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# Poster Book

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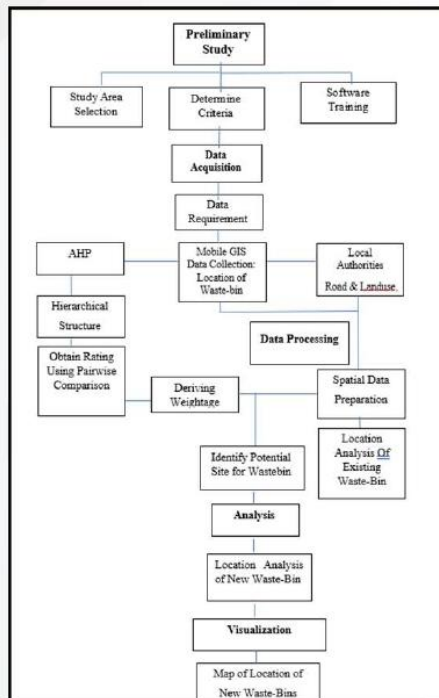
# POTENTIAL SITES FOR WASTE-BINS BY USING GIS-AHP

## INTRODUCTION

Rapid urbanization, population growth and economic development have resulted in increased waste generation in countries across the world. This situation has become one of the most important problems in cities today. In certain cities like Jerlun, Kedah, Solid Waste Management (SWM) operator did not collect the waste at each property unit like in Klang Valley. Instead, the waste will only be collected at waste-bins which had been places in certain area. Therefore, the location of waste-bins need to be at a place that could serve the demand well. Meaning that, people need not to travel far to throw their garbage, and it should not be overflowed – perhaps when their catchment area is bigger than other bins. Thus, this study aims to determine the optimal location of waste-bins by using Spatial- MCDA. The existing location of waste-bins was first analysed to understand the current scenario before new locations determined based on criteria that had been used by the local SWM operator which includes User Accessibility, Route and Avoiding Pollution. Once new locations of waste bins had been found, the location analysis was performed again to analyse the improvement in terms of accessibility made when the new sites were discovered. The analysis compared the user's trip distance to the nearest waste-bin with their origin. Ten (10) potential sites for waste-bins had been found in this study which provides improvement of 0.4km for average travelling distance and 4km for maximum travelling distance from demand.

## METHODOLOGY

- Preliminary Study** to determine criteria to find new waste bins
- Data Collection**
  - AHP: Pairwise Comparison for Criterion rating
  - GIS: Spatial Data collection for each criteria
- Data Processing**
  - Location analysis of existing waste-bins using p-median
  - Weighted Overlay analysis in finding location of new waste-bins
  - Location analysis with new waste-bins
- Analysis** on Improvement on accessibility with new waste-bins based on user's trip distance to waste-bins
- Visualization** of Location of new waste-bins



## ISSUES/ PROBLEM STATEMENT

Bin overflow is a problem that arises for a number of reasons, including where it is placed. Whether it could support the demand well or not. This, this study was conducted based on these three (3) research problems:

How well the existing location of waste bin serve the demand?

What are the criteria needed in finding the optimal location of waste-bin?

How can the optimal location of waste-bins be determined?

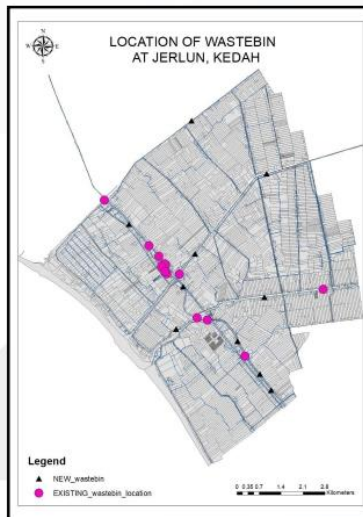
## OBJECTIVES

To determine the accessibility of the existing location of waste-bins

To identify the criteria influencing the optimal location of waste-bins

To analyse the optimal location of new waste-bins

## FINDINGS



The new locations of waste-bins with the highest suitability index had been selected after their location had been verified. Open spaces which are identified to be possible to put waste-bins were selected. In total, 10 new waste-bins had been found.

User's Trip Distance	Differences (m)
Minimum	0
Maximum	-4287.97
Average	-426.594

With additional of 10 new waste-bins, the maximum and average in user's trip distance had been improved. Previously, user need to travel as far as approximately 10km to throw their rubbish. Now, it is 6km – reduced by 4.3km. The average travelling distance also had been improved by 0.43km when additional 10 new waste-bins were to be added.

## CONCLUSION

Spatial-MCDA is the most popular technique in site suitability analysis. This study had used the technique to find the location of new waste-bins. In addition, location analysis was also conducted to determine the current problems in accessing the waste-bins. With these analysis, it had been found that, additional 10 new waste-bins are needed in Jerlun, Kedah to make waste-bins more accessible to the residents.

## NOVELTY

This study had implemented GIS-AHP in decision-analysis to find the new waste-bins. AHP uses experts' choice for weighing the criteria while GIS uses the weightage in analysing the site suitability for new waste-bins. The processes had been automated with modelbuilder to avoid human errors in the data processing and analysis.