CERUCUK
Volume 7 No. 3 2023 (121-130)

# ANALYSIS OF PARKING SPACE REQUIREMENTS IN PLANNED AREA 3 (KELAYAN PARK) WEST KELAYAN BANJARMASIN

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## ABSTRACT

The Regional Plan is a program from the Ministry to improve the quality of slum settlements in Banjarmasin by transforming the face of the area into the tourism sector. As a tourism sector, Regional Plan 3 is expected to be a place visited by tourists from various regions. The purpose of the study was to determine the capacity of the parking lot, analyze the needs and the appropriate parking service system and predict the need for parking spaces for the next few years. The parameters used are the total number of two-wheeled and four-wheeled vehicles entering and leaving the parking area. As the object of study, the survey was carried out by observing for three days and observing for 5 hours a day. The research shows that the parking capacity requirement in the Kelayan Barat 3 (Taman Kelayan) Plan of Kelayan Barat Banjarmasin is still safe with the intention of not experiencing too much density to accommodate visitor arrivals with the maximum amount of capacity available in the parking area, which is about 55.5 m2 for motorbike parking. Of the available 57 m2 of land, as well as the car park requires 100 m2 of the 112.5 m2 of available land. In comparison, the prediction index for the next five years for two-wheeled vehicles produces a saturation of 101.4%, and for four-wheeled vehicles by 114.2%. Likewise, car parking requires 100 m2 of the available 112.5 m2 of land.

Keywords: Parking space capacity

## 1. INTRODUCTION

The Regional Plan is a program from the Ministry of PUPR to improve the quality of slum settlements in Banjarmasin by transforming the face of the area into the tourism sector. As a tourism sector, Regional Plan 3 is expected to be a place visited by tourists from various regions. Every year the use of vehicles in every place continues to increase. The tendency to increase the use of these vehicles will automatically increase the need for parking spaces. It is hoped that the needs in the community for parking spaces will be met both in terms of quantity and quality so that users of parking spaces will later feel easy, safe and calm, so they can carry out visiting activities comfortably. The purpose of the study was to determine the capacity of the parking lot.

## 2. LITERATURE REVIEW

### Definition of Parking

Parking is the position of passenger/goods vehicles that are silent and left by the driver for a certain period of time in a place depending on their needs. Parking problems are common in urban transportation systems, both in large cities and developing cities (Tamin, Ofyar Z. 2000). The solution to parking problems does not escape the need for the provision of adequate and adequate parking facilities. If there is a discrepancy in terms of providing parking facilities with parking needs, it can cause disruption to the smooth flow of traffic to congestion.

### Parking Purpose

Each rider has his own activities and goals. The purpose of the parking facility is a place to rest the vehicle after a trip and also to support the smooth flow of traffic.

### Parking System

To create parking in accordance with technical parking guidelines, a parking system is needed. The parking system must be well planned so that the moving process can run smoothly. The following points need to be considered (Directorate General of Land Transportation, 1998):

1. The size and shape of the parking area.
2. Type of parking facility, i.e., self-parking or having parking attendants as parking controllers.
3. Type of parking user, namely in the period of time both short and long.

### Parking Space Unit

SRP (Parking Space Unit) is a place for parking vehicles. Where parking spaces are regulated, parking spaces should be marked on the road average. And additional space for vehicles that make changes, which are based on parking patterns.

**Table 1. Provisions for Parking Space Units**

| No | Jenis Kendaraan | SRP dalam $m^2$ |
|---|---|---|
| 1 | a. Mobil Penumpang Gol I | 2,30 x 5,00 |
| | b. Mobil Penumpang Gol II | 2,50 x 5,00 |
| | c. Mobil Penumpang Gol III | 3,00 x 5,00 |
| 2 | Bus / Truk | 3,40 x 12,50 |
| 3 | Sepeda Motor | 0,75 x 2,00 |

(Source: Directorate General of Land Transportation, 1996)

**Parking Pattern**

Based on the Directorate General of Land Transportation (1996) "Towards Orderly Traffic and Road Transport," the value of E is in Table 2.

