



IMPLEMENTATION OF TRAFFIC MANAGEMENT IN TUGUEGARAO CITY

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Abstract: *Traffic congestion is a major concern in the city of Tuguegarao –the most populated city in the entire region. As estimated by the Tricycle Regulatory Unit (TRU,) 9,000 tricycles alone, both registered and unregistered, is one of the concerns that are propelling traffic congestion. According to the 2015 Global Driver Satisfaction Index conducted by Waze, the Philippines is ranked fourth among Asian countries and placed ninth in the world in terms of negative traffic situation. Despite the Philippines' better-than-expected economic growth, the country stands to lose up to P6 billion a day by 2030 because of worsening traffic jams. In the midst of traffic congestion in the city, thousands of commuters end up late at work, emergency situations are not addressed at the soonest possible time, air pollution is getting worst and economic activities are interrupted. One of the key factors involved in decongesting roads and provides for long and short term benefits, is an effective implementation body that will implement the necessary traffic rules and ordinances provided by the local government. Triangulation Method will be used in this general procedure. The research was conducted within Tuguegarao City. It covered main vicinities, major roads and highways, and barangays in the City where traffic congestion is mostly situated. The respondents of this study were traffic enforcers from the Tuguegarao City Traffic Management Group, drivers of both public and private vehicles and passengers/commuters in Tuguegarao City. The sample was taken through purposive sampling (quota). After collecting the data needed, the researchers tabulated and analysed the gathered data with*



the help of statistical tools; For the TCTMG; Percentage and frequency Distribution was employed to determine the profile of the TCTMG. It was also used in parts 3, 4, 5 of the questionnaires (existing problems, commonly violated rules, effectiveness of penalties); for the drivers and passengers, percentage and frequency distribution will be used in part 3 (penalties) and weighted mean in parts 1 and 2 (awareness and observation); In testing the significant difference, one-way ANOVA was used in analysing variants; In testing the significant relationship, Pearson Moment Co relational was used in analysing variants. In gathering the data, the researchers scheduled weekends in floating questionnaires to drivers throughout the main roads of Tuguegarao City. At the same time, the researchers float questionnaires to traffic enforcers in the field. The researchers also asked assistance from the sub-office of TCTMG to distribute the remaining questionnaires. Distribution of questionnaires for passengers was made within the campus- students, faculties, among others. Descriptive statistics such as frequency, percentage, mean, and standard deviation were used to describe the data gathered. The weighted mean was utilized to indicate the level of awareness of the respondents in the implementation of traffic management in Tuguegarao City. A substantial majority of the members of the TCTMG are in the age bracket of 31-40. With respect to the years of experience, most of the members of the TCTMG in the profile variables have little experience in traffic enforcement (this include related experiences outside the TCTMG) and where only employed in the TCTMG in the past 1-5 years. Both passengers and drivers are "Fully Aware" of the traffic rules and ordinances. The over-all level of awareness of the respondents in the implementation of traffic management in Tuguegarao City is "Fully aware". The information on the implementation of traffic management in Tuguegarao City is properly disseminated. The overall observation of the respondents indicates that they are "Satisfied" indicating a positive outlook in the implementation of traffic management in Tuguegarao City. The existing penalties and corresponding fines set by the city government and are implemented by the TCTMG are effective in deterring traffic violations the implementation of traffic management in Tuguegarao City. The most commonly violated rules are ignoring traffic enforcers, loading and unloading and non-parking and parking in prohibited areas. The increasing volume of vehicles is the most pressing issue faced by the TCTMG. Major concerns include the lack of equipment and the lack of manpower of the TCTMG to properly administer the



implementation of traffic management in Tuguegarao City. There is a significant difference on the observations of the respondents in terms of the implementation of the traffic management in Tuguegarao City. On the other hand, there is no significant relationship between the profile of the TCTMG and the implementation of the traffic management in Tuguegarao City. The researchers concluded that there is a crucial need for an effective implementation of traffic management and a research and extension team to study and utilize such future related issues with regards to the changing environment, in addressing traffic congestion in Tuguegarao City. This will be accomplished through the participation of the people and related agencies to promote a progressive medium-sized city.

Keywords: *Traffic, management, traffic enforcer, tricycle, footway, no parking area, no stopping area, parking zones, pedestrians, poblacion, crosswalk*

INTRODUCTION

Traffic congestion is a global concern. The delays and unreliability present a severe threat to economic growth, productivity, environment sustainability and liveability of city regions. The increase of world population and upgrade of social classes contribute to traffic congestion. Compressive traffic schemes and special laws from concerned national agencies and infrastructure spending are unaccounted in providing short and long-term benefits in decongesting roads, highways and routes. The failure of concerned agencies to properly implement traffic rules and regulations, which become irrelevant over time due to the constantly changing setting, is one of the contributing factors in traffic congestion.

