

Model Simulation of Building Intensity on Optimization Roadway Level of Service Direction

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ABSTRACT

The high volume of traffic movement in corridor artery road Jenderal Sudirman - Dr. Sam Ratulangi of the Makassar city, resulted from the intensity of land use for business activities, trade and services causing problems of transportation. This study aims to analyze the importance of the effect of building intensity in the road corridor and formulate the direction of building intensity to optimize the level of a service road. The variable test influence that contributes to trip attraction, including traffic volume, road capacity, a degree of saturation, ground floor coefficient and building floor. The direction approach of the intensity of people / building units is an example case to formulate the optimization of service level of the road network. The method of multiple linear regression analysis was used to describe a descriptive quantitative influence test. The results showed Level of Service road corridors including critical (D). The movement generated by land use amounted to 4,776 pcu/hour or 87% of total movement. Variables that affect the magnitude of the trip attractions are group changes of the recommended activities, such as Mother and Child Hospital, Horison Hotel, Wisma Kalla, Ratulangi Medical Center and School Foundation. For changes to the type of activity group that is prohibited, among others: PT. PLN, KFC, Mall Ratu Indah, and New Agung store. The results of a simulation model of influence of activity type on building and limit of the floor area of the building; and the number of people/buildings using $DS = 0.74$ with the trip ceiling of 3,207.94 pcu / hour, resulting in the maximum average floor area of the building varies.

Keywords: Intensity, land use, transportation, trip attraction

Article history: received January 26th 2018, received in revised May 01th, 2018

1. INTRODUCTION

As the center of various activities in eastern Indonesia, Makassar City is in need of a good transportation system to anticipate the possibility of bad traffic condition in the future. In order for transportation investment policy to succeed so well, it is very important to understand the large pull of transport movement and movement patterns of vehicles that occur in the present and also in the future.

The assessment of traffic flow on the roads in Makassar is not proportional, so there are overloaded volume roads that exceed their capacity; on the other hand, there is a very low volume of roads. Therefore, the symptoms of congestion, chaotic in sections the standards are likely to continue to rise. In addition, the increase of trip generation and trip attractions in Makassar City also tends to

increase due to uneven distribution of land use that not supports each other.

Based on one of the traffic jam observation of Makassar City, transportation problems are caused by various types of activities in Jenderal Sudirman - Dr. Sam Ratulangi Street is the high intensity of land use. The trip attraction on land use for business, trade, and services contributes to the potential for more dynamic movements. Due to the use of land that has activities, then the trip attraction that ultimately affects the transport volume using the road.

Therefore, the required intensity of building based on road capacity as a constraint [1]. When using spatial planning, the level of service is low, means the maximum intensity of the building is too high for the specified function. In the meantime, if the high level of the service road means that the maximum intensity of the building can still be served by the existing road capacity.

A trip attraction is a modeling stage that estimates the number of movements coming from a zone and the amount of movement that is attracted to a land use or zone [2]. Traffic movement is a land-use function that generates trip generation [3]. The trip attraction includes traffic that leaves a location and traffic that goes to or arrives at a location. The result of output from the calculation of the traffic in the form of the number of vehicles, people, or freight of goods per unit time, such as vehicles/hours [4]. Trip attraction depends on two aspects:

land use type and the amount of activity and intensity of land use [5].

2. MATERIALS AND METHODS

The research location chosen in this study is corridor artery road Jenderal Sudirman - Dr. Sam Ratulangi of the Makassar city. The variables used are those that contribute to the trip attraction, including traffic volume, road capacity, degree of saturation, ground floor coefficient and building floor. While the optimization level of road network services is done by the approach the direction of the intensity of people/building units. To explain the test of influence descriptive quantitative used multiple linear regression analysis method [6].

A. Traffic Volume

The traffic volume study aims to obtain data on the number of vehicle movements at selected points through the road system.

Equation:

$$V = \frac{n}{T}$$

Where:

V = a volume of traffic passing through a point (pcu/hour).

n = the number of vehicles passing a road (pcu/hour).

