

Evaluation of Suitable Traffic Management Options for Gatambe Intersection

K. Dileep Sachintha Pathirana, Chamin Abeygunawardhana, Ruwantha G. Wimalasiri, Tissa U. Liyanage

Abstract: Traffic demand management at major road intersections is getting popular with increased traffic levels at the national road network in Sri Lanka. Kandy City becomes one of the major cities that have highly significant transportation-related externalities that have hindered the business expansion of the city further. Even though the steps are taken to improve the public transportation in Kandy City recently, by the intervention of Ministry of Megapolis to introduce a multimodal transport hub to improve the public transportation, the road traffic has not been at a satisfactory level of service at present. The Kandy City entrance across the Mahaweli River at Gatambe Intersection has become one of the major congestions impacted intersection at present creating a bottleneck for traffic movement in and out of the city centre. Major traffic flows are observed in the city is from Peradeniya – William Gopallawa Mawatha at all the time of the day. Even though the capacity of the William Gopallawa Mawatha Road having 4 lanes capacity is now adequate to carry the traffic at a high level of service, the interactions movement at Gatambe has obstructed with the extensive conflicts with a high volume of imbalance turning movements. Therefore, a sustainable traffic management solution to optimize the intersection capacity is an important factor to optimize the functionality of the overall road network in the city limit.

The turning movement of the traffic data collected at Gatambe Intersection Roundabout has indicated imbalance traffic movements in different directions at present having Average Daily Traffic (ADT) of 46,516 vehicles per day. The maximum hourly inflow traffic observed at 17.00 hours is 3,978 vehicles. The minimum hourly inflow traffic at the intersection is observed at 11.00 am as 2,455 vehicles. This gives average hourly traffic of 3,100 vehicles per hour. Even though this is a manageable traffic level for a secondary level intersection, the imbalance of turning movement throughout the day has made it difficult to give the same level of service for all users coming across the intersection. The major traffic movement was observed from and to William Gopallawa Mawatha – Peradeniya direction having over 13,000 vehicles over 12 hours period which is almost 1/3rd of the total traffic movement of the intersection. Therefore, specific traffic management measures are required to manage the abnormal traffic behaviours due to the road network connectivity setup across the intersection that has created due to the trip demand to and from the city centre. Several options are discussed in this research paper such as improving existing roundabout, signalization, geometric improvements, and grade separation as an integral solution to consider the rail gate closure impact near the intersection across the William Gopallawa Mawatha. The economic returns as the travel time savings and the vehicle operating cost savings due to the improvements to the intersection as well as eliminating the delay at railway crossing has been considered and tested as the outcome of this research. Comparative analysis for different options has been considered as the possible opportunities for the required level of improvements to the intersection node at Gatambe. The imbalance traffic levels have been accommodated through needed capacity supply with lane geometric improvements as suitable to match the intersection demand.

Keywords: Gate Closure Delay,
Turning Movements, Intersection Improvements,
Grade Separation