Proposal Of Traffic Flow Scheme in The Public Market of San Vicente, Sta. Rita, Pampanga

Adrian S. Nulud [1], Elmer Q. Sambat Jr. [1], Marlon B. Alfonso [1], Edrick C. Beler [1], Bryan Russell T. Dela Peña [1], Deanna P. Guese [1], Rodora S. Reyes [1], Marvin D. Basea [1], Rommel C. De Mesa [1]

[1]Civil Engineering Department, College of Engineering and Architecture, Don Honorio Ventura State University, Cabambangan, Villa De Bacolor, Pampanga, Philippines.

Corresponding Author: adrian0824.nulud@gmail.com

Abstract: - In urban areas, congestion is an issue that is difficult to manage because the number of cars is always rising at a rate that is greater than what the existing traffic infrastructure can handle. The traffic management system also gathers information from a variety of sources, analyzes it to identify risks that could impede traffic flow, and then manages these risks to prevent this issue (De Souza et al., 2017). This study is for the traffic problem that occurs in the Public Market of Sta. Rita, Pampanga. The study was conducted on the provincial road connecting C Mariano St. and Gosioco St. of San Vicente, Sta. Rita, Pampanga. The rationale behind this choice is that this location is also located on the provincial road going to Guagua via Porac and a nearby road. The place is the route of all quarry trucks going to Porac, Pampanga and it has also an access road going to the city of Angeles, Pampanga. The researchers used a quantitative method to analyze the results of the data that were tabulated using Excel and that were collected by manual counting, considering the blue book of the Department of Public Works and Highways, to answer the following objectives. The municipality of Sta. Rita, Pampanga permitted to conduct an assessment of the traffic condition in the said location that can help the study. The researchers find out that there is an existing traffic problem in the study area based on the assessed data; in Intersection 1 (A.M Peak), there is a saturation traffic volume, and in Intersection 2 (A.M Peak), there is a heavy traffic condition, in intersection 1 (P.M Peak), there is a heavy traffic condition, and in intersection 2 (A.M Peak), there is a heavy to moderate traffic condition. The researcher recommends having a traffic plan management using simulation software (PTV Vissim) for the public market that can help to innovate the study and implement it. Assessment of the proposed traffic mobility flow scheme in the study area. Develop a parking plan management system that seek to systematize the parking spots for the motorists who require them, while also avoiding congestion and enhancing safety. Level of service of the pedestrian, maybe a factor to consider in making a traffic plan to monitor the people's behavior on roads. Innovation of the municipal traffic ordinance to control the discipline of motorists.

Key Words: — ***Traffic mobility plan, manual counting, congestion.***

I. INTRODUCTION

Market centers experience traffic congestion as a result of users competing for space, including cars, traders, shoppers, and walkers. The traffic management systems in market centers, which are major locations of important congestion, are insufficient. Key congested areas are a frequent occurrence in the transportation networks of many cities (Jain & Vazirani, 2010). As they travel through the shared congestion region, roads heading into and out of market areas attract a significant amount of both pedestrian and vehicular traffic. However, some research has been done to look at the causes and effects of traffic congestion in market centers, as well as how to manage it. The implications of poor traffic management systems in cities have gotten a lot of attention (Armah et al., 2010). Because there aren't enough parking spaces, traffic signals, or

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other transportation amenities, congestion may be considered an inevitable byproduct (Blanco et al., 2009). People and freight transportation, which use the same infrastructure, are the two modes of transportation that are most affected by congestion in cities. As a result, excessive use of the road infrastructure beyond its capacity leads to traffic congestion on road networks, which is characterized by slower speeds, longer travel times, and more vehicle waiting. Traffic congestion is a common occurrence in any economically active and successful metropolis (Yildirim, 2001). The traffic problem affects the entire world. Economic growth, productivity, environmental sustainability, and quality of life in metropolitan environments are seriously threatened by delays and unreliability. When it comes to offering short-term and long-term benefits of reducing congestion on roads, highways, and pathways, the authorities of the concerned countries and infrastructure investment are not taken into consideration. Environmental, economic, health, and social issues are four categories in which traffic congestion has a negative impact (Mahmud et al., 2012; Weisbrod et al., 2003; Remi et al., 2009; Levy et al., 2010). Depending on variables including city size, road capacity and layout, the geographical distribution of land use, modes of public and private transportation systems, and travel habits, the nature, extent, and intensity of the effects differ in each city (Kiunsi, 2013). One of the causes of traffic congestion is the failure of the appropriate authorities to effectively implement traffic laws and regulations that over time become obsolete owing to the constantly changing environment. (Litman, 2016) as a set of regulations and policies that increase the use of parking lots. Parking management can significantly reduce the requirement for parking spaces In a certain situation, providing several benefits for the economy, society, and Environment. When all factors are considered, better management is typically the most Effective strategy to address the parking issue. Parking management can also improve Users' options for parking, pricing, and payment methods like coins, bills, credit cards, Online payments, and so forth. Other modes of transportation that can be improved Include walking, cycling, ridesharing, public transportation, and car sharing.

