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PERFORMANCE ANALYSIS OF T JUNCTION ON SMP 3 STREET – SEKUMPUL UJUNG STREET IN MARTAPURA CITY

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ABSTRAK

A T junction on SMP 3 Street - Sekumpul Ujung Street is one of the unsignalized intersections in the city of Martapura. The traffic volume at the intersection is high enough that traffic jams, collisions, and crashes are unavoidable. As these problems keep occurring, an analysis is needed to find the best alternatives to improve the level of service (LOS) to its optimal point. This study was held to find out the performance of SMP 3 Street - Sekumpul Ujung Street intersection in its existing conditions, also to find alternative ways to increase the intersection service level. This research was done based on the IHCM 1997 method of calculation with the help of KAJI software. Secondary data included the data of Banjar Regency's population growth of 2013 – 2017, taken from Statistics Indonesia of Banjar Regency. Then, primary data was taken from a traffic survey held for 15 hours, from 6:00 a.m. to 9:00 p.m. *WITA* (Central Indonesian Time). According to the analysis, the intersection existing condition had a queuing process (QP) of 27%. Then, the analysis of intersection forecasting condition of 7 years showed that it no longer fulfilled the requirements with the QP of 39%. There was also an alternative of service level improvement with an alternative of 7-year forecasting geometric dilation handling, resulting QP of 35%. Next, intersection 10-year forecasting also did not meet the requirements with QP of 38.5%. Last, with signalized intersection of 3-phase, the degree of saturation (DS) had improved up to 0.683, delay point of 23.37 sec/pcu with a cycle time of 47 seconds, and to conclude, the level of service (LOS) was "C".

Keywords: Signalized Intersection, Unsignalized Intersection, Service Level

I. PRELIMINARY

1.1 Background

Roads are the main transportation infrastructure to reach a destination from one place to another for every traffic that passes through it. Transportation problems are usually closely related to population growth which has an impact on the rate of traffic growth, so that road capacity does not match the traffic plan and can cause congestion and delays in the movement of vehicles through it.

An intersection is an area where two or more road branches meet or cross, including the facilities needed for traffic

movement and also a place for traffic conflicts to occur.

At the intersection of SMP 3 Street-Sekumpul Ujung Street is one of the access roads to Demang Lehman Stadium and is close to areas of education, shops, housing, religious and commercial tourism during rush hours in the morning and evening traffic conflicts often occur because there is no traffic jam. The existence of traffic regulations and passing motorists wanting to overtake each other coupled with the absence of traffic signs installed.

Based on the description of the problem above, it is necessary to analyze to determine the level of traffic performance and provide alternative service improvements that are appropriate so that the intersection is in optimal condition.

1.2 Research Purposes

1. Determine the traffic flow performance of the unsignalized of T junction on SMP 3 Street - Sekumpul Ujung Street in the existing condition.
2. Knowing when the intersection is no longer able to work with unsignaled intersections.
3. Knowing the form of handling both in geometric improvements and with signalized intersections.

1.3 Benefits Research

1. The number of traffic flows at the unsignalized of T junction on SMP 3 Street – Sekumpul Ujung Street is obtained.
2. Knowing the performance of the intersection.
3. Obtained a solution to the problems that exist at the intersection.

II. LITERATURE REVIEW

2.1 Intersection Management

Intersections are nodes in the road network that meet and intersect where there is a continuous traffic movement, turning, and cutting, which results in conflicts that cause problems at intersections. (Hobbs, 1995).

Problem identification indicates the location of the congestion is located at a particular intersection or point located along the road segment. Vehicle conflicts with vehicles, and pedestrians also cause delays, accidents and even traffic jams which will have a detrimental impact on drivers or road users (Morlok, 1991).

