

Below is a **government-style DPR/RFP draft framework for an Indian Municipal Corporation**. The financial figures are **indicative planning estimates** and should be validated through a city survey, asset inventory, market assessment, and procurement process.

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DETAILED PROJECT REPORT (DPR)

FOR

MUNICIPAL DIGITAL TWIN PLATFORM (MDTP)

Integrated GIS, IoT, Utility Monitoring, Asset Management and Command & Control Platform

Submitted To

[Name of Municipal Corporation / Urban Local Body / Smart City SPV]

Submitted By

[Department / Consultant / Project Management Consultant]

Project Location

[City, State, India]

Project Duration

24 Months Implementation + 5 Years Operations & Maintenance

Procurement Model

Design, Develop, Supply, Install, Integrate, Test, Commission, Operate and Maintain

PART A: DETAILED PROJECT REPORT

1. EXECUTIVE SUMMARY

The [Name of Municipal Corporation] proposes to establish a **Municipal Digital Twin Platform (MDTP)** to create an integrated digital representation of municipal infrastructure, utilities, assets and operational services.

The proposed platform will integrate spatial information, real-time operational data, IoT devices, existing departmental applications and analytical systems into a unified platform.

The Municipal Digital Twin Platform shall provide the Authority with the capability to:

- Maintain a GIS-based digital inventory of municipal infrastructure.
- Monitor selected municipal utilities in real time.
- Integrate existing SCADA, IoT, GPS and departmental systems.
- Visualize infrastructure through 2D GIS and optional 3D digital twin environments.
- Monitor municipal assets throughout their lifecycle.
- Generate alerts and incidents.
- Support preventive and predictive maintenance.
- Provide AI-enabled analytics where sufficient data is available.
- Support decision-making through executive and departmental dashboards.
- Enable field staff to update infrastructure information using mobile applications.

The proposed project shall initially focus on high-priority municipal infrastructure and shall be designed for future expansion.

2. PROJECT NEED AND JUSTIFICATION

Municipal infrastructure is generally managed by multiple departments, contractors and technology systems.

Information may exist in:

- Paper records.
- CAD drawings.
- Excel sheets.
- GIS databases.
- SCADA systems.
- Standalone departmental applications.
- Vehicle GPS platforms.
- IoT platforms.
- Contractor-managed systems.

This creates several operational challenges:

1. Lack of a single source of truth.
2. Difficulty locating underground and above-ground assets.
3. Reactive maintenance practices.
4. Delayed identification of infrastructure failures.
5. Limited real-time visibility.
6. Inconsistent asset information.
7. Difficulty coordinating across departments.
8. Limited use of historical data for planning.
9. Inefficient deployment of maintenance resources.

The proposed Digital Twin Platform will address these challenges through an integrated municipal infrastructure management environment.

3. PROJECT OBJECTIVES

The objectives of the project are to:

3.1 Establish a Municipal Digital Asset Registry

Create a standardized, GIS-linked inventory of municipal infrastructure.

3.2 Create a Unified GIS Platform

Provide authorized users with a common spatial platform for infrastructure planning and operations.

3.3 Integrate Real-Time Data

Integrate data from:

- IoT devices.
- SCADA systems.
- GPS systems.
- Smart meters.
- Existing applications.
- Mobile field applications.

3.4 Improve Asset Lifecycle Management

Enable monitoring of:

- Asset location.
- Condition.
- Ownership.
- Installation history.
- Maintenance history.
- Remaining useful life.

3.5 Enable Predictive Operations

Use analytics and machine learning to identify anomalies and potential failures.

3.6 Improve Municipal Decision-Making

Provide dashboards for:

- Municipal Commissioner.
- Chief Engineer.
- Department Heads.
- Ward Officers.
- Field Supervisors.

4. PROJECT SCOPE

The project shall be implemented as a modular platform.

Core Modules

Module 1: GIS Base Platform

- Module 2: Municipal Asset Registry
- Module 3: Water Supply Digital Twin
- Module 4: Sewerage and Stormwater Digital Twin
- Module 5: Streetlight Management Digital Twin
- Module 6: Municipal Fleet and Solid Waste Monitoring
- Module 7: Environmental Monitoring
- Module 8: Integrated Command Dashboard
- Module 9: Mobile Field Force Application
- Module 10: AI and Predictive Analytics

5. PROJECT IMPLEMENTATION APPROACH

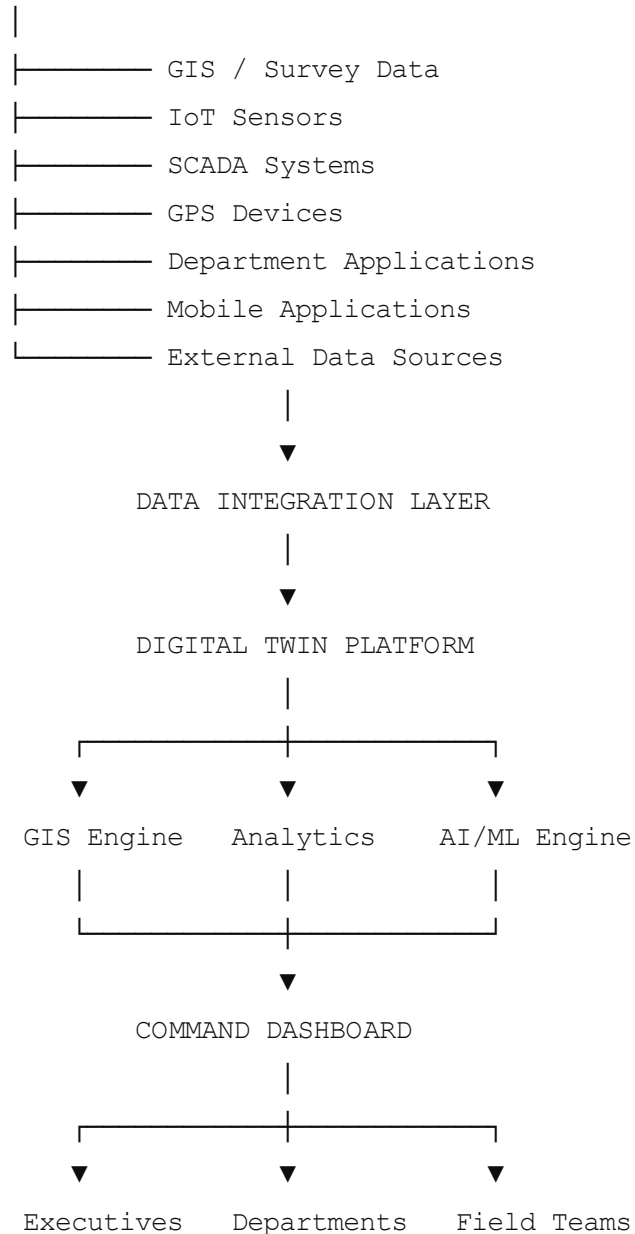
The project shall be implemented in the following phases:

Phase	Activity	Duration
Phase 1	Project Mobilization	1 Month
Phase 2	Requirement Study and Data Assessment	2 Months
Phase 3	GIS and Asset Data Development	4 Months
Phase 4	Core Platform Development	4 Months
Phase 5	Integration and IoT Deployment	5 Months
Phase 6	Pilot Implementation	3 Months
Phase 7	City-Wide Rollout	5 Months
Total	Implementation Period	24 Months

6. FUNCTIONAL ARCHITECTURE

Data Sources

Municipal Assets



7. DETAILED MODULE SPECIFICATIONS

7.1 GIS BASE PLATFORM

The GIS platform shall provide:

- Multi-layer GIS visualization.
- Ward boundaries.
- Administrative boundaries.
- Road network.

- Municipal properties.
- Utility networks.
- Infrastructure assets.
- Search and query capability.
- Layer management.
- Spatial analysis.
- Measurement tools.
- Map printing.
- Role-based access.
- Web-based access.

The system shall support standard spatial data formats and open interfaces.

7.2 MUNICIPAL ASSET MANAGEMENT SYSTEM

Each asset shall have a unique Asset ID.

Minimum Asset Attributes

- Asset ID.
- Asset Type.
- Department.
- Location.
- GPS coordinates.
- Installation date.
- Manufacturer, where applicable.
- Asset condition.
- Asset status.
- Expected life.
- Maintenance history.
- Photograph.
- Supporting documents.

Asset Categories

The system shall support:

- Roads.
- Streetlights.

- Pumps.
 - Pipelines.
 - Valves.
 - Manholes.
 - Drains.
 - Public buildings.
 - Parks.
 - Vehicles.
 - Electrical assets.
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7.3 WATER SUPPLY DIGITAL TWIN

The Water Supply Module shall support:

- Water source mapping.
- Treatment plant monitoring.
- Reservoir monitoring.
- Pump station monitoring.
- Pipeline mapping.
- Valve mapping.
- Pressure monitoring.
- Flow monitoring.
- Water-level monitoring.

Analytics

The system should support:

- Pressure anomaly detection.
 - Flow anomaly detection.
 - Potential leakage identification.
 - Water demand forecasting.
 - Pump performance analysis.
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7.4 SEWERAGE AND STORMWATER DIGITAL TWIN

The module shall provide:

- Sewer network mapping.
- Drainage network mapping.
- Manhole inventory.
- Pump station monitoring.
- Water-level monitoring.
- Overflow alerts.
- Blockage reporting.

Advanced Analytics

Where data availability permits:

- Flood-risk analysis.
 - Drainage capacity analysis.
 - Rainfall correlation.
 - Historical incident analysis.
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7.5 STREETLIGHT DIGITAL TWIN

The system shall provide:

- Streetlight GIS mapping.
 - Asset identification.
 - Operational status.
 - Fault reporting.
 - Energy consumption integration.
 - Maintenance scheduling.
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7.6 SOLID WASTE AND FLEET DIGITAL TWIN

The platform shall support:

- GPS tracking.
- Vehicle route visualization.
- Vehicle utilization.
- Collection route monitoring.
- Vehicle maintenance tracking.
- Route performance analytics.

7.7 COMMAND AND CONTROL DASHBOARD

The Executive Dashboard shall display:

City-Level Indicators

- Total municipal assets.
- Assets under maintenance.
- Active incidents.
- Critical alerts.
- Utility performance.
- Fleet status.

Department Dashboards

Separate dashboards shall be available for:

- Water Department.
- Engineering Department.
- Electrical Department.
- Solid Waste Department.
- Sewerage Department.

8. BILL OF QUANTITIES (INDICATIVE BOQ)

ASSUMPTION FOR FINANCIAL ESTIMATION

The following indicative BOQ is based on a **medium-sized municipal corporation** with:

- Population: approximately 5–15 lakh.
- Municipal area: approximately 100–300 sq. km.
- Multiple wards.
- Existing partial GIS/IT infrastructure.
- Phased IoT deployment.

Final quantities shall be determined through a detailed field survey.

8.1 SOFTWARE AND PLATFORM BOQ

Item No.	Item Description	Unit	Qty	Indicative Amount (₹ Lakh)
1	Municipal Digital Twin Core Platform	LS	1	250
2	GIS Platform and Spatial Database	LS	1	100
3	Municipal Asset Management Module	LS	1	80
4	Water Supply Digital Twin Module	LS	1	100
5	Sewerage & Drainage Module	LS	1	90
6	Streetlight Management Module	LS	1	60
7	Fleet & Waste Management Module	LS	1	60
8	Command & Executive Dashboards	LS	1	75
9	Mobile Field Force Application	LS	1	50
10	API & Integration Framework	LS	1	100
11	AI & Analytics Framework	LS	1	100
12	Alert & Incident Management	LS	1	50

Subtotal – Software Platform

₹1,115 Lakh (₹11.15 Crore)

8.2 GIS AND DATA DEVELOPMENT BOQ

Item No.	Description	Unit	Indicative Amount (₹ Lakh)
1	Existing GIS Data Assessment	LS	25
2	GIS Data Cleaning and Standardization	LS	60
3	Municipal Asset Survey	LS	150
4	Asset Digitization	LS	100
5	Utility Network Mapping	LS	125
6	GIS Database Development	LS	50
7	Data Quality Validation	LS	40

Subtotal – GIS and Data

₹550 Lakh (₹5.50 Crore)

8.3 IoT INFRASTRUCTURE BOQ

Water Infrastructure

Item	Qty	Indicative Unit Cost	Indicative Amount
Flow Monitoring Devices	100	₹2.50 Lakh	₹250 Lakh
Pressure Monitoring Devices	150	₹1.50 Lakh	₹225 Lakh
Water-Level Sensors	75	₹1.00 Lakh	₹75 Lakh
Pump Monitoring Units	50	₹2.00 Lakh	₹100 Lakh

Water IoT Subtotal

₹650 Lakh (₹6.50 Crore)

Sewerage and Drainage

Item	Qty	Indicative Amount
Water-Level Sensors	100	₹150 Lakh
Drain Monitoring Sensors	50	₹100 Lakh
Pump Station Monitoring	25	₹75 Lakh

Sewerage IoT Subtotal

₹325 Lakh (₹3.25 Crore)

Environmental Monitoring

Item	Qty	Indicative Amount
Weather Monitoring Stations	10	₹50 Lakh
Air Quality Monitoring Integration/Devices	10	₹100 Lakh
Rainfall Sensors	25	₹25 Lakh

Environmental Monitoring Subtotal

₹175 Lakh (₹1.75 Crore)

8.4 HARDWARE AND INFRASTRUCTURE BOQ

Item	Indicative Amount (₹ Lakh)
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Application Servers / Cloud Infrastructure Setup	100
Database Infrastructure	50
Backup and Disaster Recovery	75
Network and Security Equipment	75
IoT Gateway Infrastructure	100
Field Tablets/Mobile Devices	50

Subtotal

₹450 Lakh (₹4.50 Crore)

8.5 PROJECT IMPLEMENTATION AND SERVICES

Item	Indicative Amount (₹ Lakh)
Project Management	100
System Integration	150
Testing and Quality Assurance	50
Training	40
Change Management	40
Documentation	25
Pilot Deployment	75

Subtotal

₹480 Lakh (₹4.80 Crore)

9. INDICATIVE CAPEX

Component	Estimated Cost
Software Platform	₹11.15 Crore
GIS & Asset Data Development	₹5.50 Crore
Water IoT	₹6.50 Crore
Sewerage IoT	₹3.25 Crore
Environmental Monitoring	₹1.75 Crore
Hardware & Infrastructure	₹4.50 Crore
Implementation Services	₹4.80 Crore

TOTAL INDICATIVE CAPEX

₹37.45 CRORE

10. CONTINGENCY

A contingency provision may be considered for:

- Scope refinement.
- Field conditions.
- Integration complexity.
- Additional infrastructure requirements.

Indicative Contingency: 5%

₹1.87 Crore

TOTAL PROJECT CAPEX INCLUDING INDICATIVE CONTINGENCY

₹39.32 CRORE

Taxes, duties and applicable statutory charges shall be handled as per the procurement and financial rules applicable to the Authority.

11. FIVE-YEAR OPEX MODEL

The project shall include a minimum **five-year O&M period** after commissioning.

Annual OPEX Components

Component	Annual Indicative Cost
Software Support	₹1.00 Crore
Cloud/Data Centre	₹0.75 Crore
IoT Maintenance	₹1.25 Crore
Helpdesk & Technical Support	₹0.75 Crore
Cybersecurity Monitoring	₹0.40 Crore
GIS/Data Updates	₹0.50 Crore
AI Model Maintenance	₹0.35 Crore

Estimated Annual OPEX

₹5.00 CRORE

Five-Year OPEX

Year	Indicative OPEX
Year 1	₹5.00 Crore
Year 2	₹5.25 Crore
Year 3	₹5.51 Crore

Year 4	₹5.79 Crore
Year 5	₹6.08 Crore

Total Five-Year Indicative OPEX

₹27.63 CRORE

12. TOTAL PROJECT COST

Component	Estimated Cost
CAPEX Including Contingency	₹39.32 Crore
Five-Year OPEX	₹27.63 Crore

TOTAL FIVE-YEAR PROJECT OUTLAY

₹66.95 CRORE

13. FINANCIAL BENEFIT FRAMEWORK

The Authority shall establish baseline operational data before calculating final financial benefits.

Potential benefit areas include:

Water

- Reduced water losses.
- Improved pump efficiency.
- Reduced emergency repairs.

Streetlights

- Reduced energy consumption.
- Faster fault identification.

Fleet

- Reduced fuel consumption.
- Improved vehicle utilization.

Assets

- Extended asset lifecycle.
- Reduced emergency maintenance.

Administration

- Reduced manual reporting.
 - Faster infrastructure planning.
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14. RFP TECHNICAL SPECIFICATIONS

PART B: REQUEST FOR PROPOSAL (RFP)

1. SCOPE OF WORK OF THE SYSTEM INTEGRATOR

The selected System Integrator shall:

1. Conduct detailed project assessment.
 2. Prepare Solution Design Document.
 3. Conduct data assessment.
 4. Develop the Municipal Digital Twin Platform.
 5. Establish GIS databases.
 6. Conduct asset surveys.
 7. Integrate existing systems.
 8. Supply and install IoT infrastructure where included.
 9. Develop dashboards.
 10. Develop mobile applications.
 11. Configure analytics.
 12. Test the complete system.
 13. Conduct pilot implementation.
 14. Roll out the system city-wide.
 15. Provide training.
 16. Provide five years of O&M.
-

15. MINIMUM TECHNICAL REQUIREMENTS

15.1 Architecture

The solution shall:

- Be modular.
 - Be scalable.
 - Support open APIs.
 - Support horizontal scaling where applicable.
 - Support secure integration.
 - Avoid unnecessary vendor lock-in.
 - Support cloud or government-approved hosting infrastructure.
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15.2 GIS REQUIREMENTS

The GIS system shall support:

- Vector data.
 - Raster data.
 - Spatial databases.
 - Web GIS.
 - Layer management.
 - Spatial queries.
 - Geocoding.
 - Asset visualization.
 - Mobile GIS.
-

15.3 DIGITAL TWIN REQUIREMENTS

The Digital Twin Platform shall support:

Asset Representation

Each physical asset shall have a corresponding digital representation.

Asset State

The system shall support:

- Static data.
- Real-time data.
- Historical data.

Relationships

The platform shall represent relationships between:

- Assets.
- Networks.
- Locations.
- Departments.

Events

The platform shall capture:

- Alerts.
- Failures.
- Maintenance events.
- Sensor events.

15.4 IoT REQUIREMENTS

The IoT platform shall support:

- Device registration.
- Device authentication.
- Secure communication.
- Remote configuration where supported.
- Device health monitoring.
- Time-series data ingestion.

The proposed IoT solution should support standard protocols appropriate to the deployed environment, including MQTT and HTTPS/API-based integration.

15.5 API REQUIREMENTS

The platform shall provide:

- REST APIs.
 - Secure authentication.
 - API documentation.
 - Version management.
 - Logging.
 - Rate controls where required.
-

15.6 AI AND ANALYTICS REQUIREMENTS

The system shall provide:

- Data analytics.
- Trend analysis.
- Anomaly detection.
- Forecasting capability.
- Predictive maintenance capability.

AI models shall be deployed only where adequate and reliable data is available.

The bidder shall clearly specify:

- Input data requirements.
 - Model assumptions.
 - Accuracy metrics.
 - Limitations.
 - Retraining methodology.
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16. CYBERSECURITY REQUIREMENTS

The System Integrator shall implement appropriate security controls.

Minimum Requirements

- Role-Based Access Control.
- Strong authentication.
- Encryption in transit.
- Encryption at rest where required.

- Audit logging.
- Security event monitoring.
- Vulnerability management.
- Backup procedures.
- Disaster recovery procedures.
- Periodic security testing.

The bidder shall provide a detailed cybersecurity architecture as part of the Technical Proposal.

17. DATA OWNERSHIP

All municipal data generated, collected or processed under the project shall remain the property of the Authority, subject to applicable law and contractual provisions.

The System Integrator shall not:

- Sell municipal data.
- Use municipal data for unrelated commercial purposes.
- Transfer data without authorization.

At the end of the contract, the Authority shall receive:

- Complete data export.
- GIS databases.
- Asset databases.
- Documentation.
- Configuration records.
- API documentation.

18. SERVICE LEVEL AGREEMENT (SLA)

Platform Availability

Parameter	Minimum Target
Core Platform Availability	99.5%
Critical Incident Response	30 Minutes

High Incident Response	2 Hours
Medium Incident Response	8 Hours
Low Incident Response	Next Business Day

19. ACCEPTANCE TESTING

The project shall undergo:

Factory Acceptance Testing

Where applicable.

System Integration Testing

To validate integrations.

User Acceptance Testing

By nominated Authority representatives.

Pilot Acceptance

Following successful pilot operations.

Final Acceptance

Following completion of agreed city-wide rollout.

20. TRAINING REQUIREMENTS

The System Integrator shall provide training for:

Level 1: Executive Users

Dashboard and decision support.

Level 2: Department Officers

Operational monitoring and reporting.

Level 3: Technical Users

Administration and configuration.

Level 4: Field Staff

Mobile applications and asset inspection.

21. PROJECT DELIVERABLES

The System Integrator shall provide:

1. Project Inception Report.
 2. Requirement Specification Document.
 3. Solution Architecture Document.
 4. Data Migration Plan.
 5. GIS Data Model.
 6. Digital Twin Data Model.
 7. Integration Design.
 8. Cybersecurity Design.
 9. Test Plan.
 10. User Manuals.
 11. Administrator Manuals.
 12. Training Materials.
 13. Asset Survey Reports.
 14. API Documentation.
 15. O&M Manuals.
 16. Disaster Recovery Plan.
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22. BIDDER ELIGIBILITY – INDICATIVE

The Authority may require bidders to demonstrate:

Technical Experience

Experience in relevant areas such as:

- GIS.
- IoT.
- Smart City projects.

- Utility systems.
- Enterprise software integration.
- Digital infrastructure management.

Financial Capacity

Minimum financial eligibility may be determined based on the estimated project value and applicable procurement policy.

Team Requirements

The proposed team should include:

- Project Manager.
- Solution Architect.
- GIS Architect.
- IoT Architect.
- Data Engineer.
- Cybersecurity Specialist.
- AI/Data Science Specialist.
- Software Development Team.
- Field Survey Team.
- Training Team.

23. TECHNICAL EVALUATION FRAMEWORK – INDICATIVE

Evaluation Criteria	Marks
Relevant Experience	20
Technical Architecture	20
Digital Twin Solution	15
GIS and Integration Capability	15
IoT Architecture	10
Cybersecurity Approach	5
Implementation Methodology	10

Total: 100 Marks

The Authority may establish a minimum qualifying technical score before opening financial proposals.

24. PAYMENT MILESTONES – INDICATIVE

Milestone	Payment
Project Mobilization	5%
Requirement & Solution Design	10%
GIS/Data Development	15%
Core Platform Delivery	20%
Integration Completion	15%
Pilot Acceptance	10%
City-Wide Go-Live	15%
Final Acceptance	10%

O&M payments may be released quarterly or monthly against SLA compliance.

25. PROJECT GOVERNANCE

Project Steering Committee

Responsible for:

- Strategic guidance.
- Major approvals.
- Interdepartmental coordination.

Project Management Unit

Responsible for:

- Daily project monitoring.
- Vendor coordination.
- Deliverable approval.

Department Nodal Officers

Responsible for:

- Department data.
- Operational validation.
- User acceptance.

26. RISK MANAGEMENT

Risk	Mitigation
Poor GIS Data	Field verification
Legacy Integration Issues	Early technical assessment
Low User Adoption	Training and change management
IoT Device Failure	Maintenance and monitoring
Cybersecurity Threats	Security controls and audits
Scope Expansion	Change-control process
Vendor Lock-in	Open APIs and data ownership clauses

27. RECOMMENDED PROCUREMENT MODEL

The recommended procurement approach is:

Design–Build–Integrate–Operate–Maintain Model

The selected System Integrator shall have single-point responsibility for:

- Design.
- Development.
- Integration.
- Deployment.
- Commissioning.
- Support.

The Authority should ensure:

- Open architecture.
 - Data ownership.
 - Interoperability.
 - Documented interfaces.
 - Exit management provisions.
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28. PILOT RECOMMENDATION

Before full city-wide deployment, the Authority should implement a pilot.

Recommended Pilot Scope

Geographic Area

2–5 Municipal Wards

Infrastructure

- Selected water infrastructure.
- Streetlights.
- Municipal assets.
- Waste collection vehicles.
- Selected drainage infrastructure.

Pilot Duration

6–9 Months

Pilot Outcome

The Authority shall evaluate:

- Data quality.
- System performance.
- Integration success.
- User adoption.
- Operational benefits.

29. CONCLUSION AND RECOMMENDATION

The proposed Municipal Digital Twin Platform will establish a unified digital infrastructure environment for the [Name of Municipal Corporation].

The project will enable the Authority to transition toward:

- Integrated infrastructure management.
- Real-time monitoring.
- Predictive maintenance.
- GIS-based planning.
- Data-driven governance.
- Improved municipal service delivery.

It is recommended that the Authority approve a **Detailed Technical Assessment and Pilot Phase**, followed by phased city-wide implementation.

ANNEXURE A: INDICATIVE PROJECT COST SUMMARY

Category	Amount
Software Platform	₹11.15 Crore
GIS & Asset Data	₹5.50 Crore
IoT Infrastructure	₹11.50 Crore
Hardware/Infrastructure	₹4.50 Crore

Implementation Services	₹4.80 Crore
Subtotal	₹37.45 Crore
Contingency	₹1.87 Crore
CAPEX	₹39.32 Crore
5-Year OPEX	₹27.63 Crore
Total Project Outlay	₹66.95 Crore

ANNEXURE B: PROPOSED PROCUREMENT PACKAGE STRUCTURE

Package 1

Municipal Digital Twin Software and System Integration

Package 2

GIS Survey and Municipal Asset Digitization

Package 3

IoT Infrastructure and Field Instrumentation

Package 4

Cloud/Data Centre and Cybersecurity Infrastructure

Alternatively, the Authority may procure all packages through a single System Integrator under a turnkey model.

ANNEXURE C: PROJECT TAGLINE

**“ONE CITY. ONE DIGITAL VIEW. SMARTER
MUNICIPAL SERVICES.”**

Municipal Digital Twin Platform

A Foundation for Intelligent, Resilient and Data-Driven Urban Governance

Important next step

For an actual government tender, this draft should now be converted into a **city-specific DPR**, because the BOQ and ₹66.95 crore estimate will change significantly based on the city's:

- Area and number of wards
- Population
- Existing GIS data
- Number of water assets
- Number of streetlights
- Existing SCADA/IoT systems
- Number of municipal vehicles
- Required command center infrastructure

I can next prepare a full Tender/RFP document (approximately 40–60 sections) including NIT, Instructions to Bidders, eligibility criteria, technical compliance matrix, SLA penalties, bid formats, and commercial BOQ.