FEASIBILITY STUDY DOCUMENT

Project Title: Jalanidhi – A Smart Water Supply and Management Platform with IoT and AI Enhancements

The project **Jalanidhi** aims to create a **smart, ward-based water supply and complaint management system** that integrates **IoT and AI** for better transparency, accountability, and citizen engagement. The system allows: - Citizens to apply for new connections, pay bills, receive supply alerts, and submit geo-tagged complaints. - Supervisors to verify connections, perform QR check-ins, log readings, and monitor tank levels. - Admins to manage supply schedules, review complaints, and monitor service efficiency. The IoT integration enables real-time **tank water level monitoring and pressure-based leak detection**, while AI modules classify user complaints (leakages, low pressure, illegal taps, pipeline damage) for faster resolution.

1. Technical Feasibility

- **Technology Stack:** Flutter (citizen & supervisor app), React.js (admin dashboard), Firebase (backend & notifications), ESP32 (IoT water level & flow sensors), TensorFlow Lite (AI complaint categorization).
- **Reason:** Beginner-friendly, scalable, and low-cost IoT setup (~ ₹ 2,500 – ₹ 3,500). Cloud services handle authentication, storage, and real-time updates efficiently.

2. Operational Feasibility

- **Users:** Citizens, Supervisors, Admins.

- **Impact:** Eliminates manual card marking, enables instant complaint tracking, and improves decision-making for maintenance. User-friendly mobile apps and dashboards require minimal training.

Conclusion: Fully operational with intuitive UI and simple workflows.

3. Economic Feasibility

- **Estimated Cost for Prototype:**

• ESP32 + Ultrasonic Water Level Sensor: ₹500–700

• Pressure/Flow Sensor: ₹500–700

• Miscellaneous (PCB,wires, model setup): ₹500

• Software: Free (Firebase free tier, Flutter, React.js)

• **Total:** ~₹2,000–₹3,000 for MCA prototype.

Conclusion: Economically viable with low hardware and free-tier cloud services.

4. Time Feasibility

- **Mini Project (3rd Sem, 2–2.5 months):** Core apps, QR check-ins, billing & notifications.

- **Main Project (Final Sem, 3–3.5 months):** IoT water sensor integration, AI complaint categorization, optional leak pinpointing.

Conclusion: Fits academic semester timeline with proper planning.

5. Overall Feasibility Conclusion

The **Jalanidhi** project is **technically, operationally, economically, and temporally feasible** for MCA implementation and future smart city scaling. Its IoT + AI features ensure proactive maintenance, citizen engagement, and water conservation, making it a **sustainable and impactful solution**.