T = observation time

B. Road Capacity

To analyze the capacity of roads in Indonesia using the Indonesia Road Capacity Manual (Dirjen Bina Marga, 1997) and the Indonesian Road Kapaitas Guideline 2014.

Equation:

$$C = C_o \times F_{C_w} \times F_{C_{sp}} \times F_{C_{sf}} \times F_{C_{cs}}$$

Where:

- C = Road capacity (pcu/hour)
- C_o = Basic capacity (pcu/hour)
- F_{Cw} = Traffic width adjustment factor

- F_{Csp} = Segregation adjustment factor (only for undivided road).
- F_{Csf} = roadside adjustment factor / kerb
- F_{Ccs} = City size adjustment factor

C. Degree of Saturation

The degree of saturation is a description of whether a road segment has a problem. Based on the assumption that if the road is closer to its capacity then the ease of moving is getting limited. Based on the

definition of degree of saturation, the equation as follows:

$$DS = \frac{V}{C}$$

Where:

- DS = Degree of Saturation (pcu/hour)
- V = Traffic volume (pcu/hour)
- C = Capacity (pcu/hour)

D. Level of Service (LoS)

To assess road performance used standard of service level of road (Table 1). The level of road service is the level of service depends on the current and the road facilities [7].

Table 1. The standardization of service levels in Indonesia

LoS	City size adjustment factor (FC _{cs})	Limits (V/C)
A	Free traffic flow conditions with high speed and low traffic volume	0,00 – 0,20
B	The current is stable, but the operating speed begins to be limited by traffic conditions	0,20 – 0,44
C	The current is stable, but the speed and motion of the vehicle are controlled	0,45 – 0,74
D	The current is close to stable, the speed can still be controlled. V / C is still tolerable	0,75 – 0,84
E	The unstable current of speed sometimes stops, demand is near capacity	0,85 – 1,00
F	Forced flow, low speed, volume above capacity, long line (stuck)	≥ 1,00

To explain the test of influence descriptive quantitative used multiple linear regression analysis method. The regression analysis method is used to generate relationships between two or more variables in numerical form, and to analyze how two or more variables are related, where it is known which variables are influenced by other variables and which variables influence them.

The equation for multiple linear regression model Y, X₁, X₂, X_k will be

estimated to be:

$$Y = b_0 + b_1X_1 + b_2X_2 \dots + b_kX_k$$

Where:

- Y = Criterion
- X₁, X₂ .., X_k = Predictor 1, Predictor 2,, Predictor to-k
- b₀ = Constanta
- b₁ + b₂, .., b_k = Predictor coefficient 1, Predictor coefficient 2, .., Predictor coefficient to-k,

3. RESULT AND DISCUSSION

A. Existing Buildings

Existing building variables that contribute to trip attraction include Building Coverage Ratio (BCR) and Floor Area Ratio (FAR). Building Coverage Ratio (BCR) in the area of planning is determined by the ability of the land the higher the value of land and the intensity of space utilization or land use are also higher. In order to avoid excessive use of

space, controls must be made in the utilization of space for available land use. BCR is determined based on the comparison between the base areas of the building on Jenderal Sudirman Street - Dr. Ratulangi Street, with their land area (Table 2). The average value of BCR in the corridor of Jenderal Sudirman Street - Dr. Sam Ratulangi Street is equal to 0.83.