Severe traffic affects the vital role of Cities in the development of the country. According to the 2015 Global Driver Satisfaction Index conducted by Waze, the Philippines is ranked fourth among Asian countries and placed ninth in the world in terms of negative traffic situation. Major Cities in the country are rapidly entering the 21st century community where transportation affects nearly all aspects of the daily lives of Filipinos. Despite the Philippines' better-than-expected economic growth, the country stands to lose up to P6 billion a day by 2030 because of worsening traffic jams.

According to Castle, M. & Glenn, L. (n.d.), as the number of vehicles increases, the chance of congestion also increases. Lack of proper infrastructure can also add to the worsening traffic. Councils and National Governments fail to act on the looming threat of heavy congestion until it happens.



A lack of public transport, or poor public transport options subsidized to the growing concerns in traffic congestions. According to Castle, M & Glenn, L (n.d.) if there aren't enough buses, trams, or local trains, people are forced to take their vehicles to work. The ratio of passengers to vehicles decreases thus contributing to traffic, whereas if they were able to take the bus, people would feel less of a need to drive their vehicles resulting to a constant flow of traffic.

According to Coifman (n.d.), there are several processes that cause congestion to seemingly appear out of nowhere only to slowly vanish as you drive through it. Flow on a freeway is constrained by a small number of critical locations, referred to as bottlenecks. When demand exceeds the capacity of a given bottleneck it becomes active, and it is not able to serve all drivers exactly when they arrive. These drivers thus have to wait in a queue until there is space for them to pass through the bottleneck, and the delay is manifest as reduced speeds in the line-up.

In general, congestion is mainly caused by a desire for people to drive their vehicles coupled with a failure by local government to act. These causes lead to various effects. According to Writeflick (2017) one of the most important is parking problems. People find it difficult to park their vehicles especially in the city center. Long delays in getting to and from work are another result, leading to less productivity for employees. Pollution in the city center worsens as a result of car emissions, and the city becomes a less attractive place to live.

According to Sanders (2012) slower moving traffic emits more pollution than when vehicles move at freeway speeds. Car burns the most fuel while accelerating to get up to speed. Maintaining a constant speed against wind-resistance burns more or less a constant amount. The constant acceleration and braking of stop-and-go traffic burns more gas, and therefore pumps more pollutants into the air.

Traffic congestion also presents a serious threat to economic growth and liveability of city regions. The delays and unreliability caused severely affect the productivity of businesses, as well as their ability to innovate and access new markets and resources. A survey of businesses by the British Chambers of Commerce put the cost of congestion at £17,350 per business in the United Kingdom (UK) alone. The same survey found congestion to be a problem for around 90% of businesses in the UK, with around 45% viewing it as a significant problem.



Another effect in the economy is decrease productivity. According to Matthias Sweet (2008), a researcher at the McMaster Institute for Transportation and Logistics at McMaster University, Congestion might be bad in so far as it means that access is impeded, freight deliveries aren't able to happen on time. Employees are unable to arrive to work on time, which hurts local businesses. (Retrieved from <http://www.itsproducts.com/shop-fast-eat-smart/>)

According to the Transport Work Organization (2015) congestion is costly for people who live in our city regions who find themselves stuck in traffic when they should be at work, or simply frustrated at the time wasted in trying to get from A to B.

The quality of life of people making those commutes starts to decline. If you have to spend a miserable hour or two five days a week just getting to work, you're either going to require higher wages to compensate you, or you're going to look for another job. Congestion makes it harder to match the right workers to the best jobs, thus making it economically inefficient for a country.

The City of Tuguegarao is the educational and regional center of Cagayan Valley Region. It is distinctively the most populous city and the most populated place in the entire region with at least 150, 000 populations with estimated foot traffic of at least 500,000 to 1,000,000 people a day, according to a data from local news reporter Cagayano Vines (2017). An estimated of 9,000 tricycles alone, as provided by the Tricycle Regulatory Unit (TRU), both registered and unregistered, is one of the concerns that is propelling traffic congestion

According to Cagayano Vines (2017), the [Northern Luzon] city's economy is booming. Within the past three decades, its economy gradually shifted from agriculture to secondary and tertiary economic activities such as trading, commerce, services, industrial and tourism-related activities. Big establishments and real estate properties are rising in the City's economic belts propelling traffic congestion to rise in the coming years which would result to negative environmental issues, and contribute to a decreasing trend in economic confidence.

