



Parking Arrangement on Hos Cokroaminoto Street in Banyuwangi Regency

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ABSTRACT

The Hos Cokroaminoto Road section in Banyuwangi Regency has experienced a decline in performance due to high side obstacles, especially on-street parking which uses both sides of the road so that the effective width of the road is reduced from 8 meters to 5.5 meters (a decrease of 31.25%). This study aims to analyze the existing parking conditions and develop parking arrangement proposals to improve road performance. The method used is descriptive quantitative through a road inventory survey, a 16-hour traffic counting survey, and a 12-hour parking survey, which are then analyzed using parameters of accumulation, volume, static and dynamic capacity, duration, parking index, parking turnover rate, and road capacity referring to the 2023 Indonesian Road Capacity Guidelines. The results of the study indicate that the existing parking space requirement is 102 SRP for motorcycles and 81 SRP for cars, with a car parking index reaching 113% which indicates that demand has exceeded supply. Two alternative arrangements are proposed, namely optimizing one-sided parking which increases road capacity to 2,580.2 SMP/hour and providing off-street facilities in the form of a 2,925 m² parking park which increases road capacity to 2,941.43 SMP/hour. Both proposals reduce the V/C Ratio value from 0.77 to 0.55 and 0.49 and improve the Road Service Level (LOS) from D to C, so that traffic flow becomes more stable.



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INTRODUCTION

Transportation is a means of moving people and goods from one location to another according to travel destinations (Ni'am et al. 2024). Population growth, urbanization, and economic activity lead to a continuously increasing need for transportation, while the growth in vehicle numbers is often not matched by adequate road infrastructure development, resulting in an imbalance between road capacity and vehicle volume, potentially causing traffic congestion (Syakuran and Alfiyanti 2025). In addition to infrastructure capacity, the effectiveness of transportation system control is also a crucial factor in its management (Schouten et al. 2025), allowing the quality of the transportation system to be used as an indicator of a region's development success (Triani and Schouten 2023).

Banyuwangi Regency occupies a strategic route at the eastern tip of Java Island, connecting Java and Bali. The development of the economic sector, tourism, and government activities in this region shows an increasing trend, making Banyuwangi a hub for the movement of people and goods, as well as supporting trade, services, and tourism activities (Birahmatika et al. 2025). The development of natural, cultural, and ecotourism destinations also contributes to increased economic activity, investment, and the mobility of residents and tourists (Dinan and Nouri 2025).

One of the roads that plays a crucial role in supporting movement in the center of Banyuwangi City is Hos Cokroaminoto Street, located in the office and educational district and providing access to the commercial area, Banyuwangi Kota Station, and the Tawangalun Sports Hall. This section is a provincial road functioning as a primary collector road, type 2/2 TT, with an effective width of 8 meters. According to Minister of Public Works and Public Housing Regulation No. 5 of 2023, the ideal width for a primary collector road should be 9–9.5 meters (Peraturan Menteri PUPR No. 5 Tahun 2023).

Tentang Perasyaratan Teknis Jalan Dan Perencanaan Teknis Jalan, n.d.). High side obstructions, particularly on-street parking along 200 meters on both sides of the road, vehicles entering and leaving offices and schools, street vendors, and pedestrian activity, have reduced the effective width of the road to 5.5 meters, a 31.25% decrease. The highest traffic volume occurs between 7:00 and 8:00 a.m. Western Indonesian Time (WIB) at 1,427.05 smp/hour due to high school and office activity, resulting in on-road parking potentially reducing the level of road service and increasing side obstacles on the section.

Based on these problems, this study aims to (1) analyze the current parking conditions on Hos Cokroaminoto Street; (2) develop parking arrangement proposals on the section; (3) compare parking layout designs before and after the arrangement; and (4) compare the performance of the section before and after the parking arrangement, resulting in recommendations for technical solutions and traffic management to improve road performance and support smooth transportation in Banyuwangi Regency.

RESEARCH METHODS

This study uses a quantitative descriptive approach, focusing on the Hos Cokroaminoto Street section in Banyuwangi Regency. The data used consist of secondary data, including road network data from the Banyuwangi Regency Public Works Department, and primary data, including road inventory data, traffic counting (TC) data, and parking data analyzed by the Banyuwangi Regency Field Work Practice Team in 2026.

The road inventory survey was conducted through direct observation of the geometric conditions of the road using walking measurements. The traffic counting survey was conducted for 16 hours (5:00–9:00 PM WIB) to determine vehicle volume by vehicle type. The parking survey was conducted for 12 hours (6:00–6:00 PM WIB) to record the number of parked vehicles, parking duration, parking accumulation, and parking turnover rate at four parking locations along the road.

