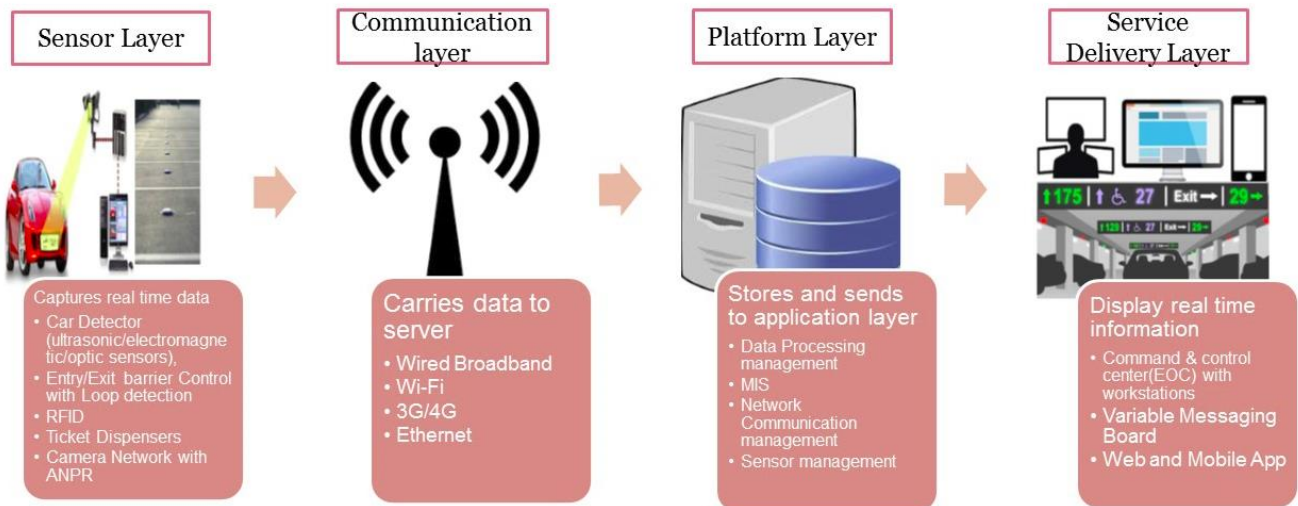
	<ul style="list-style-type: none"> <li>• Ticket Validator</li> </ul>	<ul style="list-style-type: none"> <li>• To allow users to validate their paper tickets or QR code/bar code generated from mobile app and gain access to the exit boom barrier for an hassle free exit</li> </ul>
	<ul style="list-style-type: none"> <li>• Mobile App</li> </ul>	<ul style="list-style-type: none"> <li>• To provide users with information like the Availability of Parking Spaces, Near most Parking Lot Available or any relevant information pertaining to Parking Management</li> </ul>
	<ul style="list-style-type: none"> <li>• Emergency Call Box</li> </ul>	<ul style="list-style-type: none"> <li>• It's an electronic device that is used to alert and call someone in emergency situation</li> </ul>
	<ul style="list-style-type: none"> <li>• Wireless Gateway/ Root AP</li> </ul>	<ul style="list-style-type: none"> <li>• It is required for dedicated connectivity across all parking lots.</li> </ul>

Selection of Concessionaire for Design, Development, Implementation, Operation and Maintenance of Smart Parking Solution for three Multilevel Parking Sites for Bhopal Smart City on PPP Model

Name of parking lot	Floors	EC S	Entry & Exit Barrier Control with Loop detection for 4 Wheelers	Entry & Exit Barrier Control with Loop detection for 2 Wheelers	Parking Ticketing Machine	Handheld Parking Ticketing Machine	CCTV Camera	Parking sensors	variable messaging displays	Display & Guidance System	Controllers	Electric Vehicle Charging point	Emergency call box	Ticket Validator	Car Wheel Lock	Payment Kiosk	UPS 1KV A online Backup
MP Nagar MLCP	XX	XX	✓	✓	✓	✓	✓	x	✓	✓	✓	✓	✓	✓	✓	✓	✓
Bairagarh MLCP	XX	XX	✓	✓	✓	✓	✓	x	✓	✓	✓	✓	✓	✓	✓	✓	✓
New Market MLCP	XX	XX	✓	✓	✓	✓	✓	x	✓	✓	✓	✓	✓	✓	✓	✓	✓

## 3. Functional and Technical Requirements

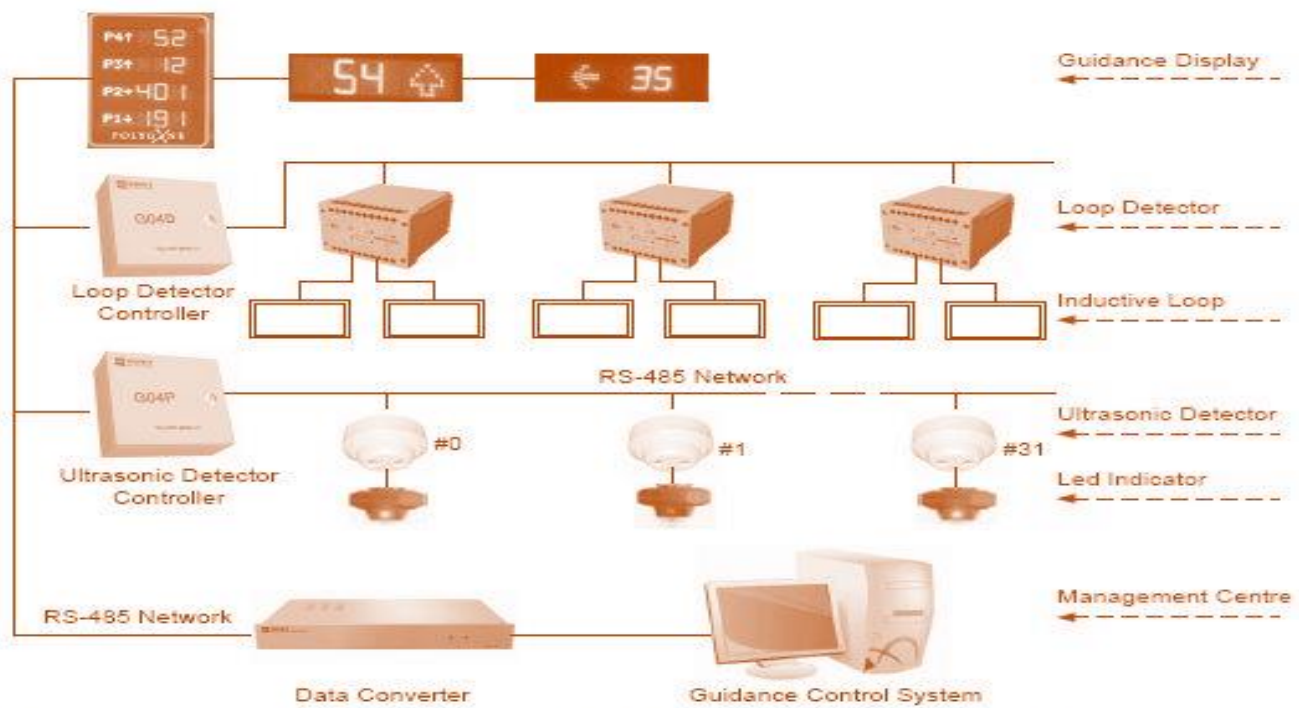
### 3.1. Solution Architecture



**Sensor Layer:** All edge devices including ticket dispensers are part of this layer. It is the layer that directly interfaces with the end-user. It is in this layer that physical counting of vehicles through touchpoints would happen. The sensors used serve as the backbone for the entire Parking Management System. These Geo-magnetic/Infrared/Ultrasonic sensors and devices send real time update and parking availability to the Parking Command Centre or the Parking Management Software which manages the Parking data for the entire city. The availability is then communicated to the citizens and platforms which are looking for parking information. This data can be used to enable payment systems, manage enforcement and maximize capacity of space. The Sensor Layer shall also enable payments through Smart Cards, and allow the use of handheld by on-ground personnel to collect parking charges from users.

