

AUTOMATING EXPOSURE ANALYSIS THROUGH GIS ALGORITHMSS.J. Hughes¹, L.L. Lim²¹*Department of Civil Engineering, University of Surrey, Guildford, UK*²*Dalton Research Institute, Manchester Metropolitan University, Manchester, UK*

Traffic emissions are a major source of atmospheric pollutants in urban areas. The process of identifying the areas with high concentrations and potential population exposure ("hot spots") is currently conducted by environmental officers. This non-computerised assessment is extremely time-consuming and is dependent on the judgment of the environmental officer. In addition, transport planners rarely take into account the impact of traffic management schemes on public health. Traffic scenarios have to be tested to determine if they are likely to create a positive impact on the environment. It is therefore important to be able to automatically determine risk areas with likely population exposure arising from traffic-related sources. This paper describes two new tools specifically developed in a Geographical Information System (GIS), to automate the evaluation of population exposure. The first tool was developed to automate the detection of the 'hot spots'. These were identified as populated areas where the pollution concentrations exceeded the relevant health-based air quality standards. The second tool was then developed so that once the 'hot spots' had been identified, alternative traffic scenarios could be tested in order