ANALYSIS OF THE CHARACTERISTICS AND REQUIREMENT OF PARKING AREAS AT KUBAH DATU KALAMPAYAN TERMINAL ASTAMBUL DISTRICT, SOUTH KALIMANTAN

Nor Astika[1], Dr. Muhammad Arsyad, S.T., M.T.[2]

Civil Engineering Study Program., Lambung Mangkurat University
Email: norastika3@gmail.com; emarsyad@ulm.ac.id

ABSTRACT

Kubah Datu Kalampayan is a place where there is a tomb of a famous cleric in the South Kalimantan area, namely Sheikh Muhammad Arsyad Al Banjari. Therefore, many pilgrims come to this dome for pilgrimage. Due to the high level of community visits and the use of parking facilities, this causes a lot of movement of visitors who come. The increase in tourist visits requires the availability of parking spaces that suit their needs. This research aims to midentifying parking characteristics and knows the need for parking spaces, as well as analyze the conditions and the right parking space service system (forecasting) for parking spaces at the Dome Datu Kalampayan Terminal. As the object of study, the survey was carried out for four days, and the observation time was 5 hours a day. This research shows characteristics. The capacity of the parking area requirement at the Dome Datu Kalampayan Terminal in 2022 is still safe, but on weekends and important days such as haul warnings and after Eid will soar, and the parking capacity provided cannot accommodate the number of visitor vehicles that come. The highest level of parking requirement for 2 (two) wheeled vehicle users is 35.7 spaces, the highest 4 (four) wheeled vehicle is 61.308 spaces, and for buses, the highest is 15.79 spaces. Forecasting parking index value for visitors who come in 2025 for 2 (two) wheels reaches 249.57%, for 4 (four) wheels 116.62%, and buses 115.14%.

Keywords: Parking space requirement

1. INTRODUCTION

Kubah Datu Kalampayan is one of the religious tourist places where there is a tomb of a famous cleric in South Kalimantan, namely Sheikh Muhammad Arsyad Al Banjari or often known as Datu Kalampayan. This dome is visited by many pilgrims from various regions and even outside the region. The land area available for parking vehicles at the Dome Datu Kalampayan terminal is sufficient, but the condition of the parking area has not been used optimally due to problems such as visitors can park within appropriate and looks disorganized.

The increase in tourist visits requires the availability of parking spaces that suit their needs. By knowing the characteristics and needs of the parking area on the parking

volume at the Dome Datu Kalampayan Terminal, it is hoped that parking needs can be fulfilled in an optimum, safe and comfortable manner for visitors who come.

2. LITERATURE REVIEW

A. Parking Definition

Parking is a state of not moving or staying in a vehicle but only temporarily. Every motorist has the possibility to find a place to park their vehicle as close as possible to their place of business or activity.[1]

B. Parking Space Unit (SRP)

A Parking Space Unit (SRP) is an area or parking space for one vehicle. The parking unit used is based on what type of vehicle is registered in which group, and group identification are based on the user who is designated parking space. In this case, the location in question is a recreational area which is included in group II.[2]

The following table is attached for the determination of vehicle parking space units.

Table 1. Determination of Parking Space Unit (SRP) Based on Vehicle Type

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: Director General of Land Transportation (1996)

C. Parking Characteristics

a. Parking volume

Parking volume is the total number of vehicles entering the parking area, then added to the number of vehicles that have been there at a certain time.[3]

$$VP = Ei + X$$

b. Parking accumulation is the number of vehicles that are in a parking lot at a certain time, where the accumulated number of parked vehicles in a certain period shows the parking load (the number of parked vehicles) in vehicle hours at a certain time.[3]

Accumulation = E i – Ex + X

c. Parking change (turn-over)

Comparisonparking turnover will show the utilization of parking space obtained from the division between the number of vehicles parked during the observation period.[3]

$$\text{“Turn Over”} = \frac{Jumlah\ kendaraan\ yang\ parkir}{Ruang\ parkir\ yang\ tersedia}$$

d. Parking duration

Parking duration or parking time is the time span for each vehicle that uses parking facilities.[3]

Duration = Ex time – En time.

