PC-II

For

Feasibility Study for the Project "Smart City Lahore Phase-I"

PC-II Cost	PKR. 18.50 Million

Approval Forum	PDWP
GS#	7042

Punjab Information Technology Board

GovernmentofthePunjab

Arfa Software Technology Park, 346-B, Ferozepur Road, Lahore

1. **Name by which survey/ feasibility will be identified**

Feasibility Study for the Project "Smart City Lahore Phase-I"

Administrative authorities responsible for

     I.   **<u>Sponsoring Agency:</u>**

        Punjab Local Government and Community Development Department

     II.   **<u>Executing Agency:</u>**

        Punjab Information Technology Board (PITB)

     III.   **<u>Consultancy Firm</u>**

        The Urban Unit

2. **Source of Funding**

ADP	Scheme Name	Department	GS#
2021-2022	Project Preparation Funding Facility (PPFF)	Planning & Development Board	7042

3. **Details of survey/feasibility study**

    i. **General description and justification**

With the rapid urbanization of the world, the concept of "Smart Cities" has been gaining momentum in the international political agenda. The transformation of cities into digital cities brings along an incredible opportunity for improving citizens' welfare and fostering economic progress. By 2050, 70% of the Population will live in cities. Cities represent more than 80% of the global GDP and 67% of the overall energy consumption

There is no universally accepted definition of a Smart City. It means different things to different people. The conceptualization of Smart City, therefore, varies from city to city and country to country, depending on the level of development, willingness to change and reform, resources and aspirations of the city residents. Smart Cities endeavor to tackle the present and future problems by solving pressing issues while still making sound fiscal decisions. This is sometimes slow but always challenging. However, gradually IOT technology drivers and conditions of necessity within use cases are molding today's IOT revolution into tomorrow's norm.

The population of Lahore is rapidly increasing, and as urban cities have a major role in the economic development of any country. Therefore, there is a need to develop smart applications that provide decent quality of life to citizens. The core applications in smart city would include but not limited to:

- Energy Management which includes Municipal services but not limited to street lights.
- Clean and Adequate Water supply
- Health Information Management System
- Efficient Urban Mobility and Public Transport
- Robust IT Connectivity and Digitalization
- Good governance, especially e-Governance and citizen participation,
  - Sustainable Environment
  - Safety and Security of citizens
  - Waste Management

4. **Implementation period of PC-II: Four(4) Months**

   i. **Month of Commencement: December, 2021**

   ii. **Month of Completion: April, 2022**

Activities/ Period	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022
Commencement of Project/PC-II	▓				
Award of Work	▓				
Preliminary Report				▓	
Final Report					▓
Presentation on Findings					▓
Final Report Submission					▓

Note: The kick of date of the Project is May 15, 2022; therefore the consultant shall complete the consultancy and give final report not later than by April 30, 2022.

5. Objectives of Consultancy Services

The main objectives of these Terms of Reference is to define consultant' deliverables that would result in a well-defined project with clear objectives:

I. Review the existing infrastructure of PSCA and advice on the communication medium of the system and applications by the concerned considering sustainability and coverage across Lahore for the Smart City Project.

II. Review IT applications and systems developed by PITB to ascertain possibility of integration with PSCA systems.

III. Review of ADP scheme "Development of Online Statistical System in Punjab", initiated by Bureau of Statistics, Punjab in terms of its scope and to benefit from the systems being developed there to avoid duplicity.

IV. Review of existing PC-I of Smart City project along with suggestions along and detailed costings of respective supporting actions.

V. Identification of right IoT solution which includes but not limited to detailed technical design, network architecture and detailed BOQ along with specifications and respective line item costing.

