

**A METHODOLOGY TO ESTIMATE THE CHANGES IN  
TRIP DISTRIBUTION DUE TO THE LAND USE  
CHANGES ACCORDING TO THE MODIFIED  
TRAFFIC ANALYSIS ZONES**

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Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of  
Master of Philosophy

Department of Civil Engineering

University of Moratuwa

Sri Lanka

May 2021

## DECLARATION

I declare that this is my own work and this dissertation does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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## ABSTRACT

Land use and transportation have a significant impact on each other, therefore planners, engineers, decision makers and scholars have researched on the interaction between land use and transportation over the past few decades. This research leads to capture the complex inter dependency of transportation and land use on each other in an urban context. Even though there are several land use-transport interaction models in both micro level and macro level, there is a necessity to address the intermediate level zoning system to capture both link capacity and junction capacity, as well as the land use, socio-economic characteristics and the traffic flow. Moreover, except considering traditional administrative zones and cell-based analysis to estimate the trip distribution, the traffic analysis zones have to be re-demarcated to address the real ground situations. Additionally, this research describes a methodology to distribute macro level trip origin-destination (O-D) data into much smaller level zones considering the land use character of the area.

The objectives of the research are, to develop a methodology to demarcate traffic analysis zoning system applicable to local level transport modelling in urban area, to develop a methodology to estimate the trip generation in local area based on the available land use information and to develop a methodology to estimate the passenger flows on links based on the Modified Traffic Analysis Zone.

Further, this research provides a guidance on land use and transportation decision making. The methodology is developed based on both spatial and statistical analysis using several software and tools. The study area of the research is the Colombo Municipal Council area, which is located within Colombo District, Western Province, Sri Lanka. The necessary data are collected from secondary sources from relevant departments and authorities in Sri Lanka.

### **Keywords:**

Land use changes, Land use-transport modelling, Modified Traffic Analysis Zone (MTAZ), Trip attraction, Trip generation, Route assignment

## **DEDICATION**

I dedicate this dissertation to Prof. J. M. S. J. Bandara, my supervisor and mentor who encouraged me to complete this study successfully, and my family who supported me throughout.

W. M. C. Oshadhi Weerasinghe,  
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## **LIST OF ABBREVIATIONS**

AAGR	Average Annual Growth Rate
BSU	Basic Spatial Units
CMC	Colombo Municipal Council
DSD	Divisional Secretariat Division
GND	Grama Niladhari Division
MCC	Manual Classified Counts
MTAZ	Modified Traffic Analysis Zones
O-D	Origin – Destination
RMSE	Root Mean Square Error
SSE	Sum of Squared Errors
TAZ	Traffic Analysis Zones
UDA	Urban Development Authority