1. Types of Traffic Movements at Crossroads

Basically, there are four types of traffic movement encounters, namely:

1) *Crossing*.
2) *Diverging*.
3) *Merging / Converging*.
4) *Weaving.*

2.2 Unsignalized intersection

Based on the method from the 1997 Indonesian Road Capacity Manual, the general principle of unsignalized intersections is traffic behavior based on road capacity obtained from the empirical data collected. This method also estimates the effect on capacity and other related measures due to geometric conditions, environment, and traffic requirements.

1. Input Data for Analysis

a. Geometric Sketch

Geometric sketch should provide an overview of the intersection location in terms of city names, main and minor roads, road widths, curbs, road shoulders, waterways, and medians.

b. Traffic Conditions

In calculating the types of vehicles, they are divided by vehicle type, namely light vehicles (LV), heavy vehicles (HV), motorcycles (MC), and non-motorized vehicles (UM).

Tabel 1 Equivalence of unsignalized intersection passenger cars

No	Transportation Type	Passenger Car Equivalent (emp)
1	LV	1,0
2	HV	1,3
3	MC	0,5

Sumber: MKJI (1997)

c. Environmental conditions

- City size class

Table 2 City size class

City Size	Population (Million)	The adjustment factor for city size F_{CS}
Sangat kecil	< 0,1	0,82
Kecil	0,1 – 0,5	0,88
Sedang	0,5 – 1,0	0,94
Besar	1,0 – 3,0	1,00
Sangat besar	> 3,0	1,05

Sumber: MKJI (1997)

2. Traffic Flow Volume (Q)

$$= \frac{Jl.Lv.Pcu.Lv + Jl.HV.Pcu.Hv + Jl.Mc.Pcu.Mc}{hour}$$

$$= pcu/hour$$

Lv = Light Vehicle
HV = Heavy Vehicle
Mc = Motorcycle
Pcu = Passenger Car Unit

3. Capacity

Based on the 1997 MKJI, the definition of the capacity of the intersection is the maximum traffic flow that can be maintained on the part of the road under certain conditions expressed in vehicles/hour or pcu/hour.

Capacity is calculated using the following formula:

$$C = C_0 x\ F_W\ x\ F_M\ x\ F_{CS}\ x\ F_{RSU} x\ F_{LT}\ x\ F_{RT}\ x\ F_{MI}$$

Where:

C = capacity value
Co = base capacity value
FW = entry width correction factor
FM = median correction factor on major roads
FCS = city size correction factor F
RSU = correction factor for the type of road environment in side disturbances
FLT = correction factor turn left
FRT = right turn correction factor
FMI = minor road current correction factor

a. Base capacity (Co)

Table 3 Base Capacity

Junction type	Co base capasity (pcu/jam)
322	2700
342	3900
324 atau 344	3200
422	2900
424 atau 444	3400

Sumber: MKJI (1997)

b. Approach width adjustment factor

Table 4 Adjustment of the approach width

Junction type	F_W
422	0,70 + 0,0866 W1
424 atau 444	0,61 + 0,0740 W1
322	0,73 + 0,0760 W1
324 atau 344	0,62 + 0,0646 W1
342	0,67 + 0,0698 W1

Sumber: MKJI (1997)

c. Left turn adjustment factor (FLT)
The left-turn adjustment factor is determined by the following equation with the input variable LT.
FLT = $0.84 + 1.61_{LT}$

d. Right turn adjustment factor

The right-turn adjustment factor is determined by the following equation with the input variable RT.

FRT = $1.09 - 0.922_{RT}$

e. Minor road flow ratio adjustment

Table 5 Adjustment of minor current ratio

IT	F_{MI}	Pm
422	$1{,}19Pm^2-1{,}19Pm+1{,}19$	0,1-0,9
424	$16{,}6Pm^4-33{,}3Pm^3+25{,}3Pm^2-3{,}6Pm+1{,}95$	0,1-0,3
444	$1{,}11Pm^2-1{,}11Pm+1{,}11$	0,3-0,9
322	$1{,}19Pm^2-1{,}19Pm+1{,}19$ $-0{,}59Pm^2+0{,}595Pm+0{,}74$	0,1-0,5 0,5-0,9
342	$1{,}19Pm^2-1{,}19Pm+1{,}19$ $2{,}38Pm^2-2{,}38Pm+1{,}49$	0,1-0,5 0,5-0,9
324	$16{,}6Pm^4-3{,}33Pm^3+25{,}3Pm^2-3{,}6Pm+1{,}95$	0,1-0,3
344	$1{,}11Pm^2-1{,}11Pm+1{,}11$ $-0{,}55$	0,3-0,5 0,5-0,9