Smart parking systems can be implemented using variety of technical solutions and some of the commonly used techniques are as following:

- Vehicle detection at entry and exit by use of inductive loops and parking slot detection via photo sensors.
- Vehicle detection at entry and exit by camera based detection and parking slot detection via ultrasonic/infrared/magnetic sensors.
- Vehicle detection at entry and exit by use of RFID tags and parking slot detection via ultrasonic/infrared/magnetic sensors
- A combination of any of the aforementioned



It shall collect and display real-time information on parking availability for drivers, utilize detection mechanism to count the vehicles as they enter and leave parking lots, display real-time information to drivers via variable display signs(VDS) located at the ‘Decision Points’ and mobile applications and this real-time information can be based on:

- Inductive loop
  - Ultrasonic/Magnetic detector
1. **Communication Layer:** All the edge devices, data center devices and service delivery devices would interact with each other through this layer.
  2. **Smart Parking Platform:** All the management servers and data processing servers are part of this layer. The entire logic of the smart parking solution shall reside on this layer. The Parking Command Centre or the Parking Management System is a powerful tool which interacts with all the sensors deployed for the Smart Parking project. The system collates data from the sensors and the mobile app and directs the citizens to the nearest available parking slots. Alerts related to asset theft and asset maintenance are also an important feature of the system software. The control and monitoring software collects all the information generated by the sensors and allows parking operators to make adjustments remotely. Furthermore, it stores historic data of the use of the parking facility to ease decision-making and predict future trends.
  3. **EOC:** This is the administrator layer. Various agencies shall use shall use workstations and other mobile devices to monitor these parking. Data such as Occupancy Rate, Peak Occupancy, Daily, Weekly and Monthly collections, etc. must be made available through MIS reports.
  4. **Service Delivery Layer:** The end-user shall be able to book parking spaces through web-based portal as well as through a mobile app. The mobile app will allow citizens to check availability of parking slots on their smartphones before setting out. The driver gets full details of the parking options available including prices, out of hour’s times and restrictions if any. The citizens can then choose the parking slots which are best suited to their requirements. The mobile app will also have the functionality to guide the drivers to the best available spaces with clear directions.

### 3.2. Key Design Considerations

The following technical architecture has been designed taking into consideration some of the following aspects as guiding principles:

1. **Scalability** - Important technical components of the architecture must support scalability to provide continuous growth to meet the growing demand of the city traffic. The system should also support vertical and horizontal scalability so that depending on changing requirements from time to time, the system may be scaled upwards. There must not be any system imposed restrictions on the upward scalability in number of field devices. Main technological components requiring scalability are Storage, Bandwidth, Computing Performance (IT Infrastructure), and Software / Application performance.
2. **Availability** - Components of the architecture must provide redundancy and ensure that there are no single points of failure in the key project components. Considering the high sensitivity of the system, design should be in such a way as to be resilient to technological sabotage. To take care of remote failure, the systems need to be configured to mask and recover with minimum outage. The bidder shall make the provision for high availability for all the services of the system.
3. **Security** - The architecture must adopt an end-to-end security model that protects data and the infrastructure from malicious attacks, theft, natural disasters etc. Successful bidder must make provisions for security of field equipment as well as protection of the software system from hackers and other threats. Using Firewalls and Intrusion detection systems such attacks and theft should be controlled and well supported (and implemented) with the security policy. The virus and worms attacks should be well defended with Gateway level Anti-virus system, along with workstation level Anti-virus mechanism. There will also be an endeavor to make use of the SSL/VPN technologies to have secured communication between Applications and its end users. Furthermore, all the system logs would be properly stored & archived for future analysis and forensics whenever desired. RMC may carry out the Security Audit of the entire system in approx. 3 months of Acceptance / operationalization through a Third Party Auditor (TPA). The following guidelines need to be observed for security:
  - Build a complete audit trail of all activities and operations using log reports, so that errors in system – intentional or otherwise – can be traced and corrected.
  - The most appropriate level of security commensurate with the value to that function for which it is deployed must be chosen.
  - Access Controls must be provided to ensure that the system is not tampered or modified by the system operators.
  - Implement data security to allow for changes in technology and business needs.
4. **Manageability** - Ease of configuration, ongoing health monitoring, and failure detection are vital to the goals of scalability, availability, and security and be able to match the growth of the environment.
5. **Interoperability** - The system is designed to take inputs from other third party systems as per situational requirements.
6. **Open Standards** - System is designed to use open standards and protocols to the extent possible without compromising on the security.

### 3.3. Network Architecture

The network architecture is divided into 2 parts.

1. The network at the parking facility which is the backhaul that will be provided by the service provider to the implementation agency
2. Consists of a last mile network that is needed to connect the edge devices with the backhaul network and will be required to be built to ensure converged communication.

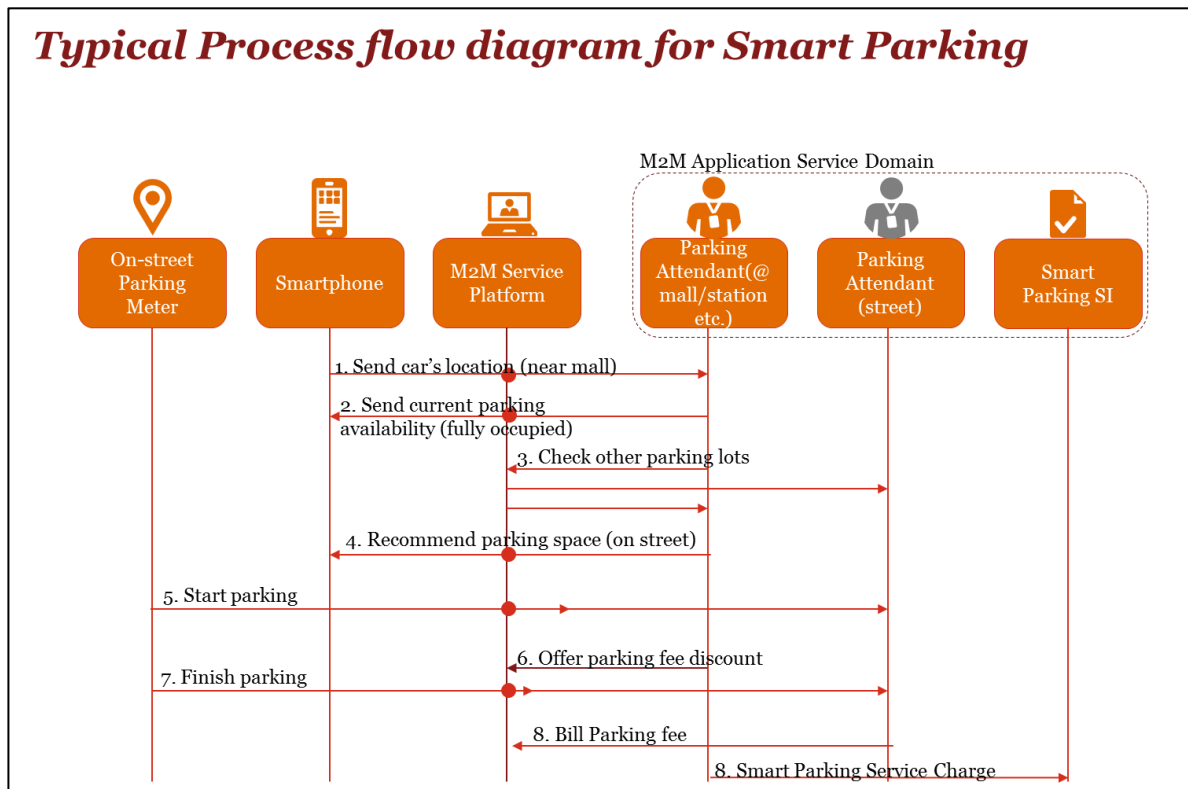
For meeting the objectives of the Smart parking project, connectivity for all edge equipment, access/aggregation points, storage and Data Centre will rely on the bandwidth services to be provided by the Network Service Provider. Initially, it has been envisaged to operate on shared network bandwidth services of Network Service Provider. Further, the connectivity of edge equipment's with the Data Centre would be migrated and served by optical fibre which would be laid by BSCDCL in their future smart solutions projects.

