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Analysis of Circulation Density of the National Capital Worship Complex (Ibu Kota Negara/IKN)

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ABSTRACT

Circulation density is an important aspect in planning the infrastructure of a worship complex. This study analyzes the circulation density in the New Indonesia Capital City Worship Complex. The problem of circulation density is very relevant with the increasing number of worship applicants and vehicles in the complex, which has the potential to affect the comfort and safety of visitors as well as the smooth running of worship activities. The aim of this research is to understand the circulation patterns and levels of traffic density in the worship complex. The research method used involves field surveys and data analysis using spatial modeling techniques. The research results show that there are circulation points that experience high density at certain hours, especially during important times of worship. Circulation patterns are also influenced by topographic factors and the distribution of worship facilities within the complex. The implication of these findings is the need for adjustments to transportation infrastructure and better traffic management in these worship complexes. Steps such as improving accessibility, arranging parking, and managing traffic routes can help reduce circulation congestion and improve the experience of visitors in carrying out their worship. This study provides valuable insights for infrastructure development and traffic management in religious complexes and can be a reference for further research in similar contexts.

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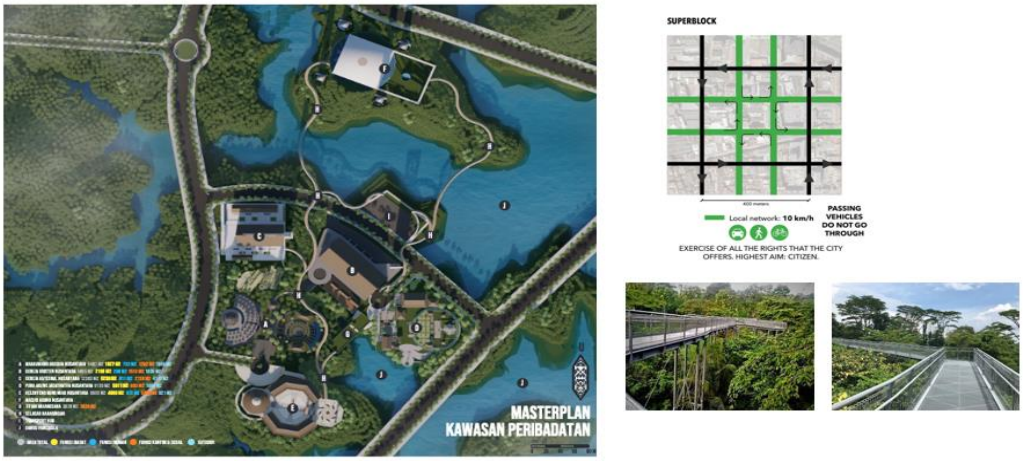
1. INTRODUCTION

Indonesia is a country with a pluralistic society in terms of culture and beliefs. "Unity in Diversity" is a motto that is upheld by the Indonesian people, so that their diversity does not divide them but unites them. However, it is rare to find development that represents unity in diversity, especially in the religious aspect. A complex with various houses of worship for different religions can support this value. In this way, differences in religious values in society will be preserved through this complex.

Figures1. Image of the Worship Complex at IKN
Source: Preliminary design, 2022

Apart from that, the construction of a complex of places of worship can have the objective of creating a safe area for walking. This is an encouragement to minimize the use of private vehicles by the public. The complex can also provide special transportation, such as buses, in order to reduce carbon emissions produced by private transportation. People can also use public transportation to get to the complex, making it easier to access and saving energy.



Figures2. Image of walking facilities
Source: Preliminary design, 2022

By creating an easily accessible environment, it will increase public interest in praying at the complex. From the increasing interest, there will be possibilities for the need to create mobilization if there is a high number of people visiting the complexes of places of worship.

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Through this, it can be seen that there is a complexity in design that involves diverse cultures and large numbers of people. This research aims to anticipate and provide recommendations for dealing with the possibility of such obstacles arising.

Judging from the daily use of places of worship by Muslims, Buddhists and Hindus, it is unlikely that there will be a mobilization issue due to the high number of people using houses of worship at the same time. The use of the mosque is quite flexible, in terms of use per week, except on Fridays, for Friday prayers. The same applies to the use of temples, temples and monasteries, where they also have flexible times to use the place of worship per week. On the other hand, Christians and Catholics will raise mobilization issues because both communities have the same day for worship per week, namely Sunday. Thus, this research aims to find appropriate recommendations to overcome this mobility issue.

In 2020, there is a guide regarding the six houses of worship, according to the majority of religions in Indonesia. The guide focuses more on ways each house of worship can implement mechanisms that support climate change control. In this guide, houses of worship are considered to be built in separate areas. Therefore, this research wants to examine the planning of multi-religious worship complexes, where various houses of worship are built in the same complex.