Table 2. The value of BCR and FAR of Jenderal Sudirman - Dr. Sam Ratulangi Street

Activity Building	Land Area (m ²)	Basic of Building (m ²)	BCR	Building Floor (m ²)	FAR
1	2	3	4	5	6
Mother and child hospital	1625	1300	0,8	2470	1,52
Horison Hotel	3869	3404,72	0,88	12264,7	3,17
Wisma Kalla	5363	4290,4	0,8	25152,5	4,69
PT. PLN	4689	3891,87	0,83	16223,9	3,46
Ratulangi Medical Centre	5184	4665,6	0,9	19077,1	3,68
KFC	3736	3175,6	0,85	6014,96	1,61
Mall Ratu Indah	23090	20072	0,8	39140,4	1,56
New Agung	3493	3213,56	0,92	13098,8	3,75
School Foundation	2306	1729,5	0,75	5695,82	2,47

Whereas, the FAR is determined based on the proportion between the floors of the building with the land area (Table 2). FAR serves to create a healthy and comfortable environment, so the determination needs to be carefully calculated by taking into account the position, condition of the region internally and its implications to the external region around it. The average value of FAR in the corridor of Jenderal Sudirman - Dr. Sam Ratulangi Street is 2.88.

Intensity People/Buildings are people who visit a type of activity on the type of land use. Table 3 shows the average number of people/buildings in corridor Jenderal Sudirman - Dr. Sam Ratulangi Street is the highest number of visitors on the land use of Mal Ratu Indah is 5655 inhabitants while the lowest number of visitors on land use Hotel Horison of 316 inhabitants.

Table 3. Average Number of Persons / Buildings Each Activity

No.	Activity	Land Area(m ²)	Intensity of People
1.	Mother and child hospital	1561	883
2.	Horison Hotel	3869	316
3.	Wisma Kalla	5363	1227
4.	PT. PLN	4689	477
5.	Ratulangi Medical Centre	5184	531
6.	KFC	3736	886
7.	Mall Ratu Indah	23090	5655
8.	New Agung	3493	3846
9.	School Foundation	2306	449

B. Trip Attaction Patterns

a. Vehicle equivalence

Trip attraction is calculated using pcu/hour unit, where vehicles are grouped into 4 groups, namely: light vehicles, heavy vehicles, motorcycles, and unmotorized. The

average pull of corridor movement of Jenderal Sudirman Street - Dr. Sam Ratulangi Street the largest on the land use of Mal Ratu Indah of 265.98 pcu/hour while the lowest on land use Wisma Kalla for 23.2 pcu/hour (Table 4).

Table 4. Average trip attraction Each Type of Activity

No.	Activity	Average of trip generation (pcu/hour)	Persentase (%)
1.	Mother and child hospital	46,2	5.8
2.	Horison Hotel	191,1	3.4
3.	Wisma Kalla	23,2	9.0
4.	PT. PLN	71,2	5.4
5.	Ratulangi Medical Centre	265,98	2.9
6.	KFC	82,7	5.7
7.	Mall Ratu Indah	45,2	33.4
8.	New Agung	42,8	24.0
9.	School Foundation	26,97	10.4

3.3 Traffic Volume Analysis

The traffic volume is the number of vehicles passing through a specific road in a given period of time. Analyzing traffic volume is intended to know the description of traffic flow in Jenderal Sudirman - Dr. Sam Ratulangi Street. Volume is calculated based on the number of vehicles / day or vehicle /

hour. In the process of calculating the volume of traffic, do a conversion in passenger cars unit (pcu). The conversion uses the equivalent of passenger cars in each type of vehicle.

Based on the survey of traffic volume, during peak hour period, the description of traffic volume condition in each direction of the road in the research location can be seen in

Table 5. The comparison of the traffic volume on Jalan Jenderal Sudirman on Monday is peak hour at 12:00 to 13:00 and 17:00 to 18:00, on Saturdays the rush hours only occur

at 4:00 pm to 7:00 pm, while on Sundays the rush hours are 12:00 to 13:00 and 5:00 pm to 6:00 pm (Figure 1).