II. METHODOLOGY

This methodology addresses the research design, respondents of the study, sampling strategy, research instrument, data collection, data analysis, and statistical processing of the data used in data collection could capture personality differences. For the study, it was necessary to count how many cars and drivers used the provincial route that runs between C. Mariano Street and Gosioco Street in San Vicente, Sta. The researchers in Rita, Pampanga, used a quantitative approach. By utilizing data that has been measured or seen, quantitative research applies scientific inquiry to the Sample. Quantitative research aims to advance knowledge and foster intercultural understanding (Allen, 2022). In quantitative descriptive research, the topic under investigation is given a logical course of action. The way specific study objectives are identified or framed is according to the study or research challenge. Finding research gaps that need to be filled, methods for describing the study population and figuring out sample size, the type of data to be collected and how it is collected and analyzed, data presentation and clarifications, and dissemination of the investigation's findings are all important considerations (Mbuva 2022). The study was conducted and developed in San Vicente, Sta. Rita, Pampanga. The Researchers focused on the vehicles passing around the public market in the said location. Researchers assess the road traffic condition by following the guidelines of the Department of Public Works and Highways (DPWH) and construct traffic schemes based On the data gathered. The researchers conducted a manual counting to know and estimate the number of vehicles daily. The researchers focused on vehicles passing to and from Porac, Guagua, San Jose, and Sta. Monica, causing traffic around the Market and Church of San Vicente, Sta. Rita, Pampanga. The researchers begin manually counting every peak hour in the Morning between 8 a.m. and 9 a.m. and every peak hour in the afternoon between 4 p.m. And 5 p.m. From March 15, 2023, to March 21, 2023 (7 days), the observation was conducted. After the counting, transferred it to Excel to speed up the computation of the data. The researchers used computations to obtain the average of such vehicles on a daily Basis; they also made a weekly computation to better show and determine the causes of traffic congestion along the public market in Sta. Rita, Pampanga. In determining the factors, a calculation was also set to determine the total and percentage of vehicles passing through the said location. The researchers also tabulated the data to determine the level of service of the vehicles in order to examine the volume count rate based on the department of Public Work and Highways blue book provision that is shown below.

Table.1. Passenger Car Equivalent Factor

PASSENGER CAR EQUIVALENT FACTOR	
Vehicle Type/Description	**PCEF Values**
Passenger Car	1

Passenger Jeepney	1.5
Pickup, Van, Good Utility and Small Bus	1.5
Large Bus	2
Rigid Truck, 2 & 3 Axles, Semi-Trailer, 3-5 Axles	2.5
Motorcycle	1
Tricycle	2.5

The following is the level of service of the road and volume count rate based on The Department of Public Work and Highways (DPWH) blue book. The rationale behind the PCEF system is as follows:

- Car, passenger van, and owner-jeep: PCEF = 1 per definition.
- Motor-tricycle: PCEF = 2.5, because this slow-moving vehicle (25-30 km/hour as normal maximum speed) causes considerable queuing on roads particularly along Areas with heavy roadside friction were stopping to load/unload passengers is frequent; shoulders and their condition would have an impact on the PCEF since the presence of a good paved shoulder would attract these slow-moving vehicles. The stopping on the carriageway causes other vehicles to slow down and even stop and therefore the motor tricycles (and jeepneys and buses) have a reducing effect on road capacity.
- Jeepney and small bus: PCEF = 1.5, because of relatively slow-moving and Frequent stopping to load/unload passengers, particularly along heavy roadside Friction areas (the heavier the roadside friction the more the potential for passengers and therefore the more stops). Running speed is at least higher than the motor-tricycle.
- Large bus: PCEF = 2.0 in flat terrain. Roadside friction is a factor to consider for jeepneys, motor tricycles, and small buses. Shoulders normally do not have any impact as large buses usually stop at will on the pavement. Gradients would have a lowering impact on bus speeds. Carriageway and shoulder widths impact road capacity for buses and trucks, especially for pavement widths of less than 6 meters. Lack of or limited shoulder and its condition also limit road capacity because it would imply the similarity of lateral obstructions.
- Trucks: PCEF = 2.0 for a rigid truck and 2.5 for a semi- or trailer-truck combination. As trucks do not stop regularly roadside friction is not a restraining factor but gradients and their lengths have a substantial effect on heavily loaded (or overloaded) trucks.