Data analysis included calculations of parking accumulation, parking volume, static and dynamic capacity, parking duration, parking index, parking turnover rate, and parking space requirements, referring to Munawar (2004). Furthermore, an analysis of demand for parking space supply is carried out, proposals for on-street and off-street parking arrangements are prepared, as well as an analysis of road section capacity and road service level (Level of Service/LOS) referring to the 2023 Indonesian Road Capacity Guidelines (Directorate General of Highways, 2023), with the capacity formula $C = C_0 \times FC_{LJ} \times FC_{PA} \times FC_{HS} \times FC_{UK}$, which is the basic capacity multiplied by the adjustment factor for lane width, direction dividers, side obstacles, and city size.

RESULTS AND DISCUSSION

Current Parking Conditions

A survey of four parking areas along Hos Cokroaminoto Street showed that the peak motorcycle parking volume occurred between 11:00 and 11:15 a.m. Western Indonesian Time (WIB), with 24 vehicles in Parking 1 on the left side, while the highest passenger car parking volume occurred between 10:15 and 1:30 p.m. Western Indonesian Time (WIB), with 11–12 vehicles. Based on these maximum parking volumes, the parking space requirements for each area were calculated, as presented in Table 1.

Table 1 Current Parking Space Needs

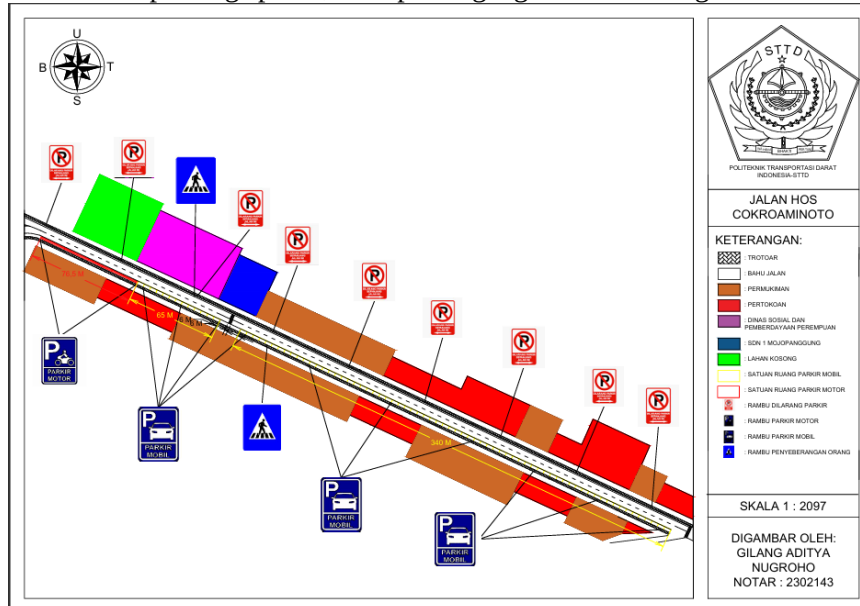
Parking Location	Vehicle Type	Motorcycle Parking Space (units)	Car Parking Space (units)
Parking Area 1 (Hos Cokroaminoto Street)	Motorcycles / Cars	42	23
Parking Area 2 (Hos Cokroaminoto Street)	Motorcycles / Cars	14	22
Parking Area 3 (Hos Cokroaminoto Street)	Motorcycles / Cars	25	15
Parking Area 4 (Hos Cokroaminoto Street)	Motorcycles / Cars	21	21
Total	-	102	81

Source: Analysis Results, 2026

The parking index analysis results indicate that motorcycle parking space utilization rates across all locations remain relatively low, with values ranging from 9% to 30%, indicating that the supply of motorcycle parking spaces is sufficient to meet demand. Conversely, the passenger car parking index is significantly higher, at 75% to 113%. In some locations, demand has even exceeded available parking capacity (index >100%). This indicates that on-street passenger car parking has exceeded available capacity, increasing side barriers and reducing the effective road width from 8 meters to 5.5 meters.