**Table 2. E. value**

| MP / Pola | Golongan I | Golongan II | Golongan III |
|---|---|---|---|
| Paralel | 5.30 | 5.50 | 6.00 |
| 30° | 7.60 | 7.75 | 7.90 |
| 45° | 9.30 | 9.35 | 9.45 |
| 60° | 10.55 | 10.55 | 10.60 |
| Tegak / 90° | 11.20 | 11.20 | 11.20 |

(Source: Directorate General of Land Transportation, 1996)

**Parking Volume**

Parking volume is the number of vehicles that have used the parking lot in one parking lot and is usually determined on a daily basis. The volume of parked vehicles is calculated based on the equation: V = Nin+X (vehicles); Note: Nin is the number of incoming vehicles (vehicles), and X is the number of vehicles that existed before the survey time (vehicles).

**Parking Accumulation**

Parking accumulation is the number of vehicles parked in a parking lot at uncertain time intervals. Parking accumulation is the number of vehicles parked at an uncertain time interval and arranged according to the type of trip category. Parking accumulation is calculated based on the equation: AP = Qs+ Qin– Qout; Note: Qs is the number of vehicles that have parked at the location before the observation, Qin is the number of vehicles that enter the parking location, Qout is the number of vehicles that leave the parking location.

**Average Parking Duration**

Average parking duration is the average value of the total time all vehicles are parked. The average parking duration is calculated based on the equation:**D** $=\frac{\sum(\boldsymbol{Nx})(\boldsymbol{X})(\boldsymbol{I})}{\boldsymbol{Nt}}$; Note: D is the average duration of parking time (hours/vehicles), Nx is the number of parking vehicles during the research time interval, X is the number of intervals, I is the time interval (hours), *Nt is the total number of vehicles during the study.*

**Parking Index**

The parking index is the number of parked vehicles divided by the number of available plots and is presented as a percentage (Wells, 1985). The parking index (IP) is a benchmark in the user's statement of road length and is expressed by the percentage of land by parked vehicles. Parking Index is calculated based on the equation: IP = $\frac{AP}{KP}$x100%; Information; IP is the level of parking usage (vehicles/hour/plot), AP is the accumulation of parking (vehicles), and KP is the parking capacity (plot).

**Parking Requirement**

The need for vehicle parking space for its users is very important. The needs are very different, depending on the characteristics of the parking lot. Calculation of parking space requirements with the following equation:

$$\text{Parking Requirement} = \frac{\text{Total Number of Vehicles x Average Parking Duration}}{\text{Observation Time}}$$

**Forecasting Parking**

Forecasting calculations/parking forecasts to find out whether the existing parking lot is sufficient for the parking space needs in the next few years. Based on the percentage of the number of vehicle data attached in the year of vehicle growth, which is already known from the Banjarmasin SAMSAT Office, it can be seen the rate of vehicle growth in the following year. Parking forecasting is calculated based on the equation: Pn = Po x (1 + i/(100%))n; Information: Pn is the forecasting value based on the value of n, Po is the highest accumulation, i% is the percentage growth rate, n is the value of how many years to aim for.

## 3. RESEARCH METHODS

Based on the research, the method used is a survey, an initial survey by determining the location to be researched, namely in Plan Area 3 (Taman Kelayan) Kelayan Barat Banjarmasin. Looking at the conditions at the parking location, the research time is determined within three days (Monday, Saturday and Sunday) to see a comparison of weekdays and weekends with a duration of five hours from 13.00-18.00 PM. After getting primary data and secondary data, then the data is analyzed to get the characteristics and needs of parking spaces.

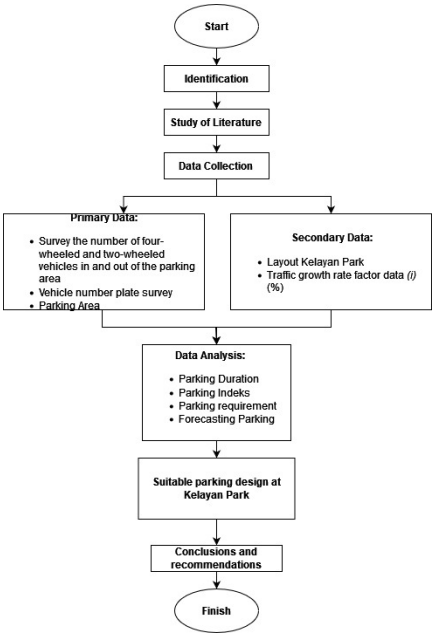


**Figure 1 Flowchart of Research Stages**

**Data processing**

After the required survey data is obtained, then data processing is carried out as follows:

1. All primary data that have been obtained are grouped in tables, both volume, accumulation, duration, and parking index, and are described in graphical form
2. The number of parked vehicles adjusted for the volume of vehicles that is assumed to be the total number of vehicles entering the parking area
3. Analysis of parking needs is carried out by taking into account secondary data, namely data on traffic growth factors.
4. Data processing is done with the help of the Excel program.