Sumber: MKJI (1997)

4. Degree of Saturation

The degree of saturation is the ratio of traffic flow to capacity, used as the main factor in determining the performance level of intersections and roads. The formula used to calculate the degree of saturation is as follows:

DS = Qtot / C

Where:

DS = Degree of Saturation

Qtot = Total Current(pcu/hour)

C = Capacity (pcu/hour).

5. Delay

a. Intersection Traffic Delay (DTI)
Intersection traffic delay is the average traffic delay for all road users entering the intersection, DTI is determined from the empirical curve between DTI and DS.

b. Main Road Traffic Delay (DTMA)
- For DS <= 0.6
  DT =1.8+5.8234xDS – (1–DS)x1.8
- For DS <= 0.6
  DT =1.0504 / (0.346 – (0.246 x DS) – (1 – DS) x 1.8

c. Minor Road Traffic Delay (DTMI)
DTMI = (Qtotx DT1 – QMA x DTMA) x QMI
Where:
QTOT = Total current (pcu/hour).
DTOT = Total average delay (sec/hour).
QMA = Main road traffic flow (pcu/hour).
DMA = Average delay of main roads (sec/pcu).
QM1 = Minor road traffic flow (pcu/hour).

d. Intersection Geometric Delay (DG)
- For DS < 1.0
  DG = (1 – DS) x (PT x 6 + (1 – PT) x 3) + DS x 4
- For DS 1.0 :
  DG = 4

Where:
DG = Intersection Geometric Delay
DS = Degree of Saturation
PT = Total Turn Ratio

e. Intersection Delay (D)
D = DG + DT1
Where:
D = Intersection delay (sec/pcu)
DG = Geometrical delay of the intersection
DTI = Intersection traffic delay

6. Queue Opportunity

Upper limit:
QP% = (47.71 x DS) – (24.68 x DS2) + (56.47 x DS2)
Lower limit:
QP% = (9.02 x DS) + (20.66 x DS2) + (10.49 x DS2)

2.3 Signalized Intersection

Based on the description of the pad an MKJI 1997, traffic signals are generally used to avoid traffic jams at intersections due to traffic flow conflicts, so it is guaranteed that a certain capacity can be maintained even during maximum traffic flow or peak hours.

1. Time Between Green

Based on the guidelines of the 1997 Indonesian Road Capacity Manual, the inter-green time is the period of the yellow signal + all red signal between two consecutive signal phases. At the same time the lost time is the number of inter-green periods in a complete cycle.

Table 6 The Normal values between green

Junction size	Average road width	Normal value between green
Kecil	6 – 9 meter	4 detik/fase
Sedang	10 – 14 meter	5 detik/fase
besar	>15 meter	>6 detik/ fase

Sumber: MKJI (1997)

2. Signal Timing

a. Selection of the type of approach

Determination of the type of approach with a protected (P) or counter (O) type based on the theory (Webster,1985) in Figure 2.1.

