

**Project Design Phase**  
**Proposed Solution Template**

Date	19 February 2026
Team ID	LTVIP2026TMIDS75186
Project Name	Rising Waters: A Machine Learning Approach to Flood Prediction
Maximum Marks	2 Marks

S.No	Parameter	Description
1	Problem Statement	Flood events are increasingly destructive and unpredictable due to volatile climate patterns, making it difficult for government agencies, urban planners, and disaster teams to issue timely alerts, protect infrastructure, and coordinate evacuations.
2	Idea / Solution Description	Develop a machine learning-based flood forecasting system using historical hydrological data and real-time environmental inputs. The solution integrates an LSTM (Long Short-Term Memory) neural network with a GIS-mapped dashboard and USGS/NOAA APIs to provide hyper-local, real-time water level predictions.
3	Novelty / Uniqueness	<ul style="list-style-type: none"> <li>- Combines satellite soil moisture data with live river-gauge telemetry for dynamic inundation mapping.</li> <li>- Features a spatial visualization dashboard that identifies specific "at-risk" zones down to the street level.</li> <li>- Focuses on "Lead-Time Optimization," providing early warnings before physical sensors are even triggered.</li> </ul>
4	Social Impact / Customer Satisfaction	<ul style="list-style-type: none"> <li>- Reduces loss of life and property damage through accurate early warnings.</li> <li>- Empowers marginalized communities in high-risk zones with actionable data.</li> </ul>

S.No	Parameter	Description
		<ul style="list-style-type: none"> <li>- Supports climate resilience goals by making urban areas more prepared for extreme weather.</li>   <li>- Enhances public trust in government emergency response systems.</li> </ul>
5	Business Model (Revenue Model)	<ul style="list-style-type: none"> <li>- B2G (Business-to-Government) model via annual service contracts for municipalities.</li>   <li>- Tiered API access for insurance companies to assess real-time risk.</li>   <li>- Premium subscription for industrial site managers to protect high-value assets.</li> </ul>
6	Scalability of the Solution	<ul style="list-style-type: none"> <li>- Cloud-native deployment (AWS/Azure) allows for monitoring of entire river basins or coastlines.</li>   <li>- Modular architecture supports integration with diverse IoT sensor networks and global weather APIs.</li>   <li>- Framework is adaptable to different flood types (Flash, Fluvial, or Coastal surge).</li>   <li>- Built using containerization (Docker) for rapid deployment in new geographic regions.</li> </ul>