The Data Centre infrastructure for Smart Parking facility would be required to be constructed at one of the MLCP facility. However, bidder is free to create one data centre at any one of the facility using innovative technology. This data centre would further be integrated with Data Center (DC) of Integrated Command & Control Center (ICCC). The connectivity between MLCP DCs and ICCDC DC will be dedicated dark optical fibre and provided by the BSCDCL or its designated agencies. The dark fibre backbone for network connectivity will be provided/available within 200meter radii of the MLCP facilities. Concessionaire has to arrange for the last mile connectivity from the dark fibre to the MLCP facility. The Network will have to be scalable, resilient, secure, and intelligent.

The proposed network will be a MPLS backbone of the network service provider depending on the feasibility & commercial viability at every region. However, any options that are suggested will be built on the above mentioned blocks.



### 3.4. Functional Requirement Specification



The smart parking solution is envisaged for MLCP Parking Facility. These parking facilities are managed by BSCDCL through hired manpower manual operations. The parking facility is well constructed multi- floor building constructed by BMC and handed over to BSCDCL for operations and maintenance.

#### 1. Identifying vehicles at Entry/Exit

- a. The smart parking solution should be able to count the number of vehicles entering and exiting any parking structure.
- b. The smart parking solution may use video camera based analytics or other loop based sensor solutions to determine number of vehicles entering and exiting parking lots. The smart parking solution should do so at each floor of multilevel parking and communicate the data.
- c. The smart parking solution must geo-reference all the parking lots.

#### 2. Visibility of vacant parking spaces and Fare Revision

- a. The total number of slots and free slots for parking must be displayed on a digital signboard near the entrance of the parking facility
- b. The smart parking solution should report occupancy of parking facility to a central software application deployed at the Integrated Command and Control Center.
- c. The smart parking solution should enable BMC/BSCDCL to obtain real time situational awareness about the occupancy of parking lot through smart dashboard.

- d. The smart parking solution should enable citizens to obtain real time space availability and slot reservation capability via mobile app or web client.
- e. The smart parking solution should facilitate real time revision of parking fees and should enable real time communication of rules to handheld terminal, parking kiosks and smart card readers.

### 3. Ticketing

- a. The smart parking solution should enable BMC/BSCDCL or any other appointed third party to facilitate generation of parking receipts and tickets based on occupancy of parking lots.
- b. The smart parking solution needs to have parking ticket vending machine at the entrance where the ticket can be issued by the machine on pressing the button by the user/ operator. Further, the solution will have provision for a handheld device through which parking receipts can be generated on payment of fees through card or cash.
- c. The ticket, QR Code and Smart Parking Card or any other technology used by the concessionaire should be capable of capturing data that is easily retrievable at the exit.
- d. Should include the provisions for the following types of parking reservations:

**Walk-In Parking:** This category of parking will include the citizens who drive in to the parking without any prior booking. The citizens can be provided with a QR coded ticket or any other advanced technology as deemed fit by the Concessionaire.

**Online Reservation of Parking spots:** The citizens should be able to reserve parking spots through online web application or the Citizen Mobile app. The pre-booking would be retained for a specific period of time and reassigned in case of no show. The motorists booking parking slots under this category can be identified with a QR code based or any other advanced technology as deemed fit by the Concessionaire.

**Pass Based Parking:** There should be an option for users to buy Monthly, Quarterly or Yearly passes for hassle free experience. The motorists opting for this category would be identified using RFID based, NFC based smart card or any other advanced technology as deemed fit by the System Integrator.

**Premium Paid Parking:** There should be an option for users to choose premium parking spaces for e.g.: near the entrance or exit. The corporate offices/Shops Owners can also choose this option to reserve premium parking space for their employees. The motorists opting for this category would be identified using RFID based, NFC based smart card or any other advanced technology as deemed fir by the Concessionaire

**Smart Card based Parking:** There should also be an option for users to be able to enter by flashing the smart card without any need to generate ticket.

### 4. Payment

- a. The payment collection can be done via card as well as cash (manually) at the kiosk where parking ticket can be shown/ given to the staff at the exit. Parking staff should be able to scan the ticket and provide the printed receipt.
- b. The system must be tamperproof.
- c. Smart Cards shall be provided to regular users of the parking lots. The Smart Card must have the details of the user, the registered vehicle number
- d. Along with paper ticket, the SI can propose a cost effective smart parking solution to include NFC enabled prepaid Smart Card System for premium customers and customers opting for monthly reserved parking passes

- e. The NFC enabled smart card reader would be available at pay station and would automatically deduct the requirement payment towards parking

## 5. Compliance

- a. The smart parking solution should retain videos of car entering /exiting the parking zone as per the security parameters defined in the tender.
- b. The Concessionaire must ensure that all parking slots are individually and clearly marked. The smart parking solution should enable accounting and mapping of individual parking spots.
- c. There should be a provision to increase or decrease the number of parking spaces that can be reserved online through web client or mobile App, and same must reflect on web clients or mobile apps.

## 6. Accessibility of real time Parking space availability over Web client and Mobile App

- a. The smart parking solution should provide real time location based view to citizens about proximity of parking lots and availability of parking lots.
- b. The smart parking solution should have a mobile and a web delivery channel for citizens to get real time parking availability and pre book parking lots using online payment of parking charges facilitated through a payment gateway.
- c. A mobile application and web based user interface should be provided with the following features:
  - i. The application should have citizen module and officer module.
  - ii. The citizen should be able to see all the parking lots with exact available space in a real time mode.
  - iii. While locating nearest parking lot, the most updated parking slot availability should be given to the user.
  - iv. Through the citizen module, the user should be able to locate nearest parking facility and also pre-book based on his geographical coordinates. The same information must be made available on map with routing information.
  - v. Citizens should be given an option to extend the pre-booked parking space
  - vi. Reservation should be permitted for specially-abled citizens too.
  - vii. A convenience fee will be charged for all online booking, and there will be some penalty levied in case of cancellation after the specified time period. The cancellation fee however in this case would not be more than 25% of the parking fee paid by the user.
  - viii. The application should have a compliance officer module where Bhopal designated inspector / operator will be able to check compliance of slot occupancy against the fees paid by the citizen.
  - ix. The citizens should be able to generate MIS report to view their occupancy of parking lots over a defined time period.
  - x. The administrators should be able to generate MIS report to view occupancy, collection and other usage statistics over a defined time period.