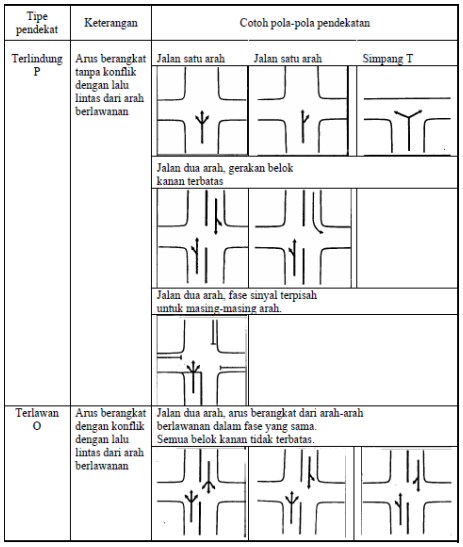

Figure 1 Determination of the type of approach

b. Saturated Current (S)

The saturation current is expressed as the basic saturation current (So) which is the saturation current at standard conditions, with an adjustment factor (F).

S= S0 x FCS x FSF x FG x FP x FRT x FLT

Where:

S0 = Basic saturation current
FCS = City size adjustment
FSF = Barrier adjustment
FG = Slope adjustment
FP = Parking adjustment
FRT = Right turn adjustment
FLT = Left turn adjustment

- Base saturation current (S0)

The basic current value for the P approach type (shielded current) can be obtained from the formula below.

S0 = 600 x We

- Slope adjustment factor (FG)

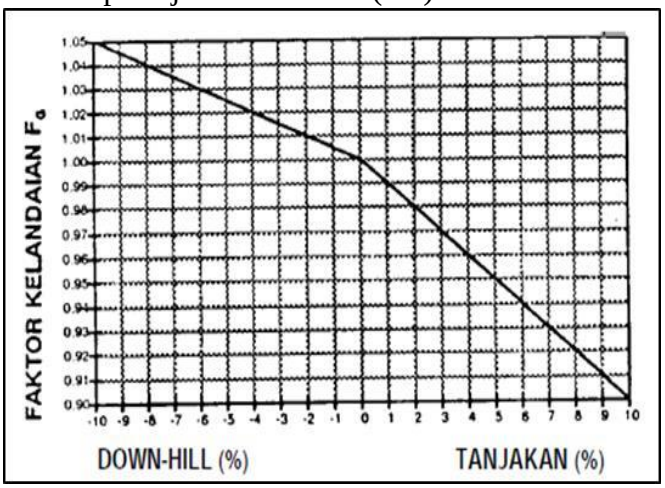

Figure 2 Slope adjustment

- Turn adjustment factor

Right and left turn adjustment factors are determined from the following equation.

FRT = 1.0 + PRT x 0.26
FLT = 1.0 – PLT x 0.16

c. Ratio of current to saturation current

The calculation of the ratio ofcurrent (Q) to saturation current (S)for each approach can be seen in theformula below.

FR = Q/S

d. Cycle time

The cycle time before adjustmentfor fixed time control, is determined using the equation below.

Cua = (1.5 x LTI + 5) / (1 - IFR)

Table 7 Appropriate cycle times

Setting type	Decent cycle time (sec)
2 fase	40 – 80
3 fase	50 – 100
4 fase	80 – 130

Sumber: MKJI (1997)

e. Green time (g)

Green time is the time the green signal flashes in a approximation (sec). Green timing for each phase at the signalized intersection.

gi = (Cua – Lti) x PRi

3. Traffic Behavior

a. Queue length (NQ)

- NQ1 = 0.25 x C x ((DS – 1) + $\sqrt{(DS-1)^2 + \frac{8\,x\,(DS-0.5)}{C}}$)
- NQ2 = cx (1-GR)/(1-GR x DS) x Q/3600
- NQ = NQ1 + NQ2

Where:

NQ1 = Number of junior high schools left behind from the previous green phase

NQ2 = Number of junior high school students who came during the red phase

NQ = total queue length

DS = degree of saturation

C = Capacity

c = cycle time GR = green ratio Q = traffic flow

b. Vehicle stopped

- NS = 0.9 x NQ/(Q xc) x 3600
- NSv = Q x NS

Where:

