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**ENVIRONMENT-ORIENTED TRAFFIC AND
TRANSPORTATION PLANNING - SABHA CITY
AS AN ILLUSTRATIVE EXAMPLE**

A thesis submitted to the

Civil Engineering Department

for the degree of

Master of Sciences

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ
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We certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a dissertation for the degree of Master of Science.

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To my beloved wife Asma ,
my son Mohamed El-Ameen,
and my daughter Ummo-Kolthum

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ABSTRACT

The thesis describes a proposed methodology for environment-oriented traffic and transportation planning. The planning system takes the urban transportation planner through a number of steps to develop a transportation plan which fulfills the requirements for pollution free environment. Noise and air pollution are considered the most disturbing effects of a transportation system on the quality of life in the urban environment. Therefore, much more considerations and provisions should be done during the planning process, to avoid or at least mitigate as much as possible these negative effects.

In fact, without accurate forecast of the traffic flow on the road network of a city, the assessment of the environmental impacts will certainly be biased. To avoid the bias in the estimation of these impacts and to make the results reasonably accurate the study will compare the most commonly used traffic assignment algorithms to choose among them the one that can give best convergent results. The selected algorithm will be used as a tool in the planning process.

The thesis also includes an interactive computer graphic system developed to facilitate the application of the proposed planning methodology. The computer system is then

tested by being applied on the traffic network of Sabha 2010, as a case study.

The thesis is organized as follows:

Chapter one introduces the subject and the objectives of the thesis, as well as the research approach.

Chapter two deals with the environmental impacts of a traffic system in an urban area. It describes the prediction methods used for the assessment of noise and air pollution.

Chapter three describes some shortest path methods and the most commonly used traffic assignment techniques, it also describes the computer programs used in the comparison between these techniques.

Chapter four deals with the development of a methodology for environment-oriented transportation planning in urban areas, it also describes the interactive computer programming technique (so-called EOTP) that supports the proposed planning methodology, its theoretical concept, input data requirements, and output capabilities.

Chapter five analyzes the existing urban structure and transportation situation in Sabha, and introduces the future

development policies proposed in the transportation master plan.

Chapter six is concerned with the application of the proposed planning methodology to Sabha. The goal of the application is to examine the efficiency of the planning system and the supporting computer system. Some results of this application are interpreted and discussed.

Finally, Chapter seven states the major conclusions and recommendations on the proposed planning methodology and the supporting computer system.

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