Heavy traffic presents a serious threat. In the midst of traffic congestion in the city, thousands of commuters end up late at work, emergency situations are not addressed at the soonest possible time, air pollution is getting worst and economic activities are interrupted. One of the key factors involved in decongesting roads, is an effective implementation body that will implement the necessary traffic rules and ordinances



provided by the local government. Hence, the study aims to provide significant perceptions on the crucial role of an effective implementation of traffic management, sights the problems in the implementation of traffic management in the City, recommend solutions and utilize future related issues in a continuously changing setting, with the participation of the people to effectively address the traffic problems and promote a progressive medium sized city and a healthy environment.

STATEMENT OF THE PROBLEM

In light of the purpose of this research study, this seeks to assess the effectiveness of the implementation of traffic management in Tuguegarao City. Hence, the study aims to answer the following:

1. What is the profile of Tuguegarao City Management Group (TCTMG) in terms of age, gender, and years of service in traffic enforcement?
2. What is the level of awareness of the respondents on the implementation of traffic management in Tuguegarao City?
3. What are the observations by the respondents in terms of the implementation of the new traffic management in Tuguegarao City?
4. What are the existing problems encountered by the TCTMG and passengers/commuters in the implementation of traffic management in Tuguegarao City?
5. What are the commonly violated rules in the implementation of Traffic Management in Tuguegarao City?
6. Are penalties being implemented by the TCTMG effective as perceived by the respondents?
7. Is there a significant difference in the observations of the respondents in terms of the implementation of the traffic management in Tuguegarao City?
8. Is there a significant relationship between the profile of TCTMG and the implementation of the traffic management in Tuguegarao City?

HYPOTHESES

This study is based on the following hypotheses:

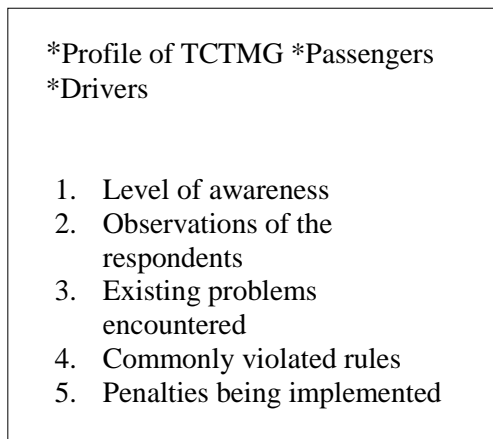
1. There is no significant difference on the observations of the respondents in terms of the implementation of the traffic management in Tuguegarao City.



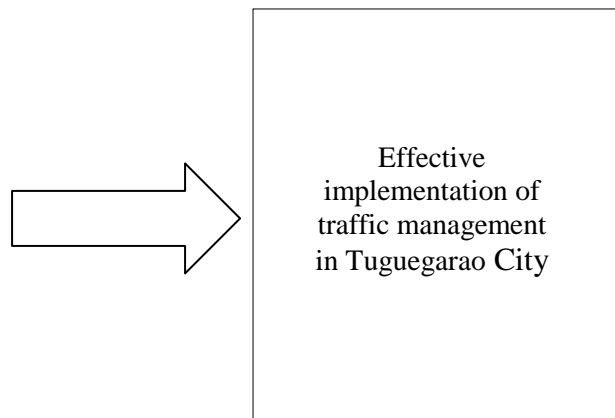
2. There is no significant relationship between the profile of TCTMG and the implementation of the traffic management in Tuguegarao City.

CONCEPTUAL FRAMEWORK

INDEPENDENT VARIABLES



DEPENDENT VARIABLE



The presumed effect of this study or the output variable is an effective implementation of traffic management in Tuguegarao City. The presumed driving variables or the independent variables are the profile of Tuguegarao City Traffic Management Group (TCTMG), the respondents' observations, the commonly violated rules of drivers, the existing problems encountered by the respondents, the effectiveness of penalties being implemented and the determination of level of awareness of the respondents.