Formula for PCU:
PCU = Σ (Vehicle Type * PCEF Values)

Table 2. Basic Hourly Car Capacity

Carriageway Width	Hourly PCU	
	Rural	Urban
single < 4 meters	600	600
4-5 meters	1200	1200
5.1 – 6.0 meters	1900	1600
6.1 – 6.7 meters	2000	1700
6.8 – 7.3 meters	2400	1800
2 x 6.7 or 2 x 7.3 meters	7200	6700

VCR = PCU*0 08/BHCC (for annual)

VCR = PCU/BHCC* (0.9 or 1) (for daily)

Note: 90% occupancy for 2m below the road shoulder/ 100% 2m above the road shoulder

Legend

BHCC = basic hourly car capacity (in PCU)

Hourly design volume = 8% of AADT in PCU

PCU = passenger car unit

PCEF = passenger car equivalent factors, and

VCR = traffic volume capacity ratio (0 00 – 1 00)

Table.3. Level of Service Factors and Conditions

LOS	CHARACTERISTICS	VCR
A	FREE-FLOWING TRAFFIC	VCR<0.20
B	RELATIVELY FREE-FLOWING TRAFFIC	0.21-0.50
C	MODERATE TRAFFIC	0.51-0.70
D	MODERATE/HEAVY TRAFFIC	0.71-0.85
E	HEAVY TRAFFIC	0.86-1.0
F	SATURATION TRAFFIC VOLUME	0.86-1.0

According to the Highway Research Board, Washington, D.C., 1965 (following Versions are still available), road capacity is an important statistic in the VCR. Use the General definition above to define capacity, which is the number of cars that can reasonably be expected to travel through a specific length of an arterial lane or a main Road within a single lane and in each direction for one hour under normal driving conditions and traffic. Capacity is defined in the table above. The capacity is referred to as the traffic volume at the upper E level. VCR = 1.00 is another name for the line separating levels E and F (Department of Works and Public Highways, 2013).

III. Results And Discussions

This section consists of reports of the researcher's discussion for the tables that indicate the result of the estimated number of vehicles and the analysis of data collected during the study procedure. For this chapter, the researchers conducted manual counting for vehicles around San Vicente, Sta Rita Pampanga. The data collected were used complete the result.

3.1 Summary of The Data Collected

The estimated number of vehicles on a daily basis according to the conducted manual counting and the traffic condition in the intersections.

Table 4. Study Area Road Measurement Intersection 1

Manual Road Measurement Per Lane	
Road Description	Measurements
C. Mariano St. Road	2.5m/lane
C. Mariano St. Shoulder	0.75m/lane
Main Road	3m/lane
Main Road Shoulder	2.5m/ lane

Table 5. Study Area Road Measurement Intersection 2

Manual Road Measurement Per Lane	
Road Description	Measurements
Gosioco St. Road	2.5m/lane
Gosioco St. Shoulder	0.75m/lane
Main Road	3m/lane
Main Road Shoulder	2.5m/ lane

Table 6. Manual Count of Vehicle Intersection 1 (A.M. Peak)

MANUAL TRAFFIC COUNT OF VEHICLE PER HOUR AVERAGE IN A DAILY BASIS									
DIRECTION		TYPES OF VEHICLE							
From	To	Private cars	Tricycles	Motorcycles	Jeepneys	Trucks	Total	Percent	%
Guagua	Porac	93	89	93	24	29	328	0.51	51%
	San Jose	54	67	65	15	6	208	0.32	32%
	Sta. Monica	33	37	37	0	0	107	0.17	17%
	TOTAL	180	194	195	40	35	643	1	100%
Porac	Guagua	92	91	93	21	25	322	0.52	52%
	San Jose	54	55	63	0	5	177	0.29	29%
	Sta. Monica	33	40	42	0	0	115	0.19	19%
	TOTAL	179	187	198	21	29	614	1	100%
San Jose	Guagua	0	0	0	0	0	*	*	*
	Porac	0	0	0	0	0	*	*	*
	Sta. Monica	0	0	0	0	0	*	*	*
	TOTAL	0	0	0	0	0	*	*	*
Sta. Monica	Guagua	29	32	34	0	0	95	0.39	39%
	Porac	24	25	23	0	0	72	0.29	29%
	San Jose	23	27	29	0	0	79	0.32	32%
	TOTAL	76	84	85	0	0	246	1	100%

Note: (*) considered one-way only.