**Parking Requirement Analysis**

Analysis of parking needs in the areaThe Plans for Area 3 (Kelayan Park) West Kelayan Banjarmasin are obtained from the number of parking vehicles based on the volume of 2-wheeled and 4-wheeled vehicles.

**Parking Design**

After analyzing the data and obtaining the SRP (Parking Space Unit) requirement, a parking design for the Banjarmasin West Kelayan Area 3 Plan was carried out.

## 4. RESULT AND DISCUSSION

### Parking Area Data

Total data on the parking area of Kelayan Barat Plan 3 (Kelayan Park) Banjarmasin for two-wheeled and four-wheeled vehicles are ± 160.5 m2, for 2-wheeled vehicles are ± 57 m2 and have 38 plots and for 4-wheeled vehicles are ± 112.5 m2, and there are 9 plots.

### Parking Volume

The characteristics of the parking volume for four-wheeled and two-wheeled vehicles in the Regional Plan 3 (Taman Kelayan) Kelayan Barat Banjarmasin based on the results of data processing are shown in Figure 2.

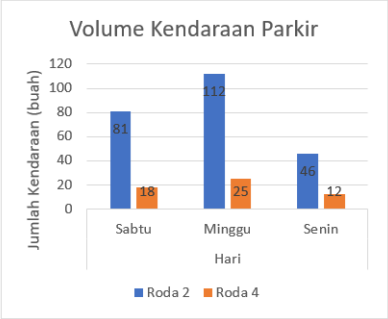


**Figure 2. Parking Vehicle Volume Diagram**

Figure 2. shows the highest number of parking vehicles on Sundays with a volume of 112 2-wheeled vehicles and 25 4-wheeled vehicles.

### Parking Accumulation

The characteristics of the accumulation of parking for four-wheeled and two-wheeled vehicles at the research location for Area Plan 3 (Taman Kelayan) Kelayan Barat Banjarmasin based on the results of data processing can be presented in Figure 3.

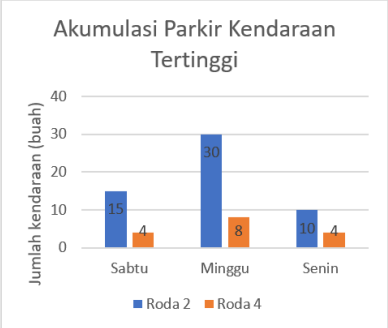


**Figure 3. Parking Accumulation Diagram**

Figure 3. shows the highest accumulation of vehicle parking on Sundays with the accumulation of 30 two-wheeled vehicles and eight four-wheeled vehicles accumulation in one interval.

**Average Parking Duration**

The equation for calculating the average parking duration of two-wheeled and four-wheeled vehicles for visitors uses the above formula, and the results of the observations can be presented in Figure 4.

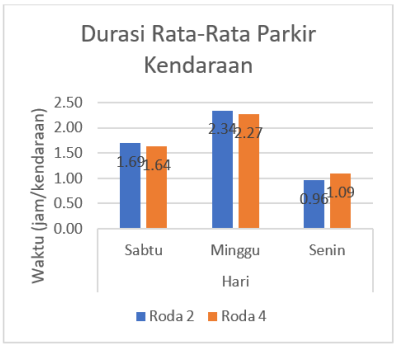


**Figure 4. Average Parking Duration Diagram**

As seen from Figure 4. it can be seen that the results of the calculation of the longest average duration of parking for vehicles occur on Sundays, with an average duration of parking for two-wheeled vehicles of 2.34 hours/vehicle. And the average duration of parking for four-wheeled vehicles is 2.27 hours/vehicle.

**Parking Index**

The value of the Parking Index with the above equation and the results of the observations are presented in Figure 5.

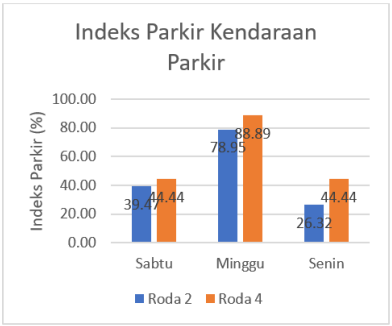


**Figure 5. Parking Index Diagram**

As seen from Figure 5. it can be seen that the results of the calculation of the highest vehicle parking index occur on Sundays with a two-wheeled vehicle parking index of 78.95% and a four-wheeled vehicle parking index of 88.89%.

