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Optimum Management of Municipal Solid Wastes in Amman-Jordan

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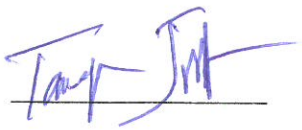

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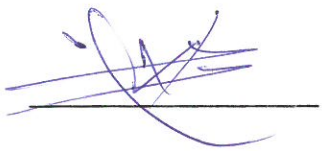

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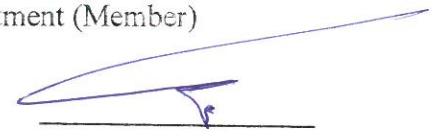

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Dedication

I dedicate this work First to My beloved husband who is the first supporter for me and he will always be in Sha'a Allah.

I dedicate this thesis to my fathers' soul who was always the man number one in my life and supported me in all shapes to arrive to whom I am today, and to my mother who helped me to complete this level in my life.

Finally and the most important I dedicate this work to my lovely daughter Eliana who is the motive for me to be always the best so I can be her ideal person in the life.

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Abstract

The amount of municipal solid waste (MSW) has been increasing steadily over the last decade by reason of population rising and high rate of waste generation. Jordan which has a relative high daily domestic waste generation rate per capita in Asia has not yet established a comprehensive waste management system. Therefore, in the present work the current solid waste management systems applied in Jordan was investigated.

The objective of this research is to develop a mathematical model for determining the optimum routs of collection, transportation, and disposal of solid waste. In addition, a model for improving and optimizing the municipal solid waste collection routs will be proposed. The suggested model will take into consideration the cost of MSW management system. The adopted methodology that will be presented in this study combines an operations research method with environmental engineering systems.

All that must be studied adopting linear programming calculations to finally find optimum way route that has the shortest distance, shortest time and least costs. OR calculations were used to find solutions for solid waste management. The main program that was used to operate and process data and give a final results called GIS (GEOGRAPHIC INFORMATION SYSTEMS), collection points on the edges of Jabal Amman were proposed to collect and compact municipal solid waste in order to move it to the landfill then GIS model was built to optimize the shortest transportation routes to carry solid waste from the neighborhood to the stationary collection points, using the road network; in this step three main and perfect roads were chosen and compared after that a matrix to choose the most suitable route was built based on route length, duration, elevation, and cost and finally; the optimum route was chosen as the best route.

In this study, Jordan will be taken as a study case due to the lack of studies that will help this country to tackle this problem, and in specific way; the capital Amman will be taken as a base for

this study because it has the largest population density and has the highest rate of waste production. Therefore, this study will aim to develop the process of collection and transfer of waste, depending on the system of collection of waste in Jordan that needs improvement. For this purpose, the basic information required has been collected, which needs to be processed to make the development, to modernize and improve the efficiency of waste collection system after the work of the required calculations and information.

***Keywords**:* Optimum route; Solid Waste Management; Optimization Solid Waste; GIS.