VI. Perform Situation Analysis/Need Assessment and Gap analysis of the project by consultant.

VII. Develop Legal and Institutional Framework for adoption and implementation by concerned department.

6. Scope, Duties and Responsibilities of Consultant

The consultancy scope is divided into three major outputs of Consultant's engagement with the Project. These outputs are further segregated into different tasks. Following outputs of consultant are:

Output A: Project Planning and Rollout blue print

Output B: Planning and Design for Solutions and Infrastructure

Output C: Technical Design of Integrated Control Room at the designated site

Outputs are segregated into following tasks:

Output A: **Project Planning and Roll Out Blue Print**

Task 1: Work Plan

Task 2: Analysis of Situation & Stakeholder Consultations

Task 3: Undertake an assessment of PSCA Infrastructure, PITB developed systems and review of ADP scheme "Development of Online Statistical System in Punjab", initiated by Bureau of Statistics.

Task 4: Drafted MoU's with concerned departments as per the permissible Laws of the Government

Task 5: Drafting of Legislation and institutional Framework

Task 6: Review of existing PC-I of Smart City Lahore Phase-I

Output B: **Smart City Solutions Planning and Design**

Task 1: Feasibility Study, Gap Analysis, Need assessment, Surveys and Site Investigations

Task 2: Designing the comprehensive System architecture of Smart City which must include blue prints for Data Platform, IOT gateways design and infrastructure backbone/network architecture and sensor nodes.

Task 3: Specifications finalization of the hardware/IOT/Infrastructure including detailed BOQ's along with item line costing.

Output C: **Determine requirements for civil works at the designated site as identified by the sponsor**

Task 1**:** Assist in Planning and Designing for Control Room estimates as per the requirements of the systems.

Task 2: Develop detail design in all aspects of Control room

Task 3 : Feasibility Study and Site inspection

7. **Estimated cost for Consultancy**

Sr.no.	Source of Funding	Total Cost
1	Planning & Development Board	18.50 Million

8. Item-wise summary of Cost

Head Wise Costing		
Sr. No	Head	PKR. Cost
1	Core Team of Experts	18,000,000
2	Direct Cost	500,000
Total		**PKR. 18,500,000/-**

9. Indicate studies already taken on the subject.

Multiple independent studies have already been conducted by third parties to identify and highlight the potential of Smart Cities in Punjab, few of which are mentioned below:
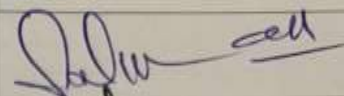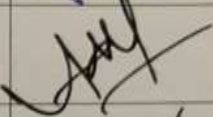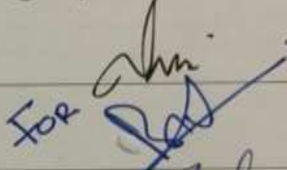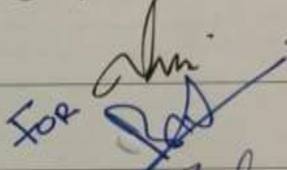
    i.   University of Cambridge, State of Smart Cities in Pakistan, Challenges, Issues and Initiatives, Sept 2016

    ii.   A Comprehensive Review of Smart Cities Components, Applications, and Technologies Based on Internet of Things

10. Certificate

25. Certificate

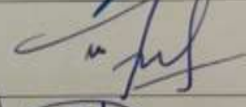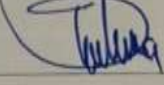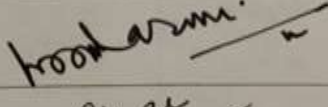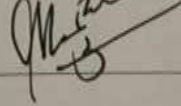Certified that the project proposal has been prepared on the basis of instructions provided by the Planning Commission for the preparation of PC-I for Infrastructure sector projects:

Prepared By	Mr. Danish Ahmad Programme Manager Punjab Information Technology Board	
	Mr. Salman Amin Director ,BD&P Punjab Information Technology Board	
Reviewed By	Mr. Ahmed Adeel Director HR Punjab Information Technology Board	
	Mr. Nisar Ahmad Additional Director General, Admin Punjab Information Technology Board	
Verified By	Mr. Atta-ur-Rehman Director ,D&P Punjab Information Technology Board	
	Mr. Faisal Yousaf Director General ,IT-Operations Punjab Information Technology Board	
	Mr. Shahid Zaman Lak Additional Secretary LG&CD Government of Punjab	
Approved by	Mr. Azfar Manzoor Chairman Punjab Information Technology Board	
	Mr. Noorul Amin Mengal Secretary LG&CD Government of Punjab	

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ANNEXURE-A ToR's for Feasibility Study for the Project "Smart City Lahore Phase-I"

1. Introduction

The Government of Punjab intends to develop an Integrated Information Communications and Technology Development Project i.e., **SMART CITY, LAHORE** to support the following Smart City Sectors across Lahore.

    i.   Smart Mobility
   ii.   Smart Healthcare
  iii.   Smart Utilities
  iv.   Smart Safety and Security
   v.   Smart Economy

The proposed project will support the government to adopt a long-term strategy and Legal framework for ICT sector and smart city solutions to allow holistic development of IT ecosystem, through the establishment of a benchmark model **Smart City** in Pakistan. The expected outcome of the project is strengthened by holistic development of ICT sector smart city solutions in Pakistan.

2. Objective of Consultancy Services

The main objectives of these Terms of Reference is to define consultant' deliverables that would result in a well-defined project with clear objectives:

    I.   Review the existing infrastructure of PSCA and advice on the communication medium of the system and applications by the concerned considering sustainability and coverage across Lahore for the Smart City Project.

   II.   Review IT applications and systems developed by PITB to ascertain possibility of integration with PSCA systems.

  III.   Review of ADP scheme "Development of Online Statistical System in Punjab", initiated by Bureau of Statistics, Punjab in terms of its scope and to benefit from the systems being developed there to avoid duplicity.

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Outputs are segregated into following tasks:

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Task 1: Work Plan

Task 2: Analysis of Situation & Stakeholder Consultations

Task 3: Undertake an assessment of PSCA Infrastructure, PITB developed systems and review of ADP scheme "Development of Online Statistical System in Punjab", initiated by Bureau of Statistics.

Task 4: Drafted MoU's as per the permissible Laws of the Government

Task 5: Drafting of Legislation and institutional Framework

Task 6: Review of existing PC-I of Smart City Lahore Phase-I

Output B: **Smart City Solutions Planning and Design**

Task 1: Feasibility Study, Gap Analysis, Need assessment, Surveys and Site Investigations

Task 2: Designing the comprehensive System architecture of Smart City which must include blue prints for Data Platform, IOT gateways design and infrastructure backbone/network architecture and sensor nodes.

Task 3: Specifications finalization of the hardware/IOT/Infrastructure including detailed BOQ's along with item line costing.

Output C: **Determine requirements for civil works at the designated site as identified by the sponsor**

Task 1**:** Assist in Planning and Designing for Control Room estimates as per the requirements of the systems.

Task 2: Develop detail design in all aspects of Control room

Task 3 : Feasibility Study and Site inspection

Furthermore, the mentioned below are the proposed Smart City Sectors/Sub Sectors. The Consultant shall evaluate and prioritize year wise plan for execution and suggest other sectors/sub-sectors based if needed based on the feasibility Study.