NS = Stop number

NSv = Number of vehicles stopped

c = cycle time

Q = traffic flow

c. Delay

- DT = cx A + $\frac{\text{NQ1 x 3600}}{\text{C}}$
- A = $\frac{0.5 \text{ x } (1-\text{GR})^2}{(1-\text{GR x DS})}$

Where:

DT = Average traffic delay (sec/pcu)

DS = degree of saturation

NQ1 = Number of junior high schools left behind from the previous green phase

c = adjusted cycle time (s)

GR = Green ratio (g/c)

- DGj = (1-PSV) x PTx6+(PSVx4)

Where:

DGj = Average geometric delay for approach j (sec/pcu)

PSV = Ratio of vehicles stopped at approach

PT = Ratio of vehicles turning on approach

2.4 Traffic Forecasting

Using the growth rate, it is obtained an estimate of how many more years the intersection can still meet certain requirements, use formula trial error namely:

$Pn = Po \times (1 + i)^n$

Where:

Pn = Traffic flow for the planned

Po = Traffic flow this year

i = Traffic flow growth factor traffic

n = Year of plan

2.5 Service Level Index

Based on the 1997 MKJI, road performance is indicated by the level of

service (LOS), which is a qualitative measure that reflects a driver's perspective on the quality of driving a vehicle.

1. **Unsignalized intersection**

   Meanwhile, according to (Radam & Lestari, 2018) The level of service for unsignalized intersections refers to the level of service for road sections, especially on major roads.

   The values used as performance indicators of unsignalized intersections are:

   - The value of the degree of saturation (DS) of the intersection should not be more than 0.80.
   - Performance based on the average intersection delay for the "STOP" priority intersection.

Table 8 "STOP" Priority Intersection

Level of Service	Average Stop Delay (driving seconds) Permenhub. No. KM 14 Tahun 2006
A	<5
B	5-10
C	11-20
D	21-30
E	31-45
F	>45

Sumber: Radam & Lestari (2018)

   - The average traffic delay should be no more than 10 sec/pcu.
   - The queue probability (QP) should be no more than 35%.

2. **Signal intersection**

Table 9 Service level index of signalized intersections

Level of Service	Average Delay (sec/kend) Permenhub. No. PM 96 Tahun 2015 Permenhub. No. KM 14 Tahun 2006	Degree of Saturation (DS) Permenhub. No. KM 14 Tahun 2006
A	≤ 5,0	0
B	5,1 – 15,0	≤ 0,1
C	15,1 – 25,0	≤ 0,3
D	25,1 – 40,0	≤ 0,7
E	40,1 – 60,0	≤ 1,0
F	> 60,0	> 1,0

Sumber: Radam & Lestari (2018)

2.6 Intersection Performance with KAJI Software

The intersection performance using KAJI is basically the same as manual calculations using the MKJI method, only that the calculation using KAJI is done automatically by using the software.

III. RESEARCH METHOD

The research method used is direct research in the field, namely the observation method in the form of direct observation and recording in the field, which is conducted at the intersection of SMP 3 Street - Sekumpul Ujung Street, Martapura City, South Kalimantan. This research was conducted for one working day. The traffic volume survey was carried out for 15 hours from 06.00 – 21.00 WITA with 10 minute intervals. The data needed in this study consisted of 2 (two) types, namely:

1. Primary Data

   Primary data was obtained from the survey in the form of geometric intersection data such as road width, location plans and traffic volume.

2. Secondary Data

   Secondary data is obtained from literature studies and data from related agencies or institutions.

The primary data and secondary data that have been obtained will be used for the calculation of the unsignalized intersection of the 1997 MKJI method using the KAJI software. Data analysis for unsignalized intersections using the

Indonesian Road Capacity Manual (MKJI 1997) aims to determine whether the performance of the intersection isstill feasible or not.

IV. RESULT AND DISCUSSION

4.1 Geometric Condition

Based on the results of field observations and measurements, the width of Sekumpul Ujung Street as the main road is 6.0 meters and the width of SMP 3 Street as a minor road is 5.0 meters.