Table 5. Jenderal Sudirman Street Traffic Volume 2015

Day	Number of vehicles (pcu/hour)					
	07.00 - 08.00	08.00 - 09.00	11.00 - 12.00	12.00 - 13.00	16.00 - 17.00	17.00 - 18.00
Monday	4758,7	5373,1	5515	5629,3	5349	6344,1
Saturday	3746,6	3607	3455,5	3568,6	4360,2	3579,8
Sunday	2766,3	3225,5	3400,3	3022,5	3187,4	3797,6

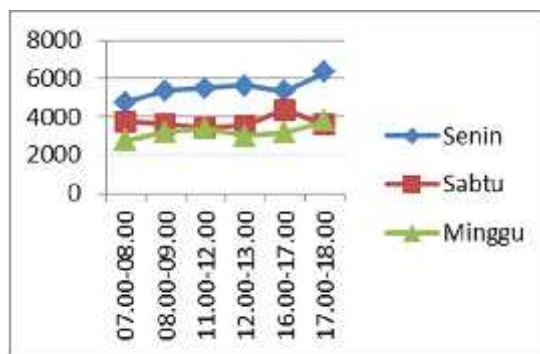


Fig. 1. Graph of Traffic Volume

The traffic volume that passes through the Jenderal Sudirman street on Monday, Saturday and Sunday is 5495 pcu / hour, 3720 pcu / hour and 3233 pcu / hour

(Table 6). This explains that traffic volume on Jenderal Sudirman Street on Monday, Saturday and Sunday has changed significantly.

Table 6. Total volume of daily traffic in Jenderal Sudirman Street, 2015.

Roads	Daily Traffic Volume (pcu/hour)			
	Monday	Saturday	Sunday	Amount
1	2	3	4	5
Sudirman	5495	3720	3233	12448

3.3 Analysis of Level of Service

Minister of transportation Regulation No.14 of 2006 on traffic management and

engineering on the road, explains that service level is the ability of road or intersection to accommodate traffic in certain circumstances.

Level of service of a road segment based on the calculation of traffic volume, capacity and degree of saturation.

Road capacity analysis aims to show the maximum capacity of traffic flow that can pass through a road. In this study, the baseline capacity value of the road segment

conform to the type of road being reviewed, while the corrected capacity is adjusted to the geometric conditions of the road and its surrounding environment. The value of capacity obtained in each segment of the road segment research location can be seen in Table 7.

Tabel 7. The capacity of Jenderal Sudirman Street

No.	Parameter	Value
1	Traffic width adjustment factor (FC_w)	2,08
2	Segregation adjustment factor (only for undivided road). (FC_{sp})	0,985
3	roadside adjustment factor / kerb (FC_{st})	0,98
4	City size adjustment factor (FC_{cs})	1,00
5	Basic Capacity of Road (pcu/hour)	3.300
	amount	6.626

The degree of saturation is one of the main indicators that show the traffic service performance of a road segment. The value of degree of saturation is the ratio between traffic volumes through a road segment with the capacity of the road segment.

The value of the degree of saturation on Jenderal Sudirman Street on Monday is 0.83 due to the effect of traffic volume and road capacity of 6.626 pcu/hour. On Saturdays, the degree of

saturation reaches 0.56 with a capacity of 6.626 pcu/hour. While on the day the value of a degree of saturation is 0.49 where with capacity 6.626 pcu/hour (Table 8). Based on the result of traffic volume and road capacity analysis, the value of the degree of saturation (DS) in the maximum volume of each road segment decreased from Monday, Saturday and Sunday (Figure 2).

Table 8. Calculation of traffic volume, capacity and degree of saturation to determine service level

Jenderal Sudirman Street				
Day	Traffic Volume	Capacity	Saturation Degree	Service Level
1	2	3	4	5
Monday	5494	6626	0,83	D
Saturday	3719	6626	0,56	C
Sunday	3233	6626	0,49	C