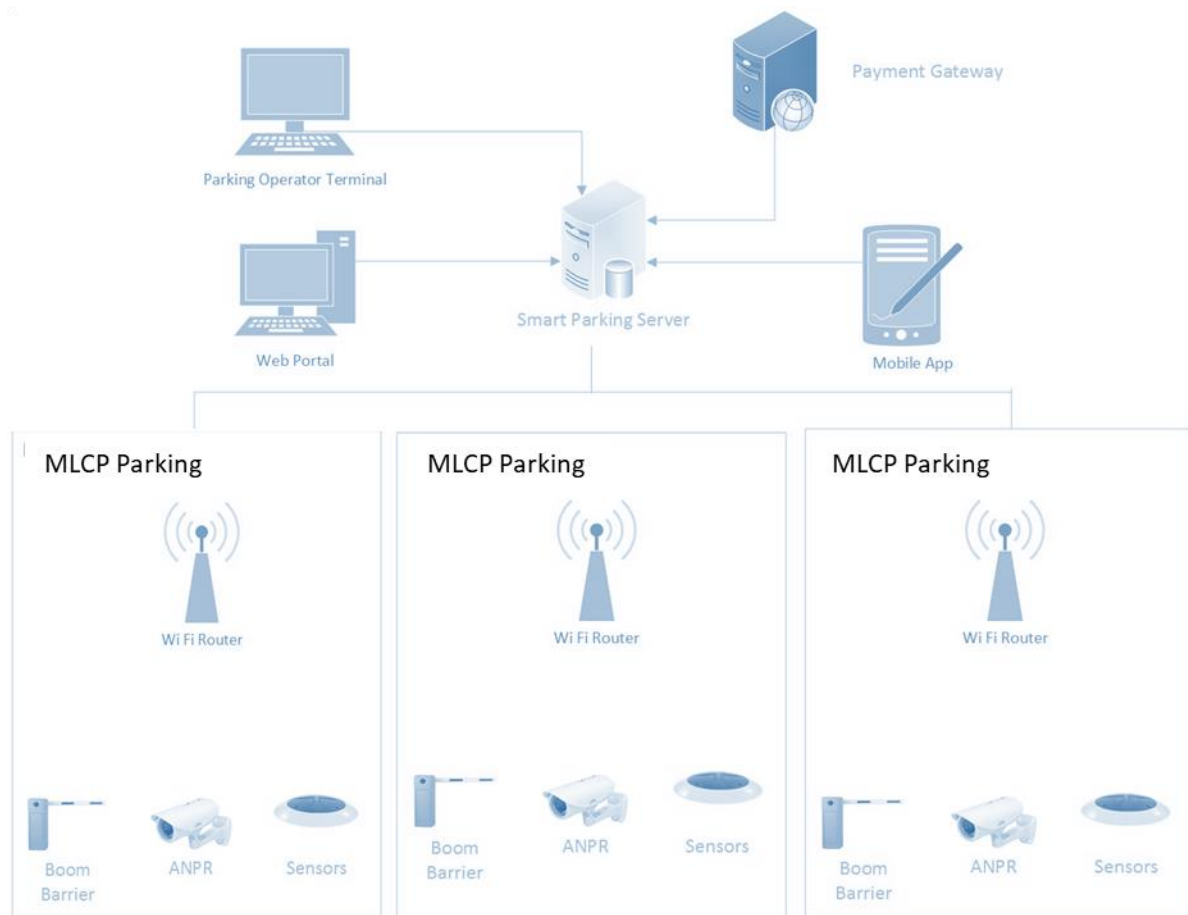
## 7. Integration

- a. Hardware: Integration information related to all Smart Parking components, including hardware components like Entry and Exit devices, barriers, handheld wireless devices, sensors, Smart Cards and software applications to perform parking related functions like payment, reporting, tracking, providing guidance etc. This information will be monitored and managed in the Emergency Operations Center.
- b. Smart Card: Integration with Smart Parking solution w.r.t identification of vehicle as well as recording time and deducting parking fees at the time of exit.
- c. Integrated Command and Control Center: Integration with ICCC for continuous monitoring and be able to respond for any failure of hardware components or any emergency situation at Parking facility.
- d. Mobile App or web client: Integration with Mobile App and web client to provide real time information on the availability of spaces in nearest or all parking facility.

## 8. Accounting

- a. Should provide an application with analytics capability for providing details such as Usage and Vacancy periods, premium parking demand etc.
- b. The solution should be automated, reliable, cost effective, secure, scalable, environment friendly, energy efficient, and must entail minimum human intervention for day-to-day parking management.
- c. System should be able to integrate with ITMS application, In order to identify restricted or not listed vehicles etc.
- d. The smart parking solution should enable the above functions with minimum manual intervention
- e. The Concessionaire would conduct a detailed Survey to study, validate and submit all updated documents, survey reports and maps as part of the proposed solution to BSCDCL
- f. The existing parking management manpower/contracts would be honored till the Go-Live of the Smart Parking Project. As soon as the Smart Parking of MLCP facility get Go-Live Certification from BSCDCL, the Concessionaire would pay Fixed Parking Revenue to adjusted with annual inflation at the start of each year
- g. The Concessionaire would be responsible for implementation and maintenance of all elements of Smart Parking initiatives for all existing RMC parking slots for the entire duration of the project
- h. The Concessionaire will be responsible for all civil and installation work related to last mile connectivity, power supply extensions to devices, installing devices and equipment, and any other networking, communication, and infrastructure requirement related to Smart Parking
- i. The Concessionaire shall provide comprehensive warranty for all hardware, software and networking components
- j. The operations and maintenance (O&M) shall be for a period of 5 years, post go-live, as approved by BSCDCL for Concessionaire.

## 3.5. Technical Specifications



**A. Entry/Exit Barriers**

1. Three phase 0,37 CV motor
2. Scaled, self-lubricating motor
3. Movement transmission is done by ball-bearing-supported connecting rods
4. Opening/ closing time: from 0,8 secs. to 8 secs. Depending on the mounted arm (standard: 1,2 secs. For an arm of 3m.)
5. Low maintenance rate: soft start and stop movements without arm oscillations
6. Emergency stop feature by a photocell or pressure strip (optional)
7. Optional UPS (Uninterrupted Power Supply) to continue operating when mains supply's fails (max. 100 up/ down movements)
8. Internal memory of 7 pulses with Automatic reset on down signal loose
9. Polyester powder painted and oven-dried steel housing
10. Operating temperature: -20 °C a +55 °C
11. Single phase power supply: 220 Vac. ± 10% 50 Hz (110 Vac. ± 10% 60 Hz. optional)
12. Operating consumption: 330 w. maximum
13. The Barrier unit must conform to ISO 9001 Quality Assurance Standard
14. CE, Ukr - Sestero certified
15. Degree of Protection: IP34D

**B. Handheld Ticketing Dispenser**

1. The wireless handheld device should be able to dispense a ticket (with printed QR Code)
2. The same device should be able to scan the same QR code ticket while leaving and generate and print receipt after receiving payment

3. The handheld should have the capability to allow personnel to enter the Unique Booking Code of the motorist
4. The handheld should also have NFC capabilities to be able to read NFC enabled Smart Card, Monthly passes, etc.
5. The handheld should be IP based and Wi-Fi enabled and should be monitored from the Emergency Operations Center
6. The handheld device will have the basic parking metering and management application, which will be synced with the overall Parking Management System, and its data will be communicated back and forth from the centralized Emergency Operations Center