Average Parking Duration Formula

$$D = \frac{\sum(Nx)(X)(I)}{Nt}$$

Where:

D = Average parking duration (hours/vehicle)

Nx = number of vehicles parked for x interval

I   = Length of observation in 1 hour

X   = Interval

Nt =Total number of parked vehicles (vehicles)

e. Parking capacity

Parking capacity is the maximum capacity of the parking space in loading the number of parked vehicles[3]

$$KP = \frac{S}{D}$$

Where:

KP = Parking capacity (vehicles/hour)

S = number of parking lots (plots)

D = Average Length of parking (hours/vehicle)

f. Parking index

The parking index is the percentage of the number of vehicles in an available parking area with the value of the ratio of parking accumulation to the available parking capacity in a certain period of time.[3]

$$IP = \frac{Akumulasi\ Parkir}{Kapasitas\ Parkir}$$

D. Parking requirement

Parking requirement is the amount of space needed to load vehicles that require parking based on the facilities and functions of land use.

$$S = \frac{N \; x \; D}{T \; x \; f}$$

Where :

S = number of parking lots currently required

N = number of vehicles parked during the observation time (vehicle)

D = Average duration of vehicle parking (hours/vehicle)

T = Length of observation time (hours)

f = Insufficient factor whose value starts from 0.85 – 0.95

E. Forecasting

Forecasting has the meaning of forecasting or predicting for the next few years whether the traffic rate factor (wheel 2 (two), wheel 4 (four), or bus) can still be accommodated in the parking lot.[4]

$$Pn = Po \; (\; 1+ \;)^\wedge n \frac{i}{100\%}$$

Where :

Pn   = Total number of vehicle growth (vehicles/hour)

Po   = The highest accumulated number of vehicles (vehicles/hour)

i   = traffic rate factor

n   = number of years

3. RESEARCH METHODS
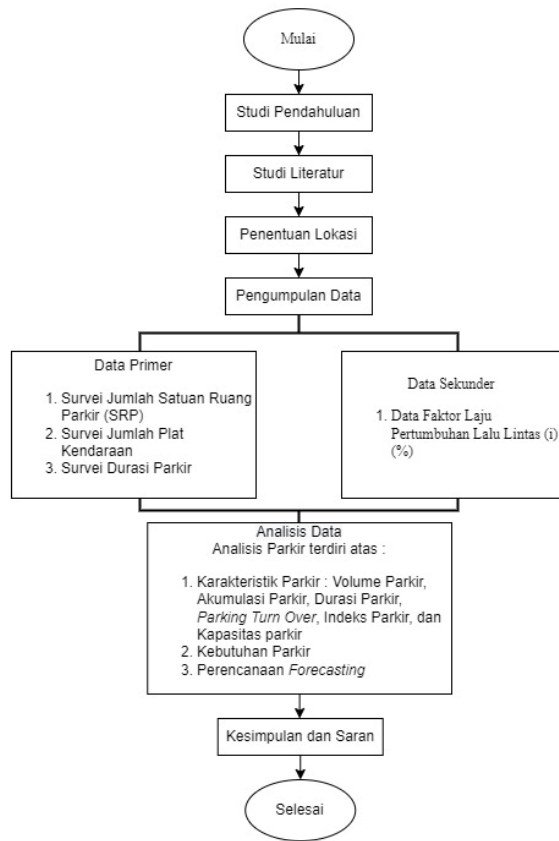
The research method carried out is presented in Figure 1.

Figure 1. Research Flowchart

4. RESULT AND DISCUSSION

A. Parking Volume

Parking volume was recorded during the observation time, namely 5 hours a day with 15-minute intervals in the Dome Datu Kalampayan parking area. Observations were made for 4 days (Monday, Friday, Saturday, and Sunday)
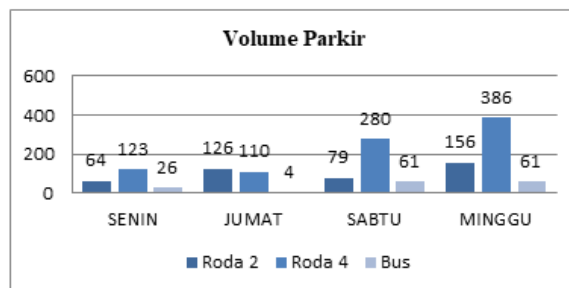

