

## **FRAMEWORK TO DETERMINE LEVEL CROSSING GRADE SEPARATION REQUIREMENT**

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Railway level crossings are a major consideration that road agencies often need to pay attention to when managing the issues related to safety, traffic, and land use in the road segment where it is located. Alternatives to avoid these issues include crossing consolidation, closure, improving the conditions of the existing level crossing, and grade separation. Grade separation is the ideal alternative since it completely separates the road and rail traffic, but it carries itself a downside due to the high project cost and maintenance, making it impossible to grade separate all the level crossings. Ineffective allocation of funds for a single grade separating structure could restrict the funds available for other development projects. With the increasing number of road users and the higher demand for the railway, increased congestion is more than certain without proper improvements to the network.

To address this, frameworks have been proposed in many countries on how to identify and prioritise potential level crossings for grade separations, leading to effectively utilising the funds allocated. A knowledge gap was identified in the Sri Lankan context where the lack of a guiding framework leads to ad hoc decision-making and inefficient allocation of funds. This study aims to develop a criterion that can be used to identify the grade separation requirement in a Sri Lankan urban context. A number of existing studies were reviewed from which, different methodologies, key parameters and a limiting criterion for Average Daily Traffic (ADT) were identified. An economic analysis was then carried out to check the suitability of the limiting criterion for the local urban context. Two existing flyovers were selected representing four-lane and two-lane grade separations. Estimation of delay at the level crossings was done with VISSIM microsimulation software for different ADT levels. Savings from travel time, vehicle operating, and emission costs due to grade separating the level crossing were considered as the economic benefits. Estimated benefits were compared with the project cost and the maintenance cost of the grade separation. The project Benefit-Cost Ratio was then calculated for the previously considered ADT levels, and a sensitivity analysis was carried out considering different cases of changing benefits and costs to assess the economic strength of the selected criterion.

Based on the above results, limiting ADT values of 90000 veh/day for four-lane level crossings and 45000 veh/day for two-lane level crossings, are recommended to identify the grade separation requirement.

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