### **C. Automatic Ticket Dispenser**

1. Ticket dispenser with magnetic recording and printing of date, time and other data of car entrance to parking, side and central strip versions
2. Magnetic reader of season cards on the same reader mouth as ticket issuer device.
3. Smart card reader (option)
4. Credit card access control system available as an option
5. Proximity card (contactless smart-card) reader for season cards control (optional)
6. Automatic/ manual ticket issue activated by car presence detector
7. Checking/ validation of season cards, full/ partial time, residents, restricted areas cards as well as master cards, monetary value, time limit and other system card as. Anti-pass back controls on cards
8. Control of vehicle passage sequence, sending ticket code as “cancelled” to the Central Unit in case of abnormal operation
9. Barrier alarm control and management and controls manual barrier opening
10. Electronic self-adjusting vehicle presence detector that prevents ticket extraction by pedestrians
11. User-oriented alphanumeric information display in two languages with TFT monitor in option
12. Date and time visualization on display while inactive
13. Ticket loading container with capacity for 5000 tickets with Ticket level control
14. Motorized magnetic ISO strip reader/ recorder
15. Ethernet communications connection to the central unit with Optional RS-422 connection
16. Pocket terminal connection for maintenance processes
17. Autonomous operation
18. Electronically controlled internal heating/ ventilation system
19. Polyester powder painted and oven-dried steel housing
20. Operating temperature: -20 °C a +55 °C
21. Protected environment use (roofed)
22. Power supply: 220 Vac. ± 10% 50 Hz (110 Vac. ± 10% 60 Hz. optional)
23. Maximum consumption 70 w (270w with heater option)
24. Conform ISO 9001 Quality Assurance Standard
25. CE, FCC, IC, CNRTLUS certified

### **D. Ticket validator**

#### *1 Specifications*

1. Motorized magnetic strip reader/ recorder ISO standard, side and central strip versions
2. Control/ validation of exit tickets and different types of season cards
3. Allow up to 4 periods of grace to be chosen for different exits
4. Inner container to collect exit tickets
5. Control/ validation of season cards, full/ partial time, residents, restricted areas cards, QR code or BAR code recognition from mobile devices as well as monetary value, time limit and others system cards

6. Anti-pass back control on cards
7. Control of vehicle passage sequence, sending to the Central Unit the ticket/ card code as to include it in the black list
8. Barrier alarm control and management. Controls manual barrier opening
9. Self-adjusting electronic vehicle presence detector. Impedes ticket or card validation by pedestrians
10. User-oriented alphanumerical information display in two languages. TFT monitor in option
11. Date and time visualization on display while inactive
12. Ethernet communications connection to the central unit. Optional RS-422 connection
13. Pocket terminal connection for maintenance processes
14. Autonomous operation
15. Electronically controlled internal heating/ ventilation system
16. Polyester powder painted and oven-dried steel housing
17. Operating temperature: -20 °C a +55 °C
18. Protected environment use (roofed)
19. Power supply: 220 Vac. ± 10% 50 Hz (110 Vac. ± 10% 60 Hz. optional)
20. Maximum consumption 70 w (270w with heater option)

***E. Parking Management and Guidance Solution***

1. The solution will be implemented in the Integrated Industry Standard Open Platform to manage, monitor and control Smart Parking initiative. Integrated Industry Standard Open Platform should have API based access to the Parking Management and Guidance System as well as the devices utilized for parking.
2. The solution should be able to monitor and configure all devices with respect to parking (sensors, displays, and signal converters).
3. It should control the system functionality and monitoring should be done from other computers and remotely.
4. It should provide capability to create full report of exact location with respect to floors, areas, levels, etc. It should be customizable and should update about occupation and movements of vehicles in real time.
5. It should provide real time monitoring of all system status.
6. It should report alarms when devices are not connected or when any equipment failure occurs.
7. The software should notify alarms after a period of time if a car is abandoned.
8. The software should provide full graphical plan information of the car parking with exact locations.
9. The software should allow downloading the information and configuration of fields for maintenance purpose.
10. The software application should have built in tools for third party integration to obtain real time information
11. Should provide access at user levels with passwords.
12. The software should have historic log for available spaces, period of time.
13. The software should be able to handle manual overriding of available spaces, special parking requirements for reserved spaces and handicapped lots.

***F. Payment Kiosk***

1. Accept up to different types of coins and returns changes.
2. Programmable automatic recharge of out-of-stock coins by means of a safe container with an approximate 500 coins capacity
3. Banknote acceptor for different notes types in any of the 2 insertion directions with two deposits for recycling, storage and change returns (optional) and a capacity of 120 banknotes for cassette
4. Safety banknote collection box (optional)
5. Thermal printer (no printer ribbon required) for receipts, payment vouchers, liquidation and accounts states

6. Automatically issues liquidation voucher on withdrawal of safety boxes (coins or notes). The voucher specifies the content of box number of coins/ notes of each type and total
7. Accepts payment with discount, money and time vouchers
8. Accepts credit card payment
9. Payment allowed for expended extra time by part-time season holders
10. Multilingual information display with 12" TFT monitor
11. Motorized magnetic ISO lateral strip reader/ recorder
12. Optional magnetic card reader/collector
13. Ethernet communications connection to the central unit. Optional RS-422 connection
14. Pocket terminal connection for maintenance processes
15. Powerless Operation: Incorporating a UPS to enable the credit pay station to complete operations in progress in the event of a power supply failure
16. Polyester powder painted and oven-dried steel housing
17. Operating temperature: -5 °C a +50 °C
18. Protected environment use (roofed)
19. Power supply: 220 Vac. ± 10% 50 Hz (110 Vac. ± 10% 60 Hz. option)
20. Maximum consumption: 200 w. (400 w. with heater option)

**G. Variable Messaging Board**

1. Source of light: High intensity LEDs
2. Colour: True Colour
3. Brightness: >8000 cd/m<sup>2</sup>
4. Luminance Class: L-3 as per EN 12966
5. Contrast Ratio: R2-R3 as per EN 12966
6. Beam Ratio: B-3 as per should be wide angle B6 or B7 or B4
7. Viewing distance: >300 meters
8. Display capability: Alpha-numeric, Pictorials, Graphical & Video
9. Display Front Panel: 100% anti-glare
10. Language: Multilingual (Hindi/English) and all fonts supported by windows.
11. Auto Dimming: Auto dimming adjust to ambient light level.
12. In built sensor: Photoelectric sensor
13. Storage capacity: Minimum 100 GB
14. Display area: Display size of VMD should be 3x2 mtrs.
15. Number of Lines & Characters: The number of lines and characters can be customized as per the requirements (Min. 3 lines & 10 characters)
16. Brightness & control: Controlled through software
17. Display Driving method: Direct current control driving circuit. Driver card of display applies Direct Current Technology.
18. Display Style: Stay on and flashing
19. Connectivity: IP based
20. Access control: Access control mechanism would be also required to establish so that the usage is regulated.
21. Integration: With smart city operations centre and service providers for offering G2C and B2c services.
22. Construction: Cast Iron Foundation and M.S. Pole, Sturdy Body for equipment.
23. Battery: Internal Battery with different charging options (Solar/Mains)
24. Power: Automatic on/off operation
25. Casing: IP-55 rated for housing
26. Operating conditions: 0 Degree to 55 degree C



### H. Emergency Call Box

1. IP rating: IP66
2. Front panel: Stainless steel cover
3. Internal speaker amplifier: 10W class D
4. Microphone technology: Digital (MEMS)
5. Echo cancellation: YES
6. Noise cancelling (static): YES
7. Web browser configuration: YES
8. Software configuration: YES
9. General Purpose I/O: 6 (configurable)
10. Power Option: PoE or external supply
11. Operating temperature: -25°C to 70°C (-13°F to 158°F)
12. Relative humidity: 0% - 95% Weight 800g (1.73 lb.)
13. Dimensions: 180 x 120 x 70 mm (7.1 in. x 4.7 in. x 2.75 in.)