STATISTICAL TOOL AND STATISTICAL TREATMENT

After collecting the data needed, the researchers will tabulate and analyse the gathered data with the help of statistical tools. The following are the statistical tools used in this study together with their corresponding formulas:

For the TCTMG:

Percentage and frequency Distribution will be employed to determine the profile of the TCTMG. It will be also be used in parts 3, 4, 5 of the questionnaires (existing problems, commonly violated rules, effectiveness of penalties) the formula used is

$$(P) = \frac{F}{N} \times 100$$

Where F = Frequency

N = total number of the respondents

P = Percentage

Weighted Mean is used in parts 1 and 2 (awareness and observations) the formula used is



$WM = TWF/N$

Where: WM = weighted mean

N = total number of respondents

WF = weighted frequency

For the drivers and passengers, percentage and frequency distribution will be used in part 3 (penalties) and weighted mean in parts 1 and 2 (awareness and observation).

In testing the significant difference, one-way ANOVA was used in analysing variants.

In testing the significant relationship, Pearson Moment Correlational was used in analysing variants.

The data gathered from the respondents was classified, tabulated, tallied, analysed and interpreted carefully.

Descriptive statistics such as frequency, percentage, mean, and standard deviation were used to describe the data gathered.

The weighted mean was utilized to indicate the level of awareness of the respondents in the implementation of traffic management in Tuguegarao City. The intervals used by the researchers for data analysis were as follow:

Intervals	Descriptive Value
2.34-3.00	Not aware
1.67-2.33	Aware
1.00-1.66	Fully Aware

The intervals and its corresponding descriptive value used in determining the observations of the respondents was indicated in the table as follows:

Intervals	Descriptive Value
4.20-5.00	Very Satisfied
3.40-4.19	Satisfied
2.60-3.39	Neither Satisfied/ Dissatisfied
1.80-2.59	Dissatisfied
1.00-1.79	Very Dissatisfied

Table 1. Frequency and percentage distribution of the TCTMG according to age

Age	Frequency	Percentage
20-30	8	22.86
31-40	15	42.86
41-50	10	28.57
51- above	2	5.71
Total	35	100.0



Table 1 presents the frequency and percentage distribution of the TCTMG according to age. The table shows that most traffic enforcers in the TCTMG are in the age bracket of 31-40 with the frequency of 15 or 42.86 percent. Meanwhile, the least number of Traffic enforcers in the TCTMG are in the age bracket of 51 above with the frequency of 2 or 5.71percent.

Table 2. Frequency and percentage distribution of the TCTMG according to years of experience in traffic enforcement

Years of experience	Frequency	Percentage
1-5	25	71.43
6-10	2	5.71
11-15	2	5.71
16- above	6	17.15
Total	35	100.0

Table 2 presents the frequency and percentage distribution of the TCTMG according to years of experience in traffic enforcement (this include experiences outside the TCTMG). A majority of the traffic enforcers surveyed have been in the field of traffic enforcement for the past 1-5 years with a frequency of 25 or 71.43 percent. The least number of traffic enforcers surveyed have been in the field of traffic enforcement for the past 6-10 years and 11-15 years with a frequency of 2 and 5.71 percent respectively. Most of the traffic enforcers do not employ long years in experience in traffic enforcement which could be one of the driving factors that contribute to the weak implementation of traffic management in Tuguegarao City.

Table 3. Respondents level of awareness on the implementation of traffic management in Tuguegarao City

Category	Weighted Mean	Descriptive Value
TCTMG	1.23	Fully Aware
Drivers	1.49	Fully Aware
Passengers/Commuters	1.6	Fully Aware
Total	1.44	Fully Aware

Table 3 presents the level of awareness of the respondents on the implementation of traffic management in Tuguegarao City. The data shows that the respondents are fully aware of the traffic rules and regulations and the implementation of traffic management in



Tuguegarao City with an over-all weighted mean of 1.43 percent. This indicates that corresponding information are properly disseminated.

Table 4. Respondent’s observations on the implementation of traffic management in Tuguegarao City

Category	Weighted Mean	Descriptive Value
TCTMG	4.29	Very Satisfied
Drivers	3.41	Satisfied
Passengers/Commuters	3.29	Neither Satisfied/Dissatisfied
Total	3.67	Satisfied

Table 4 presents the respondents observations on the implementation of traffic management in Tuguegarao City. The table shows that traffic enforcers are “Very satisfied” in the implementation of traffic management. Meanwhile, the drivers and passengers show weaker but similar positive observations who are “Satisfied” and “Neither Satisfied/Dissatisfied” of their observations. The over-all weighted mean of 3.67 which reveals that respondents are over-all “Satisfied” indicate that there is still a need for the TCTMG to improve their services which include a need for proper designation of parking and loading and loading areas which are crucial in the effective implementation of traffic management.