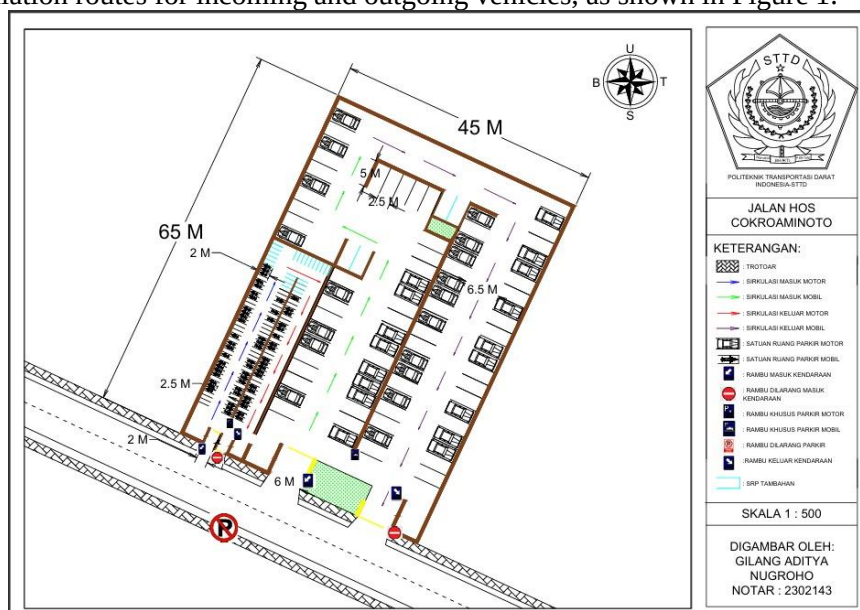
Parking Arrangement Proposal

Based on these conditions, two alternative parking arrangement proposals have been developed. First, optimizing on-street parking by moving all parked vehicles to one side of the road (the left side) and extending the parking area from 200 meters to 495.5 meters, thus accommodating 102 motorcycle parking spaces and 81 car parking spaces, with parking signs and markings.



Picture 1 Proposed On-Street Parking Layout (Source: Analysis Results, 2026)

Second, the provision of off-street facilities in the form of a 2,925 m² (65 m x 45 m) parking area with a 90° parking pattern that can accommodate 123 SRP motorbikes and 85 SRP cars along with separate circulation routes for incoming and outgoing vehicles, as shown in Figure 1.



Picture 2 Proposed Off-Street Parking Layout (Source: Analysis Results, 2026)

Road Section Performance Comparison

Road section performance comparisons were conducted by calculating road capacity using the formula $C = C_0 \times FC_{LJ} \times FC_{PA} \times FC_{HS} \times FC_{UK}$ under three conditions: current conditions, proposed single-sided parking optimization, and proposed off-street parking. The traffic volume used for comparison was the peak hour volume of 1,427.05 pcu/hour. The comparison results are presented in Table 2.

Table 2 Comparison of the Performance of the Hos Cokroaminoto Road Section

Condition	Volume (smp/hour)	Capacity (smp/hour)	V/C Ratio	LOS
Current Condition	1.427,05	1.857,74	0,77	D
Optimized Single-Sided Parking	1.427,05	2.580,20	0,55	C
Proposed Off-Street Parking	1.427,05	2.941,43	0,49	C

Source: Analysis Results, 2026

The single-sided parking arrangement increases the effective width of the road to 7 meters and the road section capacity to 2,580.2 smp/hour, so that the V/C Ratio decreases from 0.77 to 0.55 or a decrease of 32.58%. The proposal to move parking to off-street facilities returns the effective width of the road to the ideal condition of 8 meters with a capacity increase to 2,941.43 smp/hour and the V/C Ratio decreases to 0.49 or a decrease of 36.84%. Both scenarios improve the Level of Service (LOS) from D (unstable flow) to C (stable flow with speeds starting to be limited), which shows that the arrangement of both on-street and off-street parking is effective in improving the performance of Hos Cokroaminoto Street.

CONCLUSION

The current parking conditions on Hos Cokroaminoto Street are still unorganized and utilize the road on both sides (on street parking) at four points along 200 meters, so that the effective width of the road is reduced from 8 meters to 5.5 meters (down 31.25%) and the passenger car parking index reaches 113% which indicates that demand has exceeded supply. The proposed one-sided parking arrangement extends the parking area to 495.5 meters to accommodate 102 motorcycle SRPs and 81 car SRPs, while the long-term proposal is an off-street parking park of 2,925 m² capable of accommodating 123 motorcycle SRPs and 85 car SRPs with a 90° parking pattern and regular circulation paths. The implementation of these two proposals increases the road capacity from 1,857.74 smp/hour to 2,580.2 smp/hour (single-sided parking) or 2,941.43 smp/hour (off street), reduces the V/C Ratio from 0.77 to 0.55 and 0.49, and improves the Road Service Level from LOS D to LOS C. Parking arrangements on Hos Cokroaminoto Street need to be accompanied by the installation of markings and signs, routine supervision by the Transportation Agency, and the realization of off-street facilities as a permanent solution to maintain the smooth flow of traffic on an ongoing basis.

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