Table 6 shows the number of vehicles traveling intersection 1 (A.M. Peak) to and from, Guagua, Porac, San Jose, and Sta Monica around San Vicente Sta Rita, Pampanga Market, 8 am to 9 am. Based on manual counting by the researchers, the total number of vehicles observed every hour on a daily basis the average number of private cars, tricycles, motorcycles, jeepneys, and trucks is more or less 643 from Guagua to Porac,

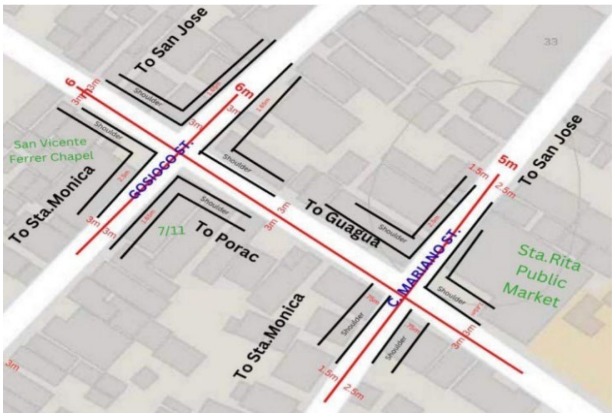

Fig.1. (Site Plan of Public Market in San Vicente, Sta. Rita, Pampanga)

San Jose, and Sta. Monica. The average number of private cars, tricycles, motorcycles, jeepneys, and trucks is more or less 614 from Porac to Guagua, San Jose, and Sta. Monica. The average number of private cars, tricycles, motorcycles, jeepneys, and trucks is more or less 245 from Sta. Monica to Guagua, Porac, and San Jose. No one is passing by San Jose to Guagua, Porac, and Sta. Monica.

Table 7. Manual Count of Vehicle Intersection 1 (P.M. Peak)

MANUAL TRAFFIC COUNT OF VEHICLE PER HOUR AVERAGE IN A DAILY BASIS									
DIRECTION		TYPES OF VEHICLE							
From	To	Private cars	Tricycles	Motorcycles	Jeepneys	Trucks	Total	Percent	%
Guagua	Porac	64	64	67	19	10	225	0.43	43%
	San Jose	46	54	57	12	5	174	0.33	33%
	Sta. Monica	36	41	43	0	0	121	0.23	23%
	TOTAL	146	159	168	32	15	519	1.00	100%
Porac	Guagua	64	61	66	17	10	217	0.48	48%
	San Jose	38	46	45	0.00	4	134	0.29	29%
	Sta. Monica	33	35	37	0	0	105	0.23	23%
	TOTAL	136	142	147	17	14	456	1.00	100%
San Jose	Guagua	0	0	0	0	0	*	*	*
	Porac	0	0	0	0	0	*	*	*
	Sta. Monica	0	0	0	0	0	*	*	*
	TOTAL	0	0	0	0	0	*	*	*
Sta. Monica	Guagua	26	29	32	0	0	87	0.33	33%
	Porac	27	29	30	0	0	86	0.32	32%
	San Jose	25	31	35	0	0	91	0.35	35%
	TOTAL	78	89	97	0	0	265	1	100%

Note: (*) considered one way only.

Table 7 shows the number of vehicles traveling intersection 1 (P.M. Peak) to and from, Guagua, Porac, San Jose, and Sta Monica around San Vicente Sta Rita, Pampanga Market, from 4 pm to 5 pm. Based on manual counting by the researchers, the total number of vehicles observed every hour on a daily basis the average number of private cars, tricycles, motorcycles, jeepneys, and trucks is more or less 519 from Guagua to Porac, San Jose, and Sta. Monica. The average number of private cars, tricycles, motorcycles, jeepneys, and trucks is more or less 455 from Porac to Guagua, San Jose, and Sta. Monica. The average number of private cars, tricycles, motorcycles, jeepneys, and trucks is more or less 264 from Sta. Monica to Guagua, Porac, and San Jose. No one is passing by San Jose to Guagua, Porac, and Sta. Monica.