#### I. Wireless Gateway/ Root AP

1. Wireless Gateway shall communicate with northbound network through dedicated leased lines connecting central control center or through pre terminated MPLS circuits over fiber network
2. Wireless Gateway shall communicate wirelessly at 2.4GHz/5 Ghz ISM band with 128 bit AES encryption with southbound devices like wireless Repeaters and parking sensors
3. Every Repeater shall have battery backup for 6 hours of operation and powered through AC mains
4. Wireless Gateway shall have IP67 protection
5. Wireless Gateway shall connect up to minimum 10 repeaters within its radio range

### J. CCTV Camera

#	Parameters	Minimum Specifications
1.	Video Compression	H.264
2.	Video Resolution	1920 X 1080
3.	Frame rate	Min. 25 fps
4.	Image Sensor	1/3" OR 1/4" Progressive Scan CCD / CMOS
5.	Lens	Fixed 3.6mm or better
6.	Minimum Illumination	Colour: 0.5 lux, B/W: 0 lux with IR On
7.	IR Range	20 Mtrs or better
8.	Day/Night Mode	Colour, Mono, Auto
9.	S/N Ratio	≥ 50Db
10.	Auto adjustment + Remote Control of Image settings	Colour, brightness, sharpness, contrast, white balance, exposure control, backlight compensation, Gain Control, Wide Dynamic Range
11.	Protocol	HTTP, HTTPS, FTP, RTSP, RTP, TCP, UDP, RTCP, DHCP, UPnP, QoS, IPV4, IPV6, ONVIF Profile S
12.	Security	Password Protection, IP Address filtering, User Access Log, HTTPS encryption
13.	Operating conditions	0 to 50°C (temperature), 50-90% humidity
14.	Casing	NEMA 4X / IP-66 rated and IK10 rated
15.	Certification	UL/EN,CE,FCC
16.	Local storage	Micro SDXC up to 64GB (Class 10) In the event of failure of connectivity to the central server the camera shall record video locally on the SD card automatically. After the connectivity is restored these recordings shall be automatically merged with the server recording such that no manual intervention is required to transfer the SD card based recordings to server.

17.	Power Source	PoE, 12V
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**K. Smart card reader**

S.No	Parameter	Technical Requirements
1	<b>Display</b>	7" inches or higher scratch resistant multi point capacitive touch screen with minimum WSVGA resolution (1024 X 600). 3.5" QVGA with backlight, TFT-LCD, 260K, 240 x 320
2	<b>Dimensions (W X H X D)</b>	87 (min.74) x 218 x 56.2 (min.29)mm
3	<b>Weight</b>	497g to 502 g
4	<b>CPU/Processor</b>	520MHz
5	<b>RAM</b>	128MB RAM
6	<b>Memory</b>	128MB ROM (Optional)
7	<b>Expansion slot</b>	At least a micro SD slot supporting up to 16 GB memory card
8	<b>Audio</b>	Good quality Speaker with 1W or higher output for announcements. Speaker, Headset jack
9	<b>External Keyboard support</b>	Device should support keyboard through USB or Bluetooth interface
10	<b>Connectivity</b>	Device should support both 3G, GPRS and Wi-Fi, should support GPS feature
11	<b>USB Port</b>	At least one free USB port shall be available after setting up the entire solution including peripheral devices
12	<b>Battery</b>	Rechargeable, 3.7V, 4,000mAh, Li-ion. Battery should be minimum 3000 MaH for the hand held terminal (HHT).
13	<b>Operating system</b>	Should support latest versions of iOS, Android and windows
14	<b>Certification</b>	RoHS (Restriction of Hazardous substance)CE or UL
15	<b>Indicators</b>	Status indicator provides ease of use, Indicators for connectivity (presence/absence), signal strength, battery status etc.,
17	<b>Barcode Reader</b>	Barcode reader capable of reading 1D Laser Class II or 1D&2D CMOS Imager
18	<b>SIM/ SAM Slots</b>	Minimum 1 SIM and 2 SAM Slots (Security encryption of MI Card) to support secure loading of signed applications
19	<b>Biometric Sensor</b>	STQC certified Finger Print Module
21	<b>Smart Card Reader</b>	ISO 7816 Compliant
22	<b>Printer</b>	Integrated or external. 2" thermal Printer (max. 90mm/sec)
23	<b>Antenna (mandatory)</b>	Internal
24	<b>Terminal Management</b>	Device should be remotely manageable in secured mode

25	<b>Warranty</b>	Suitable Warranty support
26	<b>Certification</b>	PCI / EMV Certification (Bank Certified)
27	<b>RFID Reader</b>	Optional, ISO 14443 A/B (MIFARE, Calypso), ISO 15693; ISO 14443 A/B (MIFARE, Calypso), ISO 18092 (NFC), Felica
28	<b>Radio</b>	<ul style="list-style-type: none"> <li>• <b>WWAN Radio</b>- Optional, CDMA 1x for Korea SKT, LGT; GSM/GPRS/eGPRS for global</li> <li>• <b>WLAN Radio</b>- IEEE 802.11b/g</li> <li>• <b>WPAN Radio</b>- Bluetooth V2.0+EDR Class II</li> </ul>
29	<b>Capabilities for Transaction and Payment</b>	<ul style="list-style-type: none"> <li>• <b>MSR</b>- Bi-directional, Track1,2,3, ISO 7810, ISO 7811, ISO 7813</li> <li>• <b>Contact Payment</b>- EMV Level 1&amp;2, ISO 7816</li> <li>• <b>Contactless Payment</b>- Optional, EMV Contactless Level 1 &amp; 2 (Master PayPass, Visa Wave)</li> <li>• <b>PIN Transaction</b>- Optional, PCI PED 2.0; APACS Common Criteria; GIE CB Approved</li> </ul>
30	<b>GPS</b>	<ul style="list-style-type: none"> <li>• Optional, Integrated GPS w/ AGPS and DGPS</li> </ul> <b>PERFORMANCE CHARACTERISTICS</b>
31	<b>Environment &amp; Durability</b>	<ul style="list-style-type: none"> <li>• <b>Operating</b> -20°C to 55°C / -4°F to 131°F</li> <li>• <b>Storage</b>- -30°C to 70°C / -22°F to 158°F</li> <li>• <b>Humidity</b>- 93% non-condensing</li> <li>• <b>Damp heat Cyclic</b> --Operating-40°C, 95%RH for (12+12 hrs.)), No. of cycles: 2</li> <li>• <b>Drop/Free Fall Specification</b>- 4ft. / 1.2m drop to steel surface with silicon case, 2drops per 6 sides</li> <li>• <b>Vibration Test</b> should be in packed condition, switched off conditions (10-150Hz, 0.15mm/2g, 10 sweep, cycles/axes)</li> <li>• <b>Bump test</b> should be in packed condition, switched off condition.(1000Bumps, 40g, in vertical position)</li> </ul>

#### L. Loop detector

S.No	Parameter	Technical Requirements
1.	Power supply	200 - 260VAC 50Hz 1.5VA
2.	NMI/MI Input	This input may be activated by a potential free relay contact or open collector NPN transistor output. This input is isolated from the logic.
3.	Beam Input	This input may be activated by a potential free relay contact or open collector NPN transistor output. This input is isolated from the logic and is used to keep the barrier open when a vehicle has broken the beam.
4.	Raise/Lower Output Relay	These outputs are a relay contact rated at 5A/220VAC.
5.	TVI Output Relay	This output is a normally closed relay output rated at 0.5A/35VDC.
6.	Indicators	LED indicators show: Power, Barrier Raised and Loop Detector.