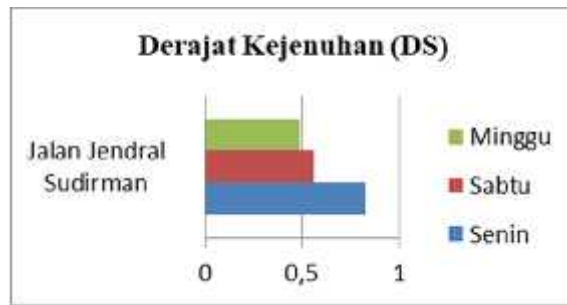


Fig. 2. Graph of Degree of Saturation in Jenderal Sudirman Street

The performance of the road segment of the study site, indicated by the degree of saturation (DS), is generally still in the normal flow [8]. On Monday at a service level D where traffic flow conditions are nearly unstable, operating speeds decrease and relatively quickly due to relatively small obstacles and freedom of movement. While

on Saturdays and Sundays the service level index is in category C indicates the condition of the traffic flow is still within the stable limit, the operating speed is limited and the resistance of the other vehicle is getting bigger. This is due to the influence of side barriers and surrounding land use (Figure 3).

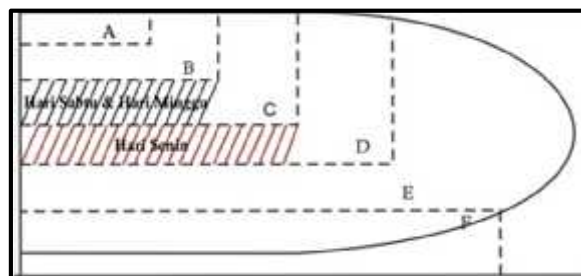


Fig. 3. Service level index on Jenderal Sudirman – Dr. Sam Ratulangi Street.

3.4 Simulation of Trip Ceiling on Building Activities

At this stage, the first to do is the determination of road performance targets based on level of service indicators. Value of service level required is category C with value $DS \leq 0,74$. Level of service C category is used based on the Minister of Transportation

Regulation No.14, 2006 which states that the secondary artery road has at least a level of service C value so that the ideal condition is determined with a minimum value.

The level of service calculation uses two scenarios based on the degree of saturation value. Scenario-1 uses the upper limit of the level of service C ($DS = 0.45$).

While scenario-2 uses the lower limit of the level of service level C (DS = 0.74). Setting scenarios 1 and 2 to get the minimum and maximum limits of the level of service. The trip ceiling is used to limit the amount of generation caused by land use along the corridor of Jenderal Sudirman - Dr. Sam Ratulangi Street. It is then used to limit the intensity of space utilization and the number of people/building in each type of activity.

Based on the existing condition is determined the capacity of 6626 pcu / hour and the level of service D in secondary arterial road. Meanwhile, according to the Minister of Transportation Regulation No.14 of 2006, the secondary arterial road has a service level of at least C, so that for the condition ideally determined the level of service level with minimum number. After determining the maximum level of service and degree saturation in each scenario, the next step is to calculate the maximum vehicle volume limit.

- Scenario I (DS = 0.45)

$$\begin{aligned} \text{Volume of vehicle } \max_{\text{scenario}} &= \text{DS} \\ \max_{\text{scenario}} \times \text{Road Capacity}_{\text{existing}} & \\ &= 0.45 \times 6.626 \text{ pcu / hour} \\ &= 2.981,7 \text{ pcu / hour} \end{aligned}$$

- Scenario II (DS = 0.74)

$$\begin{aligned} \text{Volume of vehicle } \max_{\text{scenario}} &= \text{DS} \\ \max_{\text{scenario}} \times \text{Road Capacity}_{\text{existing}} & \\ &= 0.74 \times 6.626 \text{ pcu / hour} \\ &= 4.903,24 \text{ pcu / hour} \end{aligned}$$

In scenario-1 with saturation limit of 0.45, the maximum volume is 2, 981, 7 pcu / hour. While in scenario-2 with saturation limit of 0.74 obtained the maximum volume of 4, 903, 24 pcu / hour. The total traffic volume value in the research corridor and the total trip generation of each type of activity within the corridor is 4776 pcu / hour then the continuous current in the corridor is 714,22 pcu / hour.

