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Road Intersection Design for Improved Traffic Flow at CJITS College Road Junction Using Autocad Civil 3D

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Abstract: *This project presents the geometric design and technical evaluation of a T-intersection and the adjoining approach roads near CJITS College, Jangaon, with the primary aim of enhancing campus accessibility and road safety. The design includes a 257.98-meter-long main road connecting to NH-163 and a 586.69-meter-long secondary road intersecting the main road at chainage 130 meters, forming a T-junction.*

High-resolution topographic data was collected using drone-based aerial surveys, producing a Digital Elevation Model (DEM) and orthomosaic (Ortho) imagery. These datasets were georeferenced using Ground Control Points (GCPs) obtained through Differential GPS (DGPS), ensuring high spatial accuracy for terrain modeling and alignment design.

Traffic studies were conducted to assess existing and projected traffic flow. A classified volume count (CVC) and turning movement count (TMC) at the intersection provided insights into vehicle types, directional movements, and peak-hour conditions. The peak-hour volume reached 226 vehicles/hour, with an Average Annual Daily Traffic (AADT) of approximately 2,100 vehicles/day.

The road design adheres to IRC and MORTH standards, incorporating 3.0 m lanes with 1.5 m shoulders. Turning radii of 9–10 meters were applied to accommodate light vehicles. Subgrade strength was verified through California Bearing Ratio (CBR) tests, with soaked CBR values averaging 7%, suitable for flexible pavement. The pavement structure was designed using IRC:37-2018 guidelines for a design traffic of 2 million standard axles (msa).

Earthwork computations, based on chainage-wise level differences from the DEM, yielded precise cut-and-fill volumes. Material quantities for each pavement layer—bituminous surface, wet mix macadam (WMM) base, and granular sub-base (GSB)—were also computed. A comprehensive Bill of Quantities (BOQ) was prepared.

This project demonstrates an integrated approach combining drone technology, DGPS surveys, traffic analysis, and IRC-standard road design for efficient and sustainable road infrastructure planning in a rural institutional setting

Keywords: CJITS College