Table 8. Manual Count of Vehicle Intersection 2 (A.M. Peak)

MANUAL TRAFFIC COUNT OF VEHICLE PER HOUR AVERAGE IN A DAILY BASIS									
DIRECTION		TYPES OF VEHICLE							
From	To	Private cars	Tricycles	Motorcycles	Jeepneys	Trucks	Total	Percent	%
Guagua	Porac	62	60	56	24	29	231	0.71	71%
	San Jose	0	0	0	0	0	0	0.00	0%
	Sta. Monica	29	32	33	0	0	93	0.29	29%
	TOTAL	91	91	89	24	29	324	1	100%
Porac	Guagua	41	36	44	16	17	155	0.58	58%
	San Jose	0	0	0	0	0	0	0	0%
	Sta. Monica	32	39	43	0	0	114	0.42	42%
	TOTAL	73	75	88	16	17	269	1	100%
San Jose	Guagua	25	32	32	4	8	101	0.38	38%
	Porac	22	29	31	0	1	84	0.32	32%
	Sta. Monica	20	28	33	0	0	80	0.30	30%
	TOTAL	68	89	96	4	9	266	1	100%
Sta. Monica	Guagua	22	25	27	0	0	74	0.50	50%
	Porac	21	27	28	0	0	76	0.50	50%
	San Jose	0	0	0	0	0	*	*	*
	TOTAL	43	52	55	0	0	150	1	100%

Note: (*) considered one way only.

Table 8 shows the number of vehicles traveling intersection 2 (A.M. Peak) to and from Guagua, Porac, San Jose, and Sta Monica around San Vicente Sta Rita, Pampanga Market, from 8 am to 9 pm. Based on manual counting by the researchers, the total number of vehicles observed every hour on a daily basis the average number of private cars, tricycles, motorcycles, jeepneys, and trucks is more or less 324 from Guagua to Porac, San Jose, and Sta. Monica. The average number of private cars, tricycles, motorcycles, jeepneys, and trucks is more or less 269 from Porac to Guagua, San Jose, and Sta. Monica. The average number of private cars, tricycles, motorcycles, jeepneys, and trucks is more or less 266 from San Jose to Guagua, Porac, and Sta. Monica. The average number of private cars, tricycles, motorcycles, jeepneys, and trucks is more or less 150 from Sta. Monica to Guagua, Porac.

Table 9. Manual Count of Vehicle Intersection 2 (P.M. Peak)

MANUAL TRAFFIC COUNT OF VEHICLE PER HOUR AVERAGE IN A DAILY BASIS									
DIRECTION		TYPES OF VEHICLE							
From	To	Private cars	Tricycles	Motorcycles	Jeepneys	Trucks	Total	Percent	%
Guagua	Porac	40	35	35	19	10	140	0.63	63%
	San Jose	0	0	0	0	0	*	*	*
	Sta. Monica	23	29	32	0	0	84	0.37	37%
	TOTAL	63	64	67	19	10	224	1	100%
Porac	Guagua	26	16	19	11	7.57	79	0.47	47%
	San Jose	0	0	0	0	0	*	*	*
	Sta. Monica	26	31	33	0	0	90	0.53	53%
	TOTAL	52	46	52	11	7.57	169	1	100%
San Jose	Guagua	19	23	24	6	2.43	75	0.36	36%
	Porac	18	25	28	0	0	70	0.34	34%
	Sta. Monica	15	21	23	0	0	60	0.29	29%
	TOTAL	53	69	75	6	2.43	205	1	100%
Sta. Monica	Guagua	19	22	23	0	0	63	0.45	45%
	Porac	21	26	30	0	0	77	0.55	55%
	San Jose	0	0	0	0	0	*	*	*
	TOTAL	40	48	53	0	0	140	1	100%

Note: (*) considered one way only.

Table 9 shows the number of vehicles traveling intersection 2 (P.M. Peak) to and from Guagua, Porac, San Jose, and Sta Monica around San Vicente Sta Rita, Pampanga Market, from 4 pm to 5 pm. Based on manual counting by the researchers, the total number of vehicles observed every hour on a daily basis the average number of private cars, tricycles, motorcycles, jeepneys, and trucks is more or less 224 from Guagua to Porac, San Jose, and Sta. Monica. The average number of private cars, tricycles, motorcycles, jeepneys, and trucks is more or less 169 from Porac to Guagua, San Jose, and Sta. Monica. The average number of private cars, tricycles, motorcycles, jeepneys, and trucks is more or less 205 from San Jose to Guagua, Porac, and Sta. Monica. The average number of private cars, tricycles, motorcycles, jeepneys, and trucks is more or less 140 from Sta. Monica to Guagua, Porac.