2. METHOD

Research on circulation density analysis in the New Indonesian Capital Worship Complex involves the use of field survey methods and spatial data analysis to understand circulation patterns and traffic density levels within the worship complex. Here is a more detailed description of the method used:

1. Field Survey (A field survey was carried out to collect direct data about circulation patterns and traffic density within the worship complex. The research team made observations at various main circulation points within the complex, such as entrances, pedestrian paths and parking areas. The data collected including the number of vehicles entering and leaving, pedestrian density, traffic flow patterns, and other factors that can influence circulation such as complex topography and distribution of worship facilities);
2. Spatial Data Analysis (The collected data is then analyzed spatially using geographic modeling techniques. Spatial analysis allows researchers to visualize and analyze circulation patterns and traffic density levels within religious complexes. Some spatial analysis tools that may be used include geographic information systems (GIS) and spatial modeling software. Using these techniques, researchers can identify circulation points experiencing high density and understand the factors that influence them); And
3. Use of Information Technology (In addition, the use of information technology such as traffic sensors or monitoring cameras can also be used to collect data automatically and continuously. Data produced by this technology can provide more detailed and accurate information about circulation patterns and traffic density levels within religious complexes. The use of information technology also enables more efficient monitoring and real-time data collection, which can be the basis for quick and responsive decision making to changing traffic conditions).

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With a combination of field surveys, spatial data analysis, and the use of information technology, this research can provide a comprehensive understanding of circulation density in the New Indonesian Capital Worship Complex. This method enables the identification of circulation points that are susceptible to high density and provides a basis for the development of effective solutions for managing traffic within religious complexes.

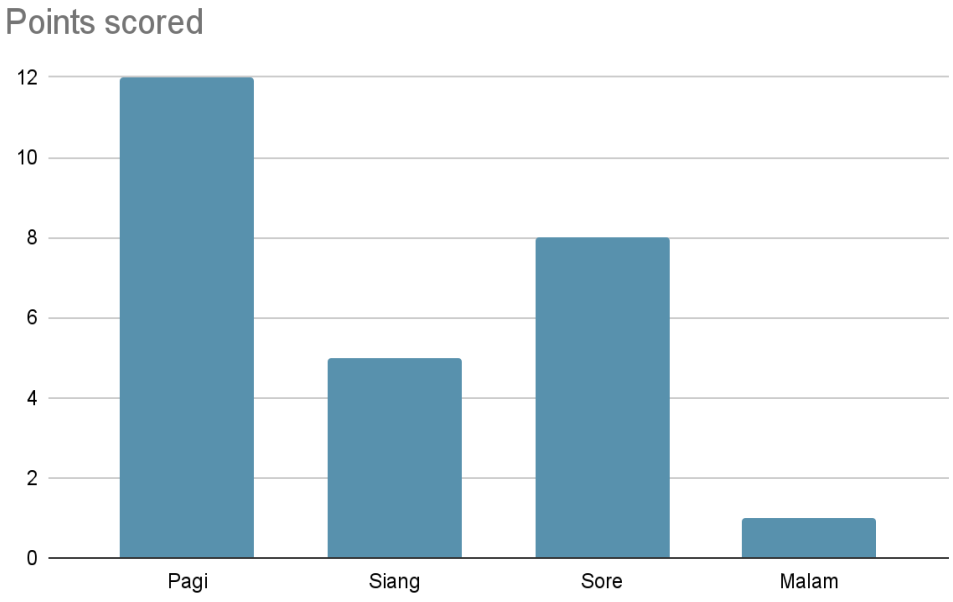
3. RESULTS AND DISCUSSIONS

A review of worship hours in Christian churches and Catholic churches was carried out first before formulating recommendations to anticipate mobilization issues in complexes of places of worship. Worship hours will be categorized into Morning (06.00-10.00), Afternoon (11.00-14.00), Afternoon (15.00-18.00), and Evening (18.30-20.00). The following table shows the number of Sunday services in several Christian churches.