7.	Detector tuning range	15 - 1500uH
8.	Loop Frequency	Approx. 23 – 130KHz
9.	Environmental tracking	Automatic Compensation
10.	Protection	Loop isolation transformer with zener diodes and gas discharge tube.
11.	Connector	11 Pin Connector on rear of unit.
12.	Dimensions	80mm (height) X 40mm (width) X 79mm (Depth excl. connector).
13.	Operating Temperature	-40°C to +80°C
14.	Storage Temperature	-40°C to +85°C

## **7.1 Other Activities**

### **7.1.1 Survey and Commencement of Works**

All three MLCPs envisaged for the project has been constructed and delivered to BSCDCL. However, if some civil works are required then prior to starting the site clearance, the Concessionaire shall carry out survey of all three facilities as specified in list of Proposed Locations. BSCDCL shall be fully informed of the results of the survey and the amount and extent of the demolition and site clearance shall then be agreed with BSCDCL.

### **7.1.2 Electrical works and power supply**

All the three facilities have already been provided with require power supply. However, if required, Concessionaire shall directly interact with Madhya Pradesh Electricity Board for provision of mains power supply at all desired locations for Smart Parking field solution. BSCDCL shall facilitate the same.

### **7.1.3 Lightning-proof measures**

The Concessionaire shall comply with this technical specifications, take into account of lightning-proof and anti-interference measures for system structure, equipment type selection, equipment earthing, power, signal cables laying. Concessionaire shall describe the planned lightning-proof and anti-interference measures in the technical documents.

Corresponding lightning arrester shall be erected for the entrance cables of power line, video line, data transmission cables. All crates shall have firm, durable shell. Shell shall have dustproof, antifouling, waterproof functions; capable to bear certain mechanical external force. Common equipment protection needs 25KA surge suppression device and important device shall have 50KA surge suppression device.

Signal separation of low and high frequency; equipment protective field shall be connected with their own public equal power bodies; small size/equipment signal lightning arrester shall be erected before the earthing.

### **7.1.4 UPS Lightning Protection**

All the lightning protection devices of the power supply system are installed in the low voltage distribution system, forming the lightning protection system of bipolar input protection for the protection of UPS power supply system.

### **7.1.5 IT Equipment Lightning Protection**

IT includes servers, switch, and routers and so on. To make sure the absolute safety of the equipment, with the all-pervasiveness of lightning strikes, along with the impact of the electrical

network surge upon the equipment, it is necessary to install a third level lightning protection components on the power distribution cabinet of the IT equipment.

1. Lightning protection equipment
  - a. Single-phase power supply lightning arrester
    - i. Nominal working voltage: 220V AC
    - ii. Maximum sustained working voltage: 380V AC
    - iii. Nominal discharge current: 20 kA
    - iv. Maximum discharge current: 40kA
    - v. Protection level: (20kA, 8/20 $\mu$ s) 1200V
    - vi. Protection mode: +/-PE
    - vii. Response time:  $\leq$ 25ns
    - viii. Protection grade: IP20
  - b. Network signal lightning arrester
    - i. Maximum sustained working voltage: 5V DC
    - ii. Maximum discharge current: 5kA
    - iii. Protection level:  $\leq$ 20V(3kA,8/20 $\mu$ s)
    - iv. Response time:  $\leq$ 1ns
    - v. Transmission speed: 100Mbps
    - vi. Insertion loss:  $\leq$ 0.5dB
    - vii. Protection circuit: 1/2,3/6
    - viii. Interface model: (IN/OUT) RJ45
    - ix. Protection grade: IP20
  - c. Earthing System

Lightning protection components first function is to absorb and release lightning current, also a way of equi-potential connector. The protection theories for all the lightning protection components quickly respond to the lightning strikes in an instant, to make sure that the equipment, the earth, buildings and affiliated buildings can be connected into one equi-potential entity, to avoid the damage done by over-voltage. The key to realize being equi-potential lies in the ground wire system of the whole computer room.

#### d. Cabling Infrastructure

The SI shall ensure the installation of all necessary cables and connectors between the field sensors /devices assembly , outstation cabinets, for pole or cantilevers mounted field sensors /devices on sign bridges, the cables shall be routed down the inside of the pole or sign bridge and through underground duct to the outstation cabinet field sensors /devices mounted on rooftops, the cables shall be routed through ducts within the building and through underground duct to the outstation cabinet All ducts shall be HDPE as per TEC Specification (Govt. of India).

All cables and labels shall be clearly labelled with indelible indications that can clearly be identified by maintenance personnel. The proposed cables shall meet the valid directives and standards. Thus Cabling has to be carried out according to BIS standards IS-694, 8130, 5831, 3975, 1554, etc. All cabling shall be documented in a cable plan by the SI and not be paid separately. Fire retardant cables must be considered in all critical locations including data centers, CCC etc.

## 4. Project Management

### 4.1. Project Governance Structure

Project governance is extremely important to be set out at the start of this project. The project governance structure will set out clear responsibility and accountability within the authority for the delivery of the project. It will provide the stakeholders in the authority the ability to manage their interest in the project and support the project implementation team to deliver the required outcomes by providing resources, giving direction and timely decision taking. The governance body will also acts as a forum for any issue resolution and support for information gathering.

For the Smart Parking project, effective governance structure has been categorized into three main categories viz. Executive Level, Strategic Level and Operational Level.

#### **Executive Level**

- Project Implementation Committee

#### **Strategic Level**

- Project Management Office

#### **Operational Level**

- Domain Specialists
- Technical Specialists
- Support Team

#### **Executive Level**

At the Executive Level, the Project Steering Committee will take major decisions on the Project Budget, Funding and Long Term Objectives. The Project Steering Committee will provide the necessary regulatory approvals wherever required. The committee would be the highest decision making body for the Smart Parking project and will be responsible for dispute resolution and strategic policy decisions. The Project Steering Committee will meet fortnightly in the initial months of the project and the meeting periodicity will be increased to one month and three months in the later stages of the project.

#### **Strategic Level**

At the Strategic Level, the Project Implementation Committee would be making decision on the Overall Project Plan and Deliverables. The purpose of this group is to prioritize deliverables and check for deviations in the project plan. The Implementation Committee would also decide

on the Quality Assurance Procedures to be followed during the entire project. Risk Monitoring and Risk Management are the primary functions of this group.

### **Operational Level**

The operational level is the most granular, and it usually involves delegates of steering or subcommittee members. This would comprise of core team members of Concessionaire, BMC, BSCDCL, PMC and domain experts which could assist in the day to day functioning and execution of the project.

## **4.2. Permissions**

The Concessionaire will require permissions from following departments/ agencies for smooth implementation of this project in Bhopal

1. Municipal Corporation (MC)
2. City Development Authority
3. Power Distribution Company
4. Other Government agencies as required for system implementation

## **5. Exit Management**

### **5.1. Purpose:**

This Clause sets out the provisions, which will apply on expiry or termination of the Concession Agreement.