Figure 2. Parking Volume Diagram

Figure 2. shows the highest parking volume at the Dome Datu Kalampayan Terminal, namely on Sundays, with the highest number of 2 (two) wheels, 156 vehicles,

4 (four) wheels, and the highest 386 vehicles, and the highest number of buses, namely 53 vehicles on Sundays.

B. Parking Accumulation

The results of the analysis of parking accumulation calculations for 4 days of observation are presented in the following diagram.
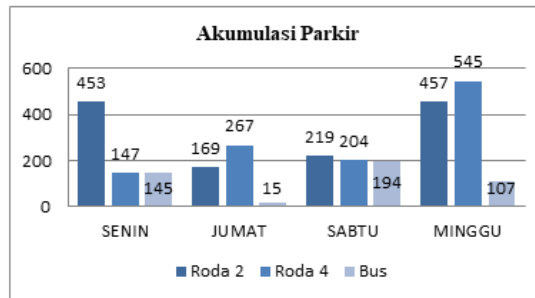

Figure 3. Parking Accumulation Diagram

Figure 3. shows the highest accumulation of parking at the Dome Datu Kalampayan Terminal, namely on Sundays, with the highest total number of 2 (two) wheeled vehicle users, 457 vehicles, 4 (four) wheelers the highest 545 vehicles, and the highest Bus 194 vehicles on Saturday.

C.   Parking Turn Over (parking change)

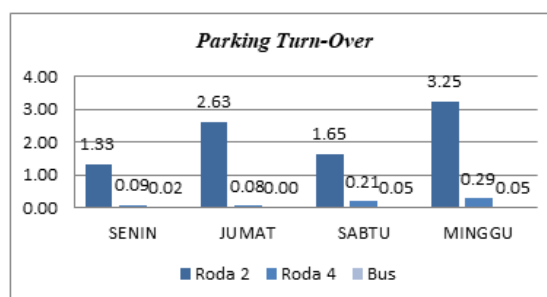The following diagram will show the results of calculating the parking turnover rate.

Figure 4. Diagram*Parking Turn-Over*

D.   Parking Duration

The results of the analysis obtained the duration of parking and the average duration of parking, as shown in the following diagram:
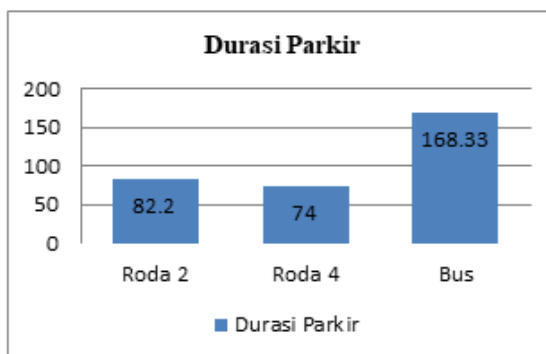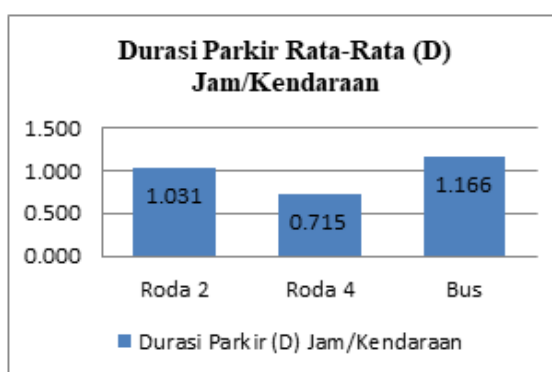
Figure 5. Parking Duration Diagram

