

UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

**RECYCLING FACILITY LOCATION WITH OPTIMAL BINS
ALLOCATION IN SEREMBAN – A SET COVERING MODEL
APPROACH**

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ABSTRACT

For every nation to keep its environment clean and safe, a sustainable waste management system must be established. This includes installing enough recycling bins strategically positioned in easily accessible places. This method plays a crucial role in encouraging the public to actively participate in recycling, especially waste separation at the source. However, waste management agencies struggle to effectively monitor these recycling bins, especially when it comes to determining the optimal locations for them. These bins' placement must be thoroughly considered to ensure they meet the needs of citizens and remain easily accessible. In urban areas, a lack of waste receptacles can make it much more difficult to successfully implement waste separation at the source. Therefore, the objective of this study is to identify the most efficient locations for recycling bins by minimizing operating costs through the application of a covering modeling approach and obtaining the optimal location for recycling bins using CPLEX. Part of city of Rasah and Seremban 3, which are within the area of Seremban district of Negeri Sembilan, Malaysia, serve as the case study area for this research. As a result, it is found that a minimum of two recycling bin locations and a maximum of three recycling bins placed is needed to achieve 100% demand coverage. In order to reach a 100% coverage level, it has been determined that more bins with greater travel distances are needed, which would necessitate people traveling farther.