### **5.2. Transfer of assets**

1. The Concessionaire shall within fifteen (15) days of the expiry of the Concession Agreement or termination of the Concession Agreement, whichever is earlier, hand over all the assets and services belonging to the BSCDCL, supplied as part of this project including all hardware and software, in proper working condition to the BSCDCL
2. In case of any deficiency noticed at the time of such handing over, the Concessionaire has to get it rectified at his own cost within 45 days of such handing over otherwise BSCDCL will get it rectified at the risk and cost of the Concessionaire.
3. Performance Bank Guarantee of the Concessionaire will be released only after successful handing over of the all the assets and services, including hardware, software, network and services in working conditions to BSCDCL, and after adjustments of any amount due and recoverable from the Concessionaire under this Agreement by BSCDCL, if any.
4. Upon service of a notice under this Clause the following provisions shall apply:
  - i. In the event, if the Assets or services to be transferred are mortgaged to any financial institutions by the Concessionaire, the Concessionaire shall ensure that all such liens and liabilities have been cleared beyond doubt, prior to such transfer. All documents regarding the discharge of such lien and liabilities shall be furnished to the BSCDCL.
  - ii. All title to the Assets and Services to be transferred to the BSCDCL pursuant to this Clause shall be transferred to BSCDCL, within the time period as mentioned in clause-1 of sec 5.2.
5. The outgoing Concessionaire will pass on to BSCDCL, the subsisting rights in any licensed products on terms not less favourable to BSCDCL, than that enjoyed by the outgoing Concessionaire

### **5.3. Cooperation and Provision of Information**

During the Exit Management Period:

- i. The Concessionaire will allow the BSCDCL access to information reasonably required to define the then current mode of operation associated with the provision of the services to enable the BSCDCL to assess the existing services being delivered;
- ii. Promptly on reasonable request by the BSCDCL, the Concessionaire shall provide access to and copies of all information held or controlled by them which they have prepared or maintained in accordance with this agreement relating to any material aspect of the services (whether provided by the Concessionaire). The BSCDCL shall be entitled to copy of all such information. Such information shall include details pertaining to the services rendered and other performance data. The Concessionaire shall permit the BMC or its nominated agencies to have reasonable access to its employees and facilities as



reasonably required by the BSCDCL to understand the methods of delivery of the services employed by the Concessionaire and to assist appropriate knowledge transfer

## **6.Change Management**

### **6.1. Change Orders / Alterations / Variations**

- a. The concessionaire agrees that the requirements given in the Bidding Documents are minimum requirements and are only indicative. The vendor would need to etch out the details at the time of preparing the design document prior to actual implementation. It shall be the responsibility of the Concessionaire to meet all the requirements of technical specifications contained in the RFP and any upward revisions and/or additions of quantities, specifications sizes given in the Bidding Documents required to be made during execution of the works, shall not constitute a change order and shall be carried out without a change order and shall be carried out without any time and cost effect to Purchaser.
- b. Further upward revisions and or additions required to make Concessionaire's selected equipment and installation procedures to meet Bidding Documents requirements expressed and to make entire facilities safe, operable and as per specified codes and standards shall not constitute a change order and shall be carried out without any time and cost effect to Purchaser.
- c. Any upward revision and/or additions consequent to errors, omissions, ambiguities, discrepancies in the Bidding Documents which the concessionaire had not brought out to the Purchaser's notice in his bid shall not constitute a change order and such upward revisions and/or addition shall be carried out by concessionaire without any time and cost effect to Purchaser.

### **6.2. Change Order**

- a. The Change Order will be initiated only in case (i) the Purchaser directs in writing the Concessionaire to include any addition to the scope of work covered under this Contract or delete any part of the scope of the work under the Contract, (ii) Concessionaire requests to delete any part of the work which will not adversely affect the operational capabilities of the facilities and if the deletions proposed are agreed to by the Purchaser and for which cost and time benefits shall be passed on to the Purchaser, (iii) the Purchaser directs in writing the Concessionaire/SI to incorporate changes or additions to the technical specifications already covered in the Contract.
- b. Any changes required by the Purchaser over and above the minimum requirements given in the specifications and drawings etc. included in the Bidding Documents before giving its approval to detailed design or Engineering requirements for complying with technical specifications and changes required to ensure systems compatibility and reliability for safe operation (As per codes, standards and recommended practices referred in the Bidding Documents) and trouble free operation shall not be construed to be change in the Scope of work under the Contract.

- c. Any change order comprising an alteration which involves change in the cost of the works (which sort of alteration is hereinafter called a “Variation”) shall be the Subject of an amendment to the Contract by way of an increase or decrease in the schedule of Contract Prices and adjustment of the implementation schedule if any.
- d. If parties agree that the Contract does not contain applicable rates or that the said rates are inappropriate or the said rates are not precisely applicable to the variation in question, then the parties shall negotiate a revision of the Contract Price which shall represent the change in cost of the works caused by the Variations. Any change order shall be duly approved by the Purchaser in writing.

Within ten (10) working days of receiving the comments from the Purchaser or the drawings, specification, purchase requisitions and other documents submitted by the concessionaire/SI for approval, the concessionaire/SI shall respond in writing, which item(s) of the Comments is/are potential changes(s) in the Scope of work of the RFP document covered in the Contract and shall advise a date by which change order (if applicable) will be submitted to the Purchaser.

## 7. Annexure1- Tentative Bill of Quantity for the MLCP operations

### A. Smart Parking Components for MLCP Facilities

S.No	Description	New Market MLCP	MP Nagar MLCP	Bairagarh MLCP	Total
1	Entry Barrier Control with Loop detection for 4 Wheelers	1	1	1	3
2	Entry Barrier Control with Loop detection for 2 Wheelers	1	1	1	3
3	Exit Barrier Control with Loop detection for 4 Wheelers	1	1	1	3
4	Exit Barrier Control with Loop detection for 2 Wheelers	1	1	1	3
5	Inductive Loop Detectors	4	4	4	12
6	Parking Ticketing Machine	2	2	2	6
7	ANPR Camera	4	4	4	12
	Internal Dome Camera for Security	20	20	20	60
8	variable messaging displays	1	1	1	3
9	Display & Guidance System	5	5	5	15
10	Payment Kiosk	1	1	1	3
11	Controllers	4	4	4	12
12	Emergency call box	5	5	5	15
13	Ticket Validator	2	2	2	6
14	Car Wheel Lock	10	10	10	30
15	UPS 1KVA online Backup	3	3	3	9
16	Fixed Smartcard validator	1	1	1	3
17	Handheld Smartcard Reader	1	1	1	3
18	Parking management solution. (includes parking server, GIS, network etc)	1	1	1	3
19	Web Portal & Mobile Application Development	0	0	0	1
20	Advertisement Board (5 Ft X 6 Ft)	100	100	100	300
21	Advertisement Board Façade Wall				
22	Miscellaneous cost	0	0	0	1

Selection of Concessionaire for Design, Development, Implementation, Operation and Maintenance of Smart Parking Solution for three Multilevel Parking Sites for Bhopal Smart City on PPP Model

Data Center Cost at one of the MLCP					
23	Local Server				1
24	Switches				1
25	Routers				1
26	Firewall				1
27	Gateway				1
28	Passive Infrastructure (Network and Rack etc)				1
29	PoP for the OFC Cable (Last Mile Connectivity)				3

**Operational Expenses**

Sr. No.	Components	Quantity	Remarks
1	Bandwidth Cost	3	One lot for each facility
2	Electric Expenses	3	One lot for each Facility
3	Project Manager	1	One for the overall project supervision
4	IT Expert	1	One for overall project support
5	Supervisor	3	One for each facility
6	Operator	18	6 in three shifts for each facility
7	Guard	18	6 in three shifts for each facility

**Notes:** Bidder is free to suggest or modify or add or subtract the infrastructure or operational expenses to optimize the expenses. However, best industry fit solution should be deployed for the facilities.