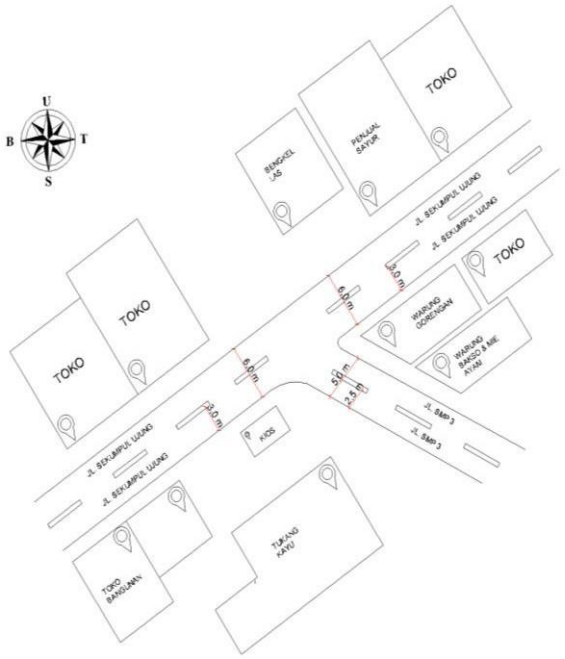

Figure 3 Layout of T Junction SMP 3 Street – Sekumpul Ujung Street

1. Approach Width

Table 10 Code and Approach Width

Approach Code	WA (m)	Enter (m)	Come out (m)
T (Sekumpul Ujung Street (Sekumpul))	3,0	3,0	3,0
S (SMP 3 Street)	2,5	2,5	3,0
B (Sekumpul Ujung Street (Bincau))	3,0	3,0	3,0

4.2 Environmental Conditions

Conditions The land use condition around the research location has many figures and housing including on the type of Commercial road environment. For side barriers at the research location, there are many parking vehicles and people going in and out of shops which cause side barriers to be in the High category.

1. Population Data

Based on the Central Statistics Agency (BPS) of Banjar Regency, the total population recorded in 2017 can be seen in Table 11.

Table 11 Population of Banjar Regency.

Regional	Population				
	2013	2014	2015	2016	2017
Banjar Regency	536328	545397	554443	563062	571573

average population from 2013-2017 was 554160.6 people with a population growth rate of 1.60%.