Figure 6. Diagram of Average Parking Duration

E. Parking Capacity

The results of the data analysis showed that the parking capacity at the Datu Kalampayan Dome Terminal is as shown in the following diagram:
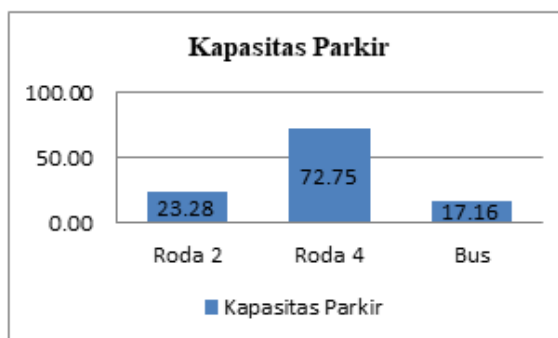

Figure 7. Parking Capacity Diagram

F. Parking Index

The parking index value can be used as a benchmark to determine the need for parking space if the existing parking space capacity can still meet the needs of the vehicle to be parked. The parking index value can be seen in the diagram below.
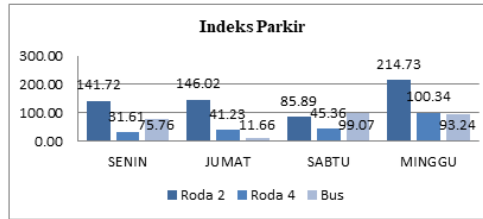
Figure 8. Parking Index Diagram

G. Parking Needs

Parking requirements are the number of parking spaces needed to accommodate the number of vehicles that will use the parking area. The results of the calculation of parking needs will be presented in the diagram below.
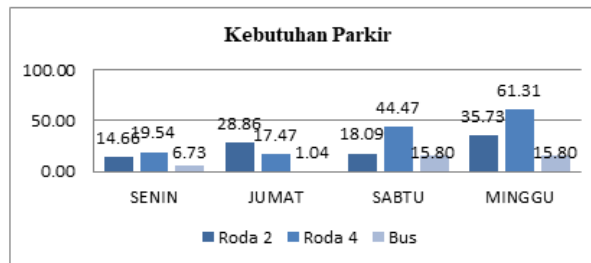

Figure 9. Parking Needs Diagram

H. Forecasting

The results of the analysis of data calculations can be obtained from the value of the growth in the number of vehicles for the next few years, as in table 2. Below.

Jenis Kendaraan	Sekarang			Forecasting	
	Kapasitas Lahan Parkir	Akumulasi Parkir (Kend)	Indeks Parkir (%)	Akumulasi Parkir (Kend)	Indeks Parkir (%)
Roda 2 (dua)	23,25	50	214,73	58	249,57
Roda 4 (empat)	72,75	73	100,34	85	116,62
Bus	17,16	17	99,06	20	115,14

Table 2. Forecasting analysis

From Table 2, it can be seen that the growth of vehicles for the next three years is no longer sufficient and is indicated by a parking index value of above 100%. Therefore, it can be seen that the parking lot is very saturated and is a parking lot for visitors. The solution can add and create a combination of effective parking patterns.
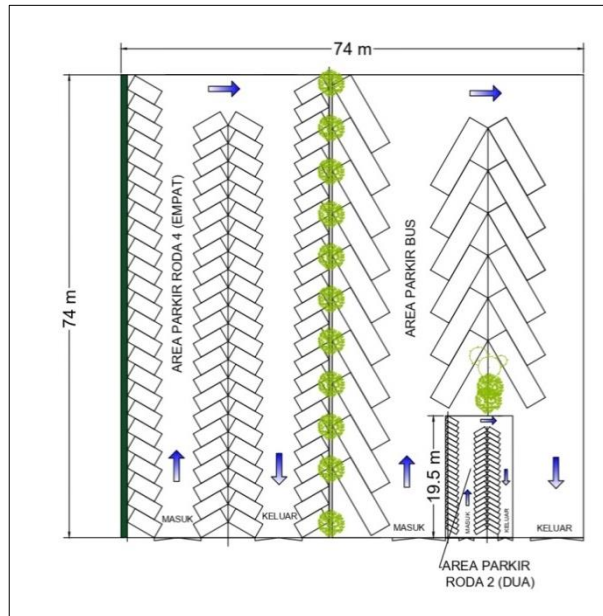
I. Parking Plan Layout