Smart City Sector	Smart City Sub Sector
Smart Mobility	Smart Parking
	Integrated Public Transport (Metro & LTC)
	Intelligent Traffic Signaling through IOT
	Congestion Pricing on Congested Areas
	Digital Payment in Public Transit
	Integrated e-hailing Platform
	Integration of Raasta Application
	Mapping of Health Facilities across Lahore (Pharmacies, Hospitals etc.)
	Integrated Hospital Management Information System (IHMIS)

Smart Healthcare	Telemedicine Platform
	Real Time Air Quality Index through IOT
	Infectious Disease Surveillance System
	Data Based Population Health Interventions
	First Aid Application
Smart Safety & Security	Fire and Emergency Service Optimization (Rescue 1122)
	Servant Verification System (Character Certificate, Driving License etc.)
	Real Time Crime Mapping (15 Integration)
	Integration of Police Record Management System
	Integration of Hotel Eye and Tenant Registration Portal
	Integration With PDMA for Disaster Early Warning System
	Crowd Management through Artificial Intelligence/Machine Learning
	Public/Private Building Inspection Application
	Gun Shot Detection
Smart Economy	Citizen/Business Specific Public service Application(Grocery Stores, Food & vegetables shops, pharmacies, restaurants)
	Development and Integration of Local civic engagement applications
	Local e-career center i.e. job portal integration
	Geo Tagging of all Public facilities in Lahore
	Business and Services Directory integration
	Open Data Portal Development
Smart Utilities	Smart Street Lights
	Smart Waste Management through IOT and AI/ML
	Smart Water Management (SCADA Integration with WASA)
	Home Energy Consumption Tracking (Integration With LESCO)
	Integration of LESCO Utility bills with Payzen
	Integration of Sui Northern Gas bills with Payzen

4. Time Duration of Proposed Consultancy and Deliverables

a). Time Duration of Consultancy

The Consultancy must be concluded by April 30, 2022.

Activity	Time Allocated (In Months)

Design, methodology and detailed work plan	1
Draft Report and a presentation on initial findings	2
Final report and presentation on findings	1

b). Consultancy Deliverables with Timelines

Deliverables with Timelines			
Phases	**Sub Phases**	**Expected Start Date**	**Expected End Date**
Project Planning and Management	Work Plan (WBS)	1-Dec-21	15-Dec-21
	Analysis of Situation & Stakeholder Consultations	1-Dec-21	15-Nov-21
	MoU's Management with Stakeholders	15-Dec-21	31-March-22
	Defining of Legislation and institutional Framework	15-Dec-21	15-Jan-22
	Undertake an assessment of PSCA Infrastructure, PITB developed systems and review of ADP scheme "Development of Online Statistical System in Punjab", initiated by Bureau of Statistics.	15-Dec-21	15-Feb-21
	Review of existing PC-I of Smart City Lahore Phase-I	15-Dec-21	5-Jan-22

	Feasibility Study, Gap Analysis, Need assessment, Surveys and Site Investigations	15-Dec-21	15-Jan-22
Smart City Solutions Planning and Design	Designing the comprehensive System architecture of Smart City which must include blue prints for Data Platform, IOT gateways design and infrastructure backbone/network architecture and sensor nodes.	16-Jan-22	20-April-22
	Specifications finalization of the hardware/IOT/Infrastructure including detailed BOQ's along with item line costing	1-March-22	15-April-22
Determine requirements for civil works at the designated site as identified by the sponsor	Feasibility Study and Site inspection	15-Dec-21	15-Jan-22
	Develop detail design in all aspects of Control room	16-Jan-22	20-April-22
	Assist in Planning and Designing for Control Room estimates as per the requirements of the systems	10-March -22	20-April-22

5. Role of Client Agencies

Responsibilities	LG&CD	PITB

Preparation of ToRs	R	I
Selection of Consultancy Firm	R	I
Advertisement of ToRs	R	I

6. Core Team of Experts required for the Assignments

The Description of Core Team which is required in Consultancy are as follows:

Sr. No	Expert Description	Minimum Qualification	Experience	No of Positions	Man, Months Required
1	**Team Leader**	16 Years of education in Computer Science/Software Engineering/IT or related discipline from an HEC recognized local or foreign Institution. Knowledge of Control systems/Telecommunication will be a plus.	15 Years' experience of IT systems and infrastructure development /Systems Integration and Command Control Center. Minimum 5 Years of Project Management /Implementation experience in the IT sector with expertise of Smart City solutions.	1	4 Months
2	**IOT Expert**	16 Years of education in Computer Science/Software Engineering/IT or related	5 Years' experience in developing IoT Architecture, In-	1	4 Months

		discipline from an HEC recognized foreign Institution	depth understanding of computer programming and network security, custom-build firmware and hardware. Minimum 3 Years of Working Experience with IoT software like Netbeast, Neura, OpenSensors ,Node ,Big Data,machine learning algorithms and experience with custom-build firmware and hardware		
3	**Radio Frequency (RF) Expert**	16 Years of educations in Telecommunication/Electrical Engineering or Related discipline from an HEC recognized local or foreign Institution	5 Years' experience in RF field , sound expertise to Perform, characterize, quantify and optimize electrical and RF frequency	1	4 Months

			performance of wireless systems and components		
4	**Artificial Intelligence/Machine Learning Expert**	16 Years of Education in Computer Science/ Computer Engineering/ IT or related from a reputed recognized local or foreign Institution. Master degree is a plus.	5 Years of relevant experience in software development, expertise in Python and basic libraries for machine learning, visualizing and manipulating big datasets. Minimum 3 years of experience in hardware to run an ML model	1	2 Months

| 5 | **Database System integration Expert** | 16 Years of educations in Computer Science/IT/Software Engineering/Computer Engineering or Related discipline from an HEC recognized local or foreign Institution | 5 Years working experience of hardware and software troubleshooting, Familiarity with TCP/IP protocols, firewall management, database administration and Working technical experience with relational database servers.

Minimum 2 years of experience of SQL and MySQL, understanding of code and script (PHP, Python, Perl, Node, Powershell and/or Ruby). | 1 | 2 Months |
| 6 | **Institutional/Legal Expert** | 16 years of education in Law/ Policy studies/ Public Administration Related discipline from an HEC recognized local or foreign Institution | Minimum 10 years' experience in the field of Law /Policy Studies/Public Administration with 5 Years' experience in defining Legal | 1 | 4 Months |

			and Institutional Gap analysis technically sound in legal matters and should have in depth knowledge of the local legal ,environment and Policy Institutional		
7	**Economist/Financial Expert**	16 years of education in Economics/Finance or Related discipline from an HEC recognized local or foreign Institution	5 Years' experience of in Developing economic/financial models, generate reports of economic outlook, Design advanced analysis of projects, Evaluate other work using best practices,	1	2 Months
8	**Civil Expert**	16 Years of education in Civil Engineering or Related discipline from an HEC recognized local or foreign Institution. Registered Engineer with PEC	5 Years' experience of in developing detailed designs of IT related control rooms, Doing feasibility assessment and site inspections, well aware Punjab government regulations and ordinances related to construction. Must work at least 3 years on design software such as AutoCAD,Autodesk ,Civil 3D and Map Creation.	1	4 Months

Note: Professional Liability of the consultant as per PPRA Rules

8. Tentative Consultant Costing

A) Tentative/Remuneration Package of Core Team inclusive of Govt. Taxes

Core Team of Experts					
Sr. No	Position Title	No of Positions	No of Months	Package/Month	Total Cost
1	Team Leader	1	4	1,000,000	4,000,000
2	IOT Expert	1	4	700,000	2,800,000
3	RF Expert	1	4	700,000	2,800,000
4	AI/ML Expert	1	2	700,000	1,400,000
5	Database System integration Expert	1	2	700,000	1,400,000
6	Institutional/Legal Expert	1	4	700,000	2,800,000
7	Economist/Financial Expert	1	2	700,000	1,400,000
8	Civil Experts	1	4	350,000	1,400,000
Total					**PKR.18,000,000/-**

B) Reimbursable/Direct Cost inclusive of Govt. Taxes

Head	Total Cost
Operational Management/Overhead Charges/	PKR.500,000/-