4.3 Traffic Conditions

1. Vehicle Composition

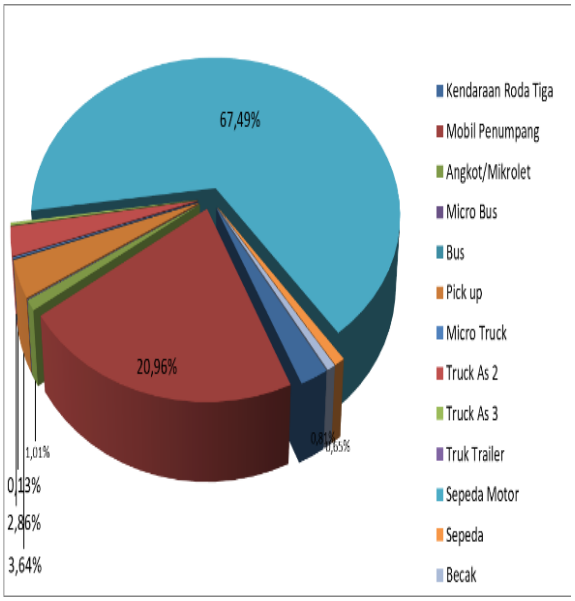

Figure 4 Vehicle Composition

2. Traffic Volume

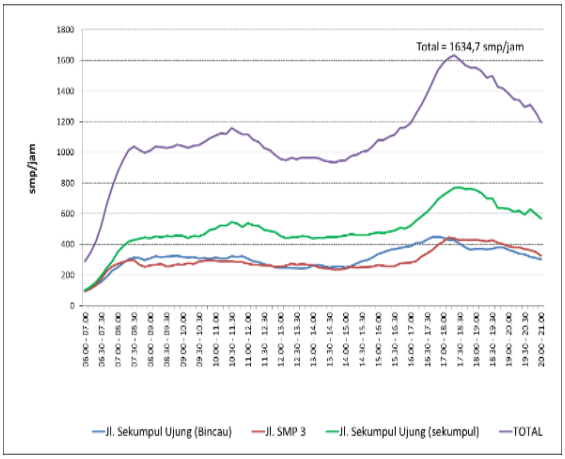

Figure 5 Traffic Volume Graph

From the graph in Figure 4.3, the peak hours of traffic flow are 17.20 – 18.20 WITA with a volume of 1634 pcu/hour. For vehicle traffic data at peak hours can be seen in Table 12.

Table 12 Traffic Data for Peak Hours

APPROACH		DIRECTION	LV	HV	MC	UM
East	Jl. Sekumpul Ujung (Bincau)	LT	12	0	99	2
		ST	86	4	591	2
West		ST	76	6	552	4
	Jl. Sekumpul Ujun (Sekumpul)	RT	49	3	562	8
South	Jl. SMP 3	LT	77	4	536	7
		RT	8	0	75	7

4.4 Analysis of Unsignalized T Junction Existing Condition

Analysis of existing conditions is carried out by entering the geometricdata of intersections and vehicle traffic data at peak hours into the USIG-1 formin the KAJI program. After that, the results will be obtained in the form of intersection capacity and traffic performance at the intersection, As can be seen in Table 13 and Table 14.

Table 13 Recap value intersection capacity

Capacity Adjustment Faktor							C
C_0	FW	FCS	FRSU	FLT	FRT	FMI	
2700	0,945	0,94	0,920	1,271	0,862	0,964	2331

Table 14 Recap intersection performance value

Q	DS	Average Delay					QP%
		DTI	DTMA	DTMI	DG	D	
1539	0,660	6,68	5,74	10,07	4.18	11,04	18 - 37

From the results of the analysis on the existing conditions, it is known that the performance of the intersection still meets the requirements because the DS value is > 0.80, the average traffic delay is > 10 sec/pcu, the queue probability > 35%, it is necessary to re-analyze the conditions for the next 7 years with peak hour traffic data in Table 15.

Table 15 Peak Hour Traffic Data

APPROACH		DIRECTION	LV	HV	MC	UM
East	Jl. Sekumpul Ujung (Bincau)	LT	15	0	121	4
		ST	106	6	716	4
West	Jl. Sekumpul Ujun (Sekumpul)	ST	93	8	669	6
		RT	61	5	681	11
South	Jl. SMP 3	LT	94	6	650	9
		RT	11	0	92	9

After that, the results will be obtained in the form of intersection capacity and traffic performance as shown in Tables 16 and 17.

Table 16 Recap of the value of the intersection capacity

Capacity Adjustment Faktor							C
C_0	FW	FCS	FRSU	FLT	FRT	FMI	
2700	0,945	0,94	0,920	1,271	0,862	0,964	2331

Table 17 Recap intersection performance value

Q	DS	Average Delay					QP%
		DTI	DTMA	DTMI	DG	D	
1539	0,660	6,68	5,74	10,07	4.18	11,04	18 - 37

4.5 Geometric Widening

Alternative geometric widening is done in two stages. For the first phase of widening, SMP 3 Street is widened to 6 meters and Sekumpul Ujung Street is widened to 8 meters with the condition for the next 7 years. For the second phase of widening, SMP 3 Street is widened to 6 meters and Sekumpul Ujung Street is 8 meters with conditions for the next 10 years. The result of calculating the capacity and performance of alternatives with geometric dilation can be seen in Table 18 and Table 19.