Table 5. Respondents’ perception on the effectiveness of penalties being implemented by the TCTMG

Statements	TCTMG		Drivers		Passengers		Total	
	Yes	No	Yes	No	Yes	No		
First Offense	30	5	55	15	26	9		
Second Offense	28	7	55	15	26	9		
Third Offense	27	8	51	19	28	7		
Confiscation of Driver’s License	24	11	54	16	28	7		
Weighted Mean	27.25	7.75	53.75	16.25	27	8	108	32

Table 5 presents the respondents perception on the effectiveness of penalties being implemented by the TCTMG. 108 of the 140 respondents perceived that the penalties set by the City Government and being implemented by the TCTMG are effective. This indicates that the offenses and corresponding fines are effective in the implementation of traffic



management in Tuguegarao City. Violations committed by drivers are deterred when the corresponding fines attached to the offenses are adequate.

Table 6. TCTMG perception on the existing problems faced by them

Statements	YES	NO
1. Lack of equipment.	33	2
2. Lack of budget.	14	21
3. Insufficient salary of traffic enforcers.	30	5
4. Lack of manpower.	34	1
5. Increasing volume of vehicles	35	0
6. Inadequate planning	20	15
Weighted Mean	27.67	7.33

Table 6 presents the Traffic enforcers' perception of the existing problems faced by the TCTMG. The most common problems that are being faced by traffic enforcers are the increasing volume of cars, lack of manpower and the lack of the necessary equipment that will aid in the implementation of traffic management in Tuguegarao City. According to Castle, M. & Glenn, L. (n.d.), as the number of vehicles increases, the chance of congestion also increases.

Table 7. TCTMG perception on the commonly violated rules by the drivers

Statements:	YES	NO
1. Arrogant\Reckless\Discourteous Driver	28	7
2. Colorum Operation	27	8
3. Driving Against Unauthorized Flow of Traffic	30	5
4. Evading Apprehension	19	16
5. Ignoring\Disregarding Traffic Sign\Officers	35	0
6. Loading\Unloading Outside Terminal	31	4
7. Loading\Unloading in Prohibited Zone	33	2
8. Overloading Passengers	21	14
9. Parking in prohibited Areas	33	2
10. Unauthorized Color and Body Number	19	16
Weighted Mean	27.6	7.4

Table 7 shows the commonly violated rules by the drivers as perceived by the TCTMG. The table shows that the most commonly violated rule is the loading and unloading in prohibited zone and parking in prohibited areas. The least commonly violated rules are the evading apprehension and the unauthorized color and body number. It coincides with the secondary data given by the TCTMG on the commonly violated rules by drivers. The data indicating that loading and unloading in prohibited zone and parking in prohibited areas is the



commonly violated rule affirms the Study on Traffic Management along Edsa in Metro Manila (January 2013), which also indicates, in a manner of a generalized conclusion, that most serious traffic build-up is the violation of indiscriminate loading and unloading of public transport.

Table 8. Comparison on the observations of the respondents in the implementation of the traffic management in Tuguegarao City using Post Hoc Test

I (Category)	J(Category)	Mean Difference (I-J)	Std. Error	P- Value	Statistical decision
TCTMG	Drivers	.8714	.2057	.000	Reject Ho.
	Passengers	1.0000	.2375	.000	Reject Ho.
Drivers	TCTMG	-.8714	.2057	.000	Reject Ho.
	Passengers	.1286	.2057	.823	Accept Ho.
Passengers	TCTMG	-1.0000	.2375	.000	Reject Ho.
	Drivers	-.1286	.2057	.823	Accept Ho.

Table 8 presents the comparison on the observations of the respondents in the implementation of the traffic management in Tuguegarao City using Post Hoc Test. The test illustrates that the observations of TCTMG and drivers has a computed p-value of .000, thus, the null hypothesis is rejected. The observations of TCTMG and passengers has a computed value of .000 thus, the null hypothesis is also rejected. The observations of drivers and passengers has a computed p-value of .823, thus, the null hypothesis is accepted. In short, the null hypothesis is rejected. This means that that there is a significant difference on the observations of the respondents in the implementation of traffic management in Tuguegarao City.

Table 9. Relationship between the age bracket of TCTMG and the implementation of the traffic management in Tuguegarao City

Observation & Age	N	Correlation	Sig.	Statistical Decision
	35	-.011	.951	Accept Ho.