Table 10. Volume Count Rate along Intersection 1 (A.M. Peak)

LEVEL OF SERVICE									
DIRECTION		TYPES OF VEHICLE							
From	To	Private cars (PCU/Hours)	Tricycles (PCU/Hours)	Motorcycles (PCU/Hours)	Jeepneys (PCU/Hours)	Trucks (PCU/Hours)	Total (PCU/Hours)	VCR (PCU/Hours)	LOS (PCU/Hour)
Guagua	Porac	93	223	93	37	73	518	0.86	E
	San Jose	54	169	65	23	14	325	0.54	C
	Sta. Monica	33	93	37	0	0	163	0.27	B
	TOTAL	180	485	195	59	87	1006	1.68	F
Porac	Guagua	92	229	93	31	62	507	0.84	E
	San Jose	54	138	63	0	11	267	0.44	B
	Sta. Monica	33	100	42	0	0	175	0.29	B
	TOTAL	179	466	198	31	74	949	1.58	F
San Jose	Guagua	0	0	0	0	0	*	*	*
	Porac	0	0	0	0	0	*	*	*
	Sta. Monica	0	0	0	0	0	*	*	*
	TOTAL	0	0	0	0	0	*	*	*
Sta. Monica	Guagua	29	80	34	0	0	143	0.24	B
	Porac	24	64	23	0	0	110	0.18	B
	San Jose	23	67	29	0	0	119	0.20	B
	TOTAL	76	210	85	0	0	372	0.62	D

Note: (*) considered one way only.

BHCC/lane = 600 hourly PCU (Rural with less than 4m single lane).

Table 10 shows the percentage count unit and volume count rate of the vehicle in intersection 1 (A.M. Peak), it also has the level of service of the road that is arranged based on the location of the vehicle where they are going or where they are from. The vehicle from Guagua going to Porac, San Jose, and Sta. Monica has a total percentage count unit of more or less 10,006 PCU per hour and their count rate is 1.7, therefore the level of service of this route is F, which means it has a saturation traffic volume. The vehicle from Porac going to Guagua, San Jose, and Sta. Monica has a total percentage count unit of more or less 948. PCU per hour and the count rate is 1.6, therefore the level of service of this route is F which means it has a saturation traffic volume. The vehicle from San Jose going to Guagua, Porac, and Sta. Monica has no traffic volume because the road is considered one-way that's why there are no vehicles coming from this route, the vehicle from Sta. Monica going to Guagua, San Jose, and Sta. Monica has a total percentage count unit of more or less 372 PCU per hour and the count rate is 0.61, therefore the level of service of this route is D which means it has a moderate/heavy traffic volume.

Table 11. Volume Count Rate along Intersection 1 (P.M. Peak)

LEVEL OF SERVICE									
DIRECTION		TYPES OF VEHICLE							
From	To	Private cars (PCU/Hours)	Tricycles (PCU/Hours)	Motorcycles (PCU/Hours)	Jeepneys (PCU/Hours)	Trucks (PCU/Hours)	Total (PCU/Hours)	VCR (PCU/Hours)	LOS (PCU/Hour)
Guagua	Porac	64	160	67	29	25	346	0.58	C
	San Jose	46	134	57	18	11	267	0.45	B
	Sta. Monica	36	104	43	0	0	183	0.31	B
	TOTAL	146	398	168	48	36	796	1.33	F
Porac	Guagua	64	151	66	25	25	332	0.55	C
	San Jose	38	116	45	0	10	209	0.35	B
	Sta. Monica	33	87	37	0	0	157	0.26	B
	TOTAL	136	355	147	25	35	698	1.16	F
San Jose	Guagua	0	0	0	0	0	*	*	*
	Porac	0	0	0	0	0	*	*	*
	Sta. Monica	0	0	0	0	0	*	*	*
	TOTAL	0	0	0	0	0	*	*	*
Sta. Monica	Guagua	26	72	32	0	0	131	0.22	B
	Porac	27	74	30	0	0	130	0.22	B
	San Jose	25	78	35	0	0	138	0.23	B
	TOTAL	78	224	97	0	0	399	0.66	C

Note: (*) considered one way only.

BHCC/lane = 600 hourly PCU (Rural with less than 4m single lane).

Table 11 shows the percentage count unit and, volume count rate of the vehicle in intersection 1 (P.M. Peak), it also has the level of service of the road that is arranged based on the location of the vehicle where they are going or where they are from. The vehicle from Guagua going to Porac, San Jose, and Sta. Monica has a total percentage count unit of more or less 796 PCU per hour and their count rate is 1.32, therefore the level of service of this route is F, which means it has a saturation traffic volume. The vehicle from Porac going to Guagua, San Jose, and Sta. Monica has a total percentage count unit of more or less 698 PCU per hour and the count rate is 1.16, therefore the level of service of this route is F which means it has a saturation traffic volume. The vehicle from San Jose going to Guagua, Porac, and Sta. Monica has no traffic volume because the road is considered one-way that's why there are no vehicles coming from this route, the vehicle from Sta. Monica going to Guagua, San Jose, and Sta. Monica has a total percentage count unit of more or less 397 PCU per hour and the count rate is 0.66, therefore the level of service of this route is C which means it has a moderate traffic volume.

Table 12. Volume Count Rate along Intersection 2 (A.M. Peak)

LEVEL OF SERVICE									
DIRECTION		TYPES OF VEHICLE							
From	To	Private cars (PCU/Hours)	Tricycles (PCU/Hours)	Motorcycles (PCU/Hours)	Jeepneys (PCU/Hours)	Trucks (PCU/Hours)	Total (PCU/Hours)	VCR (PCU/Hours)	LOS (PCU/Hour)
Guagua	Porac	62	150	56	37	73	376	0.63	C
	San Jose	0	0	0	0	0	*	*	*
	Sta. Monica	29	79	33	0	0	141	0.23	B
	TOTAL	91	229	89	37	73	517	0.86	E
Porac	Guagua	41	90	44	24	43	243	0.41	B
	San Jose	0	0	0	0	0	*	*	*
	Sta. Monica	32	98	43	0	0	173	0.29	B
	TOTAL	73	188	88	24	43	416	0.69	C
San Jose	Guagua	25	79	32	7	20	163	0.27	B
	Porac	22	73	31	0	1	128	0.21	B
	Sta. Monica	20	70	33	0	0	122	0.20	B
	TOTAL	68	222	96	7	21	413	0.69	C
Sta. Monica	Guagua	22	63	27	0	0	112	0.19	A
	Porac	21	67	28	0	0	116	0.19	A
	San Jose	0	0	0	0	0	*	*	*
	TOTAL	43	130	55	0	0	228	0.38	B

Note: (*) considered one way only.

BHCC/lane = 600 hourly PCU (Rural with less than 4m single lane).

Table 12 shows the percentage count unit and, volume count rate of the vehicle in the intersection 2 (A.M. Peak), it also has the level of service of the road that is arranged based on the location of the vehicle where they are going or where they are from. The vehicle from Guagua going to Porac, San Jose, and Sta. Monica has a total percentage count unit of more or less 517 PCU per hour and their count rate is 0.86, therefore the level of service of this route is E, which means it has a heavy traffic volume. The vehicle from Porac going to Guagua, San Jose, and Sta. Monica has a total percentage count unit of more or less 416 PCU per hour and the count rate is 0.69, therefore the level of service of this route is C which means it has a moderate traffic volume. The vehicle from San Jose going to Guagua, Porac, and Sta. Monica has a total percentage count unit of more or less 413 PCU per hour and the count rate is 0.69, therefore the level of service of this route is C which means it has a moderate traffic volume. The vehicle from Sta. Monica going to Guagua, San Jose, and Sta. Monica has a total percentage count unit of more or less 228 PCU per hour and the

count rate is 0.38, therefore the level of service of this route is B which means it has a relatively free-flowing traffic volume.

Table 13. Volume Count Rate along Intersection 2 (P.M. Peak)

LEVEL OF SERVICE									
DIRECTION		TYPES OF VEHICLE							
From	To	Private cars (PCU/Hours)	Tricycles (PCU/Hours)	Motorcycles (PCU/Hours)	Jeepneys (PCU/Hours)	Trucks (PCU/Hours)	Total (PCU/Hours)	VCR (PCU/Hours)	LOS (PCU/Hour)
Guagua	Porac	40	88	35	29	25	217	0.36	B
	San Jose	0	0	0	0	0	*	*	*
	Sta. Monica	23	72	32	0	0	127	0.21	B
	TOTAL	63	160	67	29	25	344	0.57	C
Porac	Guagua	26	39	19	11	19	114	0.19	A
	San Jose	0	0	0	0	0	*	*	*
	Sta. Monica	26	76	33	0	0	136	0.23	B
	TOTAL	52	115	52	11	19	250	0.42	B
San Jose	Guagua	19	58	24	6	6	113	0.19	A
	Porac	18	62	28	0	0	107	0.18	A
	Sta. Monica	15	54	23	0	0	92	0.15	A
	TOTAL	53	173	75	6	6	312	0.52	C
Sta. Monica	Guagua	19	55	23	0	0	96	0.16	A
	Porac	21	64	30	0	0	115	0.19	A
	San Jose	0	0	0	0	0	*	*	*
	TOTAL	40	119	53	0	0	212	0.35	B

Note: (*) considered one way only.

BHCC/lane = 600 hourly PCU (Rural with less than 4m single lane).

Table 13 shows the percentage count unit and, volume count rate of the vehicle in intersection 2 (P.M. Peak), it also has the level of service of the road that is arranged based on the location of the vehicle where they are going or where they are from. The vehicle from Guagua going to Porac, San Jose, and Sta. Monica has a total percentage count unit of more or less 344 PCU per hour and their count rate is 0.57, therefore the level of service of this route is C, which means it has a moderate traffic volume. The vehicle from Porac going to Guagua, San Jose, and Sta. Monica has a total percentage count unit of more or less 250 PCU per hour and the count rate is 0.42, therefore the level of service of this route is B which means it has a relatively free-flowing traffic volume. The vehicle from San Jose going to Guagua, Porac, and Sta. Monica has a total percentage count unit of more or less 312 PCU per hour and the count rate is 0.52, therefore the level of service of this route is C which means it has a moderate traffic
volume. The vehicle from Sta. Monica going to Guagua, San Jose, and Sta. Monica has a total percentage count unit of more or less 212 PCU per hour and the count rate is 0.35, therefore the level of service of this route is B which means it has a relatively free-flowing traffic volume.

3.2 The Proposal of Traffic Mobility Plan Scheme in Sta. Rita, San Vicente, Pampanga

Fig.2. (Propose Traffic Flow Scheme Map)

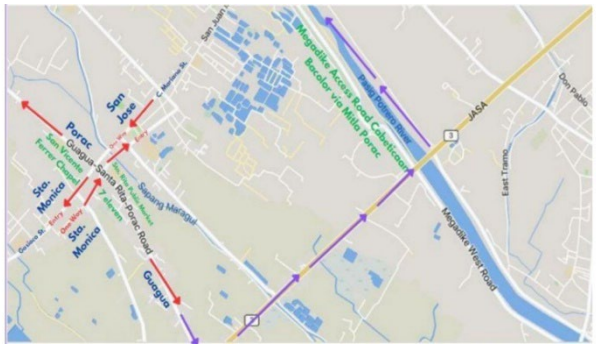

Fig.3. (Alternative Route for Trucks Map)

As the traffic data shows, there is a possibility to resolve the traffic problem along the Public Market in San Vicente, Sta. Rita Pampanga. The data recorded the number of vehicles in the market zone and church zone along the way at the intersection has different road conditions that can help resolve the existing traffic problem in the said location. The researchers develop a method to manage the traffic in the intersections using a traffic flow scheme (Figure 7) and an alternative route for trucks (Figure 8), which are based on the standards and guidelines of the Department of Public Works and highways and developed from the given data results. The existing traffic that is assessed by the researchers is not effective for the area, in order to manage the congestion of vehicles rebuilding a new traffic flow scheme (figure 7) is the factor that the researchers developed and due to the large volume of trucks passing along the market zone, it is really helpful to use the alternative road for the trucks (figure 8) which is the Mega Dike access road (Eco Park) in Cabetican, Bacolor, pampanga via Mitla Porac, Pampanga this plan and scheme that is produced can reduce the traffic in the intersections.

IV. CONCLUSION

This section consists of the results of the study with their corresponding interpretation. The tables are organized in a way that follows the sequencing of the research objectives.

Based on the result findings that were manually counted and tabulated by the researchers, the observation revealed that the level of service shows the condition that affects traffic in the market zone. The data result regarding the Department of Public Works and Highways blue book, that the road conditions per route are a factor in the congestion of the traffic. Vehicles are thus still a potential factor in the growth of congestion in the study area. The study further found that there is a possibility to resolve the traffic problem on the public market in San. Vicente, Sta. Rita, Pampanga. Suggesting alternative ways for the trucks to possibly solve the congestion that the location was experiencing. Also, the researchers recommend a traffic flow scheme to speed up traffic conditions. In coherence with the summary of the findings and the tabulated data that was manually gathered, the number of vehicles that passed through the study area was obtained. Considering the provision of the Department of Public Works and Highway (DPWH) the traffic condition per route was analyzed. The researchers have concluded that a traffic flow scheme can affect the traffic in the public market in San Vicente, Sta. Rita, Pampanga.

Recommendations:

This consists the researcher's recommendation for the municipality of Sta. Rita pampanga and for the future readers of the study.

- In connection with the study, the researchers recommend having a traffic management plan using traffic flow simulation software (PTV Vissim) at the San Vicente, Sta public market. Rita, Pampanga to have better traffic channelization, widening or rehabilitation of the road, placing traffic signs, signals, and pavement markings in the right places.
- Parking plan management will be a valuable way to discipline motorists. Parking arrangements can help prevent vehicles from being parked in restricted places and in some congested areas.
- The Level of service of the pedestrian, maybe a factor to consider in making a traffic plan to monitor people's behavior in roads.
- Assessment of the effectiveness of the proposed traffic flow scheme to ensure the capabilities of the solution that is innovated by the researchers.
- Develop the traffic ordinance to ensure and manage the discipline of the motorist and the pedestrian along the market zone.

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