Table1. Number of Sunday services in several Christian Churches

Church/Worship Hours	**Morning**	**Afternoon**	**Afternoon**	**Evening**
Church 1	2	0	1	1
Church 2	2	0	1	0
Church 3	8	2	3	0
Church 4	4	2	2	0
Church 5	0	1	1	0

Source:



Picture1.
Source:

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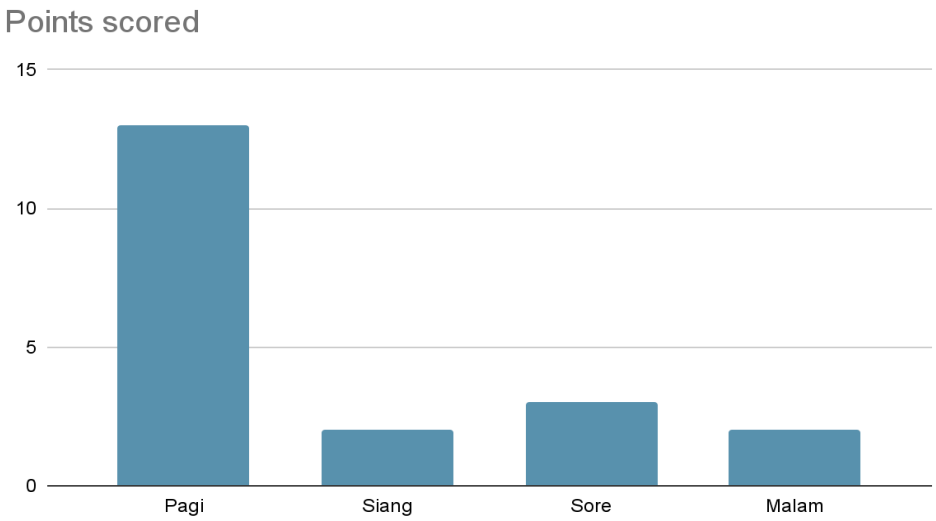
The following table shows the number of services, or masses, on Sundays in several Catholic churches.

Table2. Number of Sunday services in several Christian Churches

Church/Hours of Worship or Mass	Morning	Afternoon	Afternoon	Evening
Church 1	2	1	1	0
Church 2	3	0	0	0
Church 3	3	0	1	1
Church 4	2	1	1	1
Church 5	3	0	0	0

Source:



Picture2.
Source:

Based on the statistical data above, the majority of services that will collide on Sunday will be in the morning. Conflicting worship times will cause mobility issues in the complex of places of worship. Thus, a modification of the worship hours is needed to ensure a smooth flow of mobilization. It is also important to remember about mobilization out of the complex of places of worship, not just the process of entering to reach the complex.

In supporting complexes of places of worship as public facilities, public transportation can help facilitate people's mobility to reach these facilities. For example, it can be supported by electric buses with a capacity of 50 people per bus. Benefits via public transportation, such as buses, are considered a fairly effective solution to overcome the issue of facilities and infrastructure in a complex with high mobility. This can be seen through the campus complexes of several universities. Previously, Gadjah Mada University experienced issues regarding transportation and then considered providing public transportation in the complex. The same thing happens at Semarang State University, which facilitates internal transportation in the campus complex to optimize mobility and circulation of the campus community.

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4. CONCLUSIONS

This study investigates circulation density in the New Indonesian Capital Worship Complex, with a focus on understanding circulation patterns, levels of traffic density, and implications for the management of transportation infrastructure in the complex. With the significant growth in the number of worship applicants and vehicles, analysis of circulation density becomes important to ensure smoothness and comfort in carrying out worship activities, as well as safety for visitors.

The research results show that worship complexes experience circulation points that experience high density at certain hours, especially during important times of worship such as Friday prayers, religious celebrations and other religious events. Factors such as the topography of the complex and the distribution of religious facilities influence circulation patterns and levels of traffic density. Limited parking space is also one of the main causes of circulation congestion in this worship complex.

The implication of these findings is that action is needed to improve the management of transportation infrastructure in these worship complexes. Steps that can be taken include improving accessibility, rearranging parking spaces, organizing traffic routes, and implementing information technology to manage traffic flow. Adjustments to transportation infrastructure also need to take into account the special needs and characteristics of worship complexes, such as the existence of certain worship times that influence circulation patterns.

Apart from that, it is important to involve various related parties in managing traffic at worship complexes, including the complex management, local government and the surrounding community. Collaboration between various parties is needed to design and implement effective solutions to overcome circulation density problems.

This study also provides valuable insights for infrastructure development and traffic management in religious complexes and can be a reference for further research in a similar context. Technological developments and innovative approaches in traffic management can be the focus of future research to increase the efficiency and comfort of users of worship complexes.

In addition, it is important to continue monitoring and evaluating the implementation of proposed solutions to address circulation congestion. Regular evaluation is required to evaluate the effectiveness of the solutions that have been implemented and identify potential for further improvements. In this way, the worship complex can continue to improve the worship experience for its visitors while maintaining smooth and safe circulation within the complex.

Overall, the analysis of circulation density in the New Indonesian Capital Worship Complex highlights the importance of effective transportation infrastructure management in supporting worship activities and visitor comfort. This study makes an important contribution to understanding traffic dynamics in religious complexes and offers guidance for better infrastructure development and traffic management in the future.

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