Table 18 Recap value capacity

Step	Capacity Adjustment Faktor							C
	C_0	FW	FCS	FRSU	FLT	FRT	FMI	
1	2700	0,945	0,94	0,918	1,271	0,861	0,963	2479
2	2700	1,009	0,94	0,918	1,271	0,861	0,963	2479

Table 19 Recap traffic performance

Step	DS	Average Delay			QP%	ITP
		DTI	DG	D		
1	0,758	8,31	4,13	12,44	23 - 47	C
2	0,796	9,00	4,11	13,11	26 - 51	C

From the results of the analysis on the alternative conditions of geometric widening, it is known that the performance of the intersection still meets the requirements because the DS value is > 0.80, the average traffic delay is > 10 sec/pcu, the queue probability is > 35% with the condition 7 years to come. Then the analysis is carried out again with the conditions in the next 10 years, it is known that the performance of the intersection does not meet the requirements with a 38% chance of queuing. Therefore, it is necessary to improve alternatives by using alternative 3-phase signalized intersections.

4.6 Signalized Intersection

Because the performance of the intersection of SMP 3 Street – Sekumpul Ujung Street still does not meet the requirements when using the alternative geometric widening with conditions in the next 10 years, it is continued with the alternative signalized intersection. For alternative signalized intersections, it is done using 3 phases. For signalized intersections alternative analysis results are shown in Table 20.

Table 20 signalized intersections Performance

Phase		DS	Delay		*Cycle Time*	ITP
			Traffic	Intersection		
3 Fase	S	0,638	18,91	23,37	47 det	C
	T	0,667	21,00			
	B	0,683	18,35			

From the results of analysis on the alternative condition improvements with signalized intersection is known that the performance of the intersection to intersection 3-phase alternative value obtained 47 seconds cycle time and overall the intersection of the delay is 23.37 seconds / smp with an index value of service level C and cycle time setting can be seen in Figure 6.

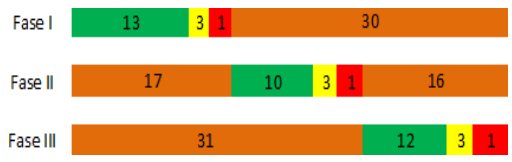

Figure 6 Pengaturan Waktu Siklus 3 fase

V. CLOSING

5.1 Conclusions

1. From the analysis of intersection performance Three SMP 3 Streets – Sekumpul Ujung Street Martapura City using KAJI software in the existing conditions, the side delay value is 11.04 sec/pcu, the average queue probability value is 27%, and the degree of saturation is 0.660 with a service index of B. seen from these results it can be said that the performance in the existing condition still meets the indicator requirements.
2. From the results of the analysis of existing conditions, existing conditions with conditions of 7years to come, geometric widening with conditions of 7 years to come, and geometric widening with conditions of 10 years to come, the degree of saturation value is 0.796, the value of the intersection delay is 14.67 seconds. /smp and the average queuing opportunity value is 38.5% with an ITP value of C. With the results of the above analysis it is known that in the next 10 years the unsignalized intersection will no longer function. The change in the handling of the unsignalized intersection will be changed to a signalized intersection.
3. Based on the results of the analysis, several alternative treatments were carried out to improve the level of service at the intersection. The first treatment is geometric widening by widening SMP 3 Road to 6 meters and Sekumpul Ujung Road to 8 meters, then the QP value = 38.5% and the ITP value, namely C, does not meet the requirements. Then the second treatment is carried out,

namely the 3-phase signalized intersection, the service level index value is C and the value *cycle time* is 47 seconds, from the analysis results the best intersection performance is to use an alternative 3-phase signalized intersection.

5.2 Suggestion

1. With the change and regulation of traffic flow, it is hoped to improve the performance of the intersection by implementing the best alternative.
2. The plan is to change the signalized intersection to improve the performance of the intersection.
3. It is hoped that people crossing the intersection will further increase awareness of traffic order, so that the level of comfort and driving safety is achieved.

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