Table 9. Number of Trips per Activity Type

Activity Building	Number of trips (pcu/hour)	Percentage (%)
1	2	3
Mother and child hospital	277,2	5,80
Horison Hotel	161,8	3,39
Wisma Kalla	426,9	8,94
PT. PLN	257	5,38
Ratulangi Medical Centre	139,3	2,92
KFC	270,9	5,67
Mall Ratu Indah	1595,9	33,41
New Agung	1151	24,10
School Foundation	496	10,39
Total	4776	100,00

Total trip attraction at each type of activity in Jalan Jenderal Sudirman corridor - Dr. Sam Ratulangi is 4776 pcu / hour (Table 9). From this data can be calculated the proportion of traffic through and local traffic flow in the corridor Jenderal Sudirman - Dr. Sam Ratulangi Street. The calculation of the proportion between the number of traffic troughs and local traffic flows due to the generated movement generated by the buildings is presented in Table 10.

Table 10. Portion of traffic thruht and local flow

Traffic Volume (pcu/hour)	5494
Trip attaction (pcu/hour)	4776
traffic through (pcu/hour)	714,22
Local flow portion	87%
traffic through portion	13%

The maximum volume results in scenarios are used to calculate trip generation limits. The value of the trip ceiling becomes the maximum limit of movement that can be generated totally by the various activities located in the corridor of Jenderal Sudirman - Dr. Sam Ratulangi. Trip ceiling calculations are performed by reducing the maximum vehicle volume in the scenario by the amount of through traffic. Here are the trip ceiling values for each scenario.

J Scenario-1 (DS = 0,45)

$$\begin{aligned} \text{Trip ceiling} &= \text{Vesichle Volume} \\ &\text{max.scenario} - \text{Volume thruht traffic} \\ &= 2,981.7 - 1,695.3 \end{aligned}$$

$$= 1,286.4 \text{ pcu/hour}$$

J Scenario-2 (DS = 0.74)

$$\begin{aligned} \text{Trip ceiling} &= \text{Vesichle Volume max.scenario} - \\ &\text{Volume thruht traffic} \\ &= 4,903.24 - 1.695,3 \\ &= 3,207.94 \text{ pcu/hour} \end{aligned}$$

This analysis uses previously analyzed data and regression result modeling. The analysis of the determination of the intensity of space utilization is finished based on the type of activity so the value of trip ceiling that has been obtained as a whole needs to be proportioned according to each type of activity.

Table 11. Trip ceiling section of each activity type in both scenarios

Activity Building	Scenario-1		Scenario-2	
	Trip Ceiling Total (pcu/hour)	Trip Ceiling proportion (pcu/hour)	Trip Ceiling Total (pcu/hour)	Trip Ceiling proportion (pcu/hour)
Mother and child hospital		74,61		186,06
Horison Hotel		43,73		109,06
Wisma Kalla		115,77		288,71
PT. PLN		69,46		173,22
Ratulangi Medical Centre	1.286,4		3207,9	
KFC		37,3		93,03
Mall Ratu Indah		73,32		182,85
New Agung		429,65		1071,45
School Foundation		308,73		769,9
Total		133,78		333,62
		1286,4		3207,9

Data of trip ceiling calculation result and modeling result of regression analysis which have been done before used to determine limitation of space utilization intensity in each activity type with descriptive-quantitative analysis.

From the calculation model calculated the value of the intensity of space utilization. For this process of analysis, it takes trip ceiling data per building activity (Tabel 12).

Table 12. Trip Ceiling per Building Activities

DS	Trip Ceiling (pcu/hour)	Building Population	Trip Ceiling Average/building (pcu/hour)
		Mother and child hospital	
0,45	74,61	1	74,61
0,74	186,06		186,06
		Horison Hotel	
0,45	43,73	1	43,73
0,74	109,06		109,06
		Wisma Kalla	
0,45	115,77	1	115,77
0,74	288,71		288,71
		PT. PLN	
0,45	69,46	1	69,46
0,74	173,22		173,22
		Ratulangi Medical Center	
0,45	37,3	1	37,3
0,74	93,03		93,03
		KFC	
0,45	73,32	1	73,32
0,74	186,85		186,85
		Ratu Indah Mall	
0,45	429,65	1	429,65
0,74	1.071,45		1.071,45
		New Agung Store	
0,45	429,65	1	429,65
0,74	769,90		769,90
		School Foundation	
0,45	133,78	1	133,78
0,74	333,62		333,62