**Parking Needs**

The need for parking space in question is the number of parking lots needed in order to accommodate the needs of parking vehicles in the parking lot. Parking needs based on the results of data processing can be presented in Figure 6.

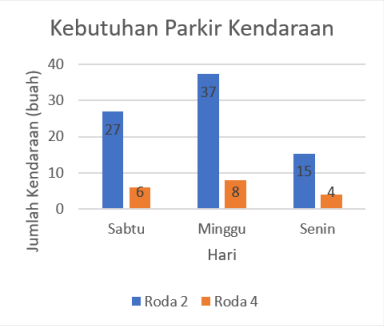


**Figure 6. Parking Needs Diagram**

As seen from Figure 6. it can be seen that the results of the calculation of the highest vehicle parking needs occur on Sundays, with 37 parking needs for 2-wheeled vehicles and 8 for 4-wheeled vehicles parking needs.

**Forecasting Parking**

Forecasting Parking is needed to forecast parking demand in the next few years. Parking forecasting based on the results of data analysis can be presented in Table 3.

**Table 3. Comparison of Parking Index with Parking Forecasting**

| | Parking Index (%) | Forecasting Parking (%) |
|---|---|---|
| 2 Wheel Vehicle (Two) | 78.9 | 101.4 |
| 4 Wheel Vehicle (Four) | 88.9 | 114.2 |

Figure 7. seen a comparison of the parking index in the present and several years to come, parking forecasting for the next few years is 101.4% for 2-wheeled vehicles and 114.2% for 4-wheeled vehicles.

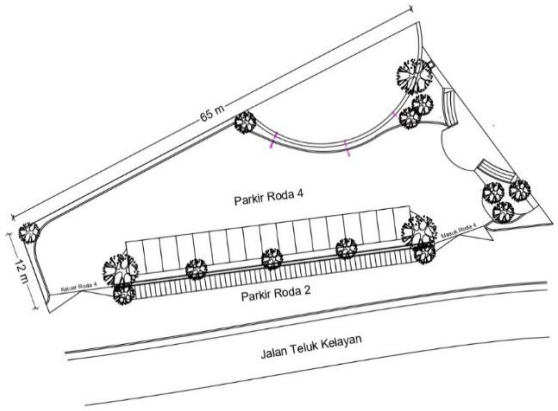


**Figure 7. New Parking Plan Layout**

## 5. FINALE

### CONCLUSION

Based on the results of the analysis of the West Kelayan Plan 3 (Kelayan Park) Banjarmasin, the following conclusions are presented:

1. In the results of the analysis carried out on 2 (two) wheeled vehicles, and 4 (four) wheeled vehicles in the area of the 3rd (Kelayan Kelayan) West Kelayan Banjarmasin parking space, it was found that the capacity required for parking space for 2 (two) and wheeled visitors 4 (four) Planned Area 3 (Kelayan Park) West Kelayan Banjarmasin is still safe with the intention of not experiencing too much congestion to accommodate the arrival of visitors who will park and not exceeding the capacity available in the parking lot.
2. The need for parking space for the Planned Area 3 (Kelayan Park) West Kelayan Banjarmasin is still safe with the intention of not experiencing too much congestion to accommodate visitor arrivals from the total capacity in the parking area, which is about 55.5 m2 for motorbike parking from 57 m2 of land available, as well as car parking requires 100 m2 of the available 112.5 m2 of land.
    1. 3. The parking index for predicting (forecasting) visitors using 2 (two) wheeled vehicles in the next 5 (five) years will result in a saturation of 101.4%, while the parking index for predicting (forecasting) visitors using 4 (four) wheeled vehicles) in the next 5 (five) years will result in saturation of 114.2%. Based on these results, the need for parking capacity for the next 5 (five) years will no longer be able to accommodate the parking needs of two-wheeled and four-wheeled vehicles. So

that the results of the analysis will get the needs and service system in the form of an appropriate parking lot design for the Plan of Area 3 (Kelayan Park) West Kelayan Banjarmasin if it is in a condition of overcapacity for visitors.

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