Figure 10. Parking Needs Diagram

5.CONCLUSION

From the calculated analysis, conclusions can be drawn from the results of the study for 4 days with an observation time of 5 hours/day. namely from Friday, March 25, 2022, to Monday, March 28, 2022, namely:

1) Parking Characteristics

   Maximum parking accumulation is 50 vehicles for 2 (two) wheels, 73 vehicles for 4 (four) wheels, and 17 vehicles for buses; the average duration of 2 (two) wheels is1.0307vehicle/hour for 4 (four) wheels of0.7147vehicles/hour, and for buses1.1655maximum parking volume is 156 vehicles on 2 (two) wheels, 386 vehicles on 4 (four) wheels, and 61 vehicles for buses, maximum PTO for 2 (two) wheels3.2500vehicle/plot/hour, for 4 (four) wheels0.2893vehicle/plot/hour, and for buses0.0465vehicle/plot/hour, maximum parking index for 2 (two) wheels is 214.73%, for 4 (four) wheels 100.33 %, and for buses 99.06 %. The IP value exceeds 100%, meaning that the condition of the parking area at the Dome Datu Kalampayan Terminal is no longer able to load vehicles arriving at peak hours on holidays and important days such as haul warnings and after Eid will increase.

2) Parking Needs

    a. The highest level of parking needed for 2-wheeled vehicle users is 35.7 spaces on Sunday. This parking requirement exceeds the 24 plots provided (does not meet)

    b. The highest level of parking requirement for 4 (four) wheeled vehicles is 61.308 spaces on Sunday. This parking requirement exceeds the 52 plots provided (does not meet)

    c. The highest level of the parking demand for buses is 15.79 spaces on Sundays. This parking requirement is less than 20, and the number of plots provided (fulfilling).

Forecasting parking needs for the next 3 years starting from 2022 found that: the parking index for 2 (two) wheels reached 249.57% with the number of vehicles, 58.11 vehicles/hour, for 4 (four) wheels, 116.62% with the number of vehicles 85 vehicles/hour and buses by 115.14% with the number of vehicles 20 vehicles/hour. This means that the supply and demand for parking spaces this year are not balanced, or there is a need for expansion of parking spaces.

6. ADVICE

1) It is better for forecasting calculations using data on the growth of the number of vehicles or the accumulation of visitor arrivals every year to get more valid forecasting data.

2) It is advisable to make parking plot markings that are in accordance with the SRP so that vehicle drivers do not park arbitrarily so that the efficiency of the parking area will be optimal, orderly, and comfortable.

3) It is necessary to expand the parking area and update the parking pattern for the parking area for 2 (two) and 4 (four) wheels and buses in the near future; according to forecasting calculations, the available parking lots will no longer be able to accommodate the number of vehicles.

4) During peak hours, it is hoped that parking attendants can assist in coordinating the position of parked vehicles so that they look more neat and efficient at the parking points of visitors' vehicles.

5) The need for additional signs from agencies, for example, parking is prohibited for important areas, so that motorbikes that do not get a parking space do not position them arbitrarily.

REFERENCES

[1] G. . Wells, "Traffic Engineering, "*J. Chem. inf. Model.*, vol. 53, no. 9, pp. 1689–1699, 2013.

[2] Director-General of Land Transportation, "Technical Guidelines for the Implementation of Parking Facilities, "*J. Foundation*, vol. 1, no. 1, pp. 0–3, 1996.

[3] S. Ginting, "Acceleration: Scientific Journal of Civil Engineering Acceleration: Scientific Journal of Civil Engineering, "*J. Ilm. Tech. Civil*, vol. 2, no. 2, pp. 63–69, 2021.

[4] Minister For Public Works and Human Settlements; Directorate General of Highways, "Design Manual," no. 02, 2017.