

**DESIGN OF HIGHWAY INFRASTRUCTURE
IN THE SAPTOSARI AREA OF GUNUNGKIDUL**

Final Project Infrastructure



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GUNUNGKIDUL is an original work and not a plagiarism of someone else's work. We, the undersigned, have contributed to this final project in equal proportions. Thus, we make this statement as a complement to the final document of this project.

Yogyakarta, 21st June 2025



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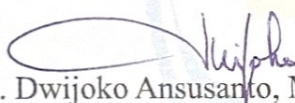
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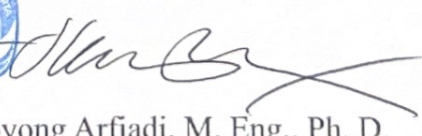
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STATEMENT

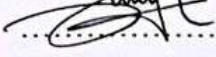
Final Project Infrastructure

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ABSTRACT

The development of road infrastructure is fundamental for enhancing connectivity, supporting economic growth, and improving the quality of life in regional areas. This study focuses on the design of highway infrastructure in the Saptosari area of Gunungkidul, addressing the need for improved transportation facilities to accommodate increasing mobility and traffic demands. The planning process adheres to established standards and guidelines to ensure safety, accessibility, and durability of the road network.

The methodology integrates manual calculations and software tools, referencing national and international regulations to achieve an optimal design. The design workflow is divided into two primary stages: geometric and pavement design, followed by geotechnical analysis. The geometric design stage encompasses the determination of horizontal and vertical alignments, superelevation, and cross-sectional profiles, utilizing the Analytic Hierarchy Process (AHP) to select the most effective route based on criteria such as road length, curvature, and elevation. Pavement design considers projected traffic loads, vehicle types, and subgrade conditions, with flexible pavement selected according to the Manual for Road Pavement by the Directorate General of Highways.

The geotechnical stage involves comprehensive soil investigations, including Standard Penetration Test (SPT) and Cone Penetration Test (CPT), to classify soil types and evaluate bearing capacity. Settlement and embankment stability analyses are conducted to ensure the subgrade can support design loads and to anticipate potential surface subsidence. Calculations for immediate and consolidation settlements are performed, and slope stability is assessed using safety factor analysis. Based on the results of these investigations and analyses, the existing soil conditions have been confirmed as safe and adequate for supporting the planned infrastructure, so no additional soil improvement measures are necessary.

The final design achieves compliance with applicable standards, providing a road infrastructure solution that is both structurally sound and safe in terms of settlement and slope stability. This approach ensures the long-term functionality and resilience of the highway, supporting regional development objectives.

Keywords: Road Design, Infrastructure, Geometric Design, Pavement, Geotechnical Analysis, Gunungkidul, Saptosari

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3. Our parents, families, and loved ones for their unwavering support through prayers, motivation, and material assistance during the preparation of this report and the completion of our studies in the Civil Engineering Study Program, Faculty of Engineering, Atma Jaya Yogyakarta University.

We are fully aware that this report is not without its shortcomings; therefore, we welcome any constructive criticism and suggestions to improve the quality of this final project report, in the hope that it may be beneficial to readers, especially Civil Engineering students.

Yogyakarta, June 19, 2025

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