3.5 The direction of Intensity of Land Use of Each Type of Trade and Services Activities in Corridor Jenderal Sudirman - Dr. Sam Ratulangi Street.

a. Scenario-1

Dalam skenario ini, aktivitas/fungsi yang berkembang adalah 100% perdagangan dan jasa, karena itu trip rate untuk fungsi perdagangan dan jasa. Nilai

trip rate yang digunakan adalah trip rate tertinggi, yaitu trip rate pada jam puncak siang, yaitu sebesar 0,017 pcu/hour. Berdasarkan hasil perhitungan, diketahui bahwa FAR maksimum yang harus diterapkan untuk dapat mencapai kondisi seperti pada skenario-1 disajikan pada Tabel 13.

Table 13. FAR Determination Maximum Corridor road Jenderal Sudirman - Dr. Sam Ratulangi based on Scenario-1.

Activity	Trip Ceiling For Trade Buildings and Services (pcu/hour)	Trip Rate for Trade Building and services (pcu/hour)	Building Floor and Trade Building Services to be built (m ²)	Extensive trading and services	Maximum FAR Terms
Mother and child hospital	74.61	0,017	4388,82	1625	2,7
Horison Hotel	43.73	0,017	2572,35	3869	-1,504
Wisma Kalla	115.77	0,017	6810	5363	1,27
PT. PLN	69.46.00	0,017	4085,88	4689	-1,14
Ratulangi Medical Centre	37.03.00	0,017	2194,11	5184	-2,36
KFC	73.32.00	0,017	4312,94	3736	1,154
Mall Ratu Indah	429.65	0,017	25273,52	23090	1,094
New Agung	308.73	0,017	18160,58	3493	5,19
School Foundation	133.78	0,017	7869,41	2306	3,41

b. Scenario-1

Similar to Scenario-1, the developing activity/function is 100% trading and services, therefore, the trip rate for trade and service functions. The trip rate used is the

highest trip rate, ie the trip rate at peak hour, which is 0,017 pcu / hour. Based on the calculation results, it is known that the maximum FAR should be applied to achieve such conditions in Scenario-2 (Table 13).

Activity	Trip Ceiling For Trade Buildings and Services (pcu/hour)	Trip Rate for Trade Building and services (pcu/hour)	Building Floor and Trade Building Services to be built (m ²)	Extensive trading and services	Maximum FAR Terms
Mother and child hospital	7,75	0,017	10944,7	1625	6,73
Horison Hotel	4,55	0,017	6415,29	3869	1,65
Wisma Kalla	288.71	0,017	16982,94	5363	3,16
PT. PLN	7,22	0,017	10189,41	4689	2,17
Ratulangi Medical Centre	3,88	0,017	5472,35	5184	1,05
KFC	182.85	0,017	10755,88	3736	2,87
Mall Ratu Indah	44,66	0,017	63026,47	23090	2,72
New Agung	32,05	0,017	45288,23	3493	12,96
School Foundation	333.62	0,017	19624,7	2306	8,51

2. CONCLUSION

1. Along the way Jenderal Sudirman - Dr. Sam Ratulangi Makassar City is a secondary arterial road that has a road capacity of 6626 pcu / hour with traffic volume of 3,838 pcu / hour and Level of Service belonging to class D. Movements generated by land use 4,776 pcu / hour or 87% of the total movement in the Road corridor. 2. Based on regression analysis results, the variables affecting the magnitude of the trip attraction are group changes of the recommended activities, such as Mother and Child Hospital, Horison Hotel, Wisma Kalla, Ratulangi Medical Center and School Foundation; change of a group of activities that are prohibited, among others: PT. PLN, KFC, Mall Ratu Indah, and New Agung store.

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