Table 9 presents the relationship between the age bracket of TCTMG and the implementation of the traffic management in Tuguegarao City. The Pearson Moment



Correlational illustrates that the age of TCTMG and the implementation of traffic management has a computed p-value of .951, which is higher than the 5% level of significance. Therefore, the null hypothesis is accepted. This means that there is no significant relationship between age of TCTMG and their observations on the implementation of the traffic management in Tuguegarao City.

Table 10. Relationship between the years of experience I traffic enforcement of TCTMG and the implementation of the traffic management in Tuguegarao City

		Correlations		
		Observatio n	Years of Experience	Statistical Decision
Observation	Pearson Correlation	1	.107	
	Sig. (2-tailed)		.539	Accept Ho.
	N	35	35	
Years of Experience	Pearson Correlation	.107	1	
	Sig. (2-tailed)	.539		Accept Ho.
	N	35	35	

Table 10 presents the relationship between the years of experience in traffic enforcement of TCTMG and the implementation of the traffic management in Tuguegarao City. The Pearson Moment Correlational illustrates that the years of experience in traffic enforcement of TCTMG and the implementation of traffic management has a computed p-value of .539, which is higher than the 5% level of significance. Therefore, the null hypothesis is accepted. This means that there is no significant relationship between age of TCTMG and their observations on the implementation of the traffic management in Tuguegarao City.

SUMMARY OF FINDINGS

A substantial majority of the members of the TCTMG are in the age bracket of 31-40. With respect to the years of experience, most of the members of the TCTMG in the profile variables have little experience in traffic enforcement (this includes related experiences outside the TCTMG) and are only employed in the TCTMG in the past 1-5 years.

Both passengers and drivers are “Fully Aware” of the traffic rules and ordinances. The overall level of awareness of the respondents in the implementation of traffic management in Tuguegarao City is “Fully Aware”. The information on the implementation of traffic management in Tuguegarao City is properly disseminated. The overall observation of the



respondents indicates that they are “Satisfied” indicating a positive outlook in the implementation of traffic management in Tuguegarao City.

The existing penalties and corresponding fines set by the city government are effective in deterring traffic violations.

The most commonly violated rules are ignoring traffic signs/enforcers, loading and unloading and parking in prohibited areas.

The increasing volume of vehicles is the most pressing issue faced by the TCTMG. The major concerns include the lack of equipment and manpower of the TCTMG to properly administer the implementation of traffic management.

There is a significant difference on the observations of the respondents in terms of the implementation of the traffic management in Tuguegarao City. On the other hand, there is no significant relationship between the profile of the TCTMG and the implementation of the traffic management in Tuguegarao City.

CONCLUSION

The study tells that the profile of the TCTMG has no connection in the effectiveness in the implementation of the traffic management in Tuguegarao City. Moreover, the findings and analysis say that while the respondents are fully aware of the Traffic rules and regulations implementation of traffic management in Tuguegarao City, its enforcement and implementation are not properly administered. As perceived by the traffic enforcers, the most commonly violated rules are the ignorance of drivers and passengers to traffic enforcers, loading and unloading and parking in prohibited areas but in general, the existing penalties and corresponding fines set by the city government are effective tools in deterring traffic violations.

RECOMMENDATIONS

The following recommendations as based on the findings and conclusions made on the study are presented for consideration and implementation:

1. There is a need for strict implementation and enforcement of the traffic rules and regulations to efficiently decongest traffic in Tuguegarao City.
2. There is a need to hire additional traffic personnel in the facilitation of the implementation of traffic management in Tuguegarao City.



3. There is a need to designate more parking and non-parking areas, loading and unloading areas within the City's economic belts to deter unnecessary parking and unloading and loading areas to reduce the parking and loading and unloading in prohibited areas and reduce traffic congestion.
4. There is a need to purchase more equipment and supplies (i.e. towing trucks, traffic lights, CCTV) to aid in the effective implementation of Traffic Management in Tuguegarao City.
5. There is a need for a relocation of Tricycle Operators and Drivers Association (TODA) terminals from the City Proper to more convenient locations outside the City Proper but with careful study and analysis of its possible implications.
6. There is a need for a centralized and adequate planning by the TCTMG to efficiently administer its function in the implementation of traffic rules and regulations and designation of parking and loading and unloading areas.
7. New measures in the effective implementation of traffic management in Tuguegarao City must be carefully studied and analysed before being adopted by the TCTMG.
8. The City government must seek for effective measure in controlling the increasing volume of vehicles to ease the burden of the TCTMG in the implementation of traffic management in Tuguegarao City.

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