Project Design Phase-II

Technology Stack (Architecture & Stack)

Date	06 February 2026
Team ID	LTVIP2026TMIDS24399
Project Name	Civil Engineering Insight Studio
Maximum Marks	4 Marks

Technical Architecture:

User Uploads Image → Streamlit UI → PIL Image Processing → NVIDIA NIM Vision API → Response Processing (Python) → Local Storage (JSON) → PDF Generation (ReportLab)

Table-1: Components & Technologies:

S.No	Component	Description	Technology
1	User Interface	Web-based interface for image upload and analysis	Streamlit
2	Application Logic-1	Image preprocessing and validation	Python, PIL
3	Application Logic-2	AI request handling and response processing	NVIDIA NIM Vision API
4	Application Logic-3	Report formatting and structuring	Python
5	File Storage	Storage of reports and history	JSON File System
6	External API-1	AI-based vision analysis service	NVIDIA NIM API
7	Machine Learning Model	Pre-trained vision-language model for image analysis	NVIDIA NIM Vision Model
8	Infrastructure (Server / Cloud)	Local deployment environment	Local Deployment

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1	Open-Source Frameworks	Web framework and development tools used	Streamlit, Python
2	Security Implementations	Secure API key handling	Environment Variables (.env)
3	Scalable Architecture	Supports structured inspection workflow	Modular Python Architecture
4	Availability	Accessible via local hosting	Streamlit Local Hosting
5	Performance	Fast image upload and report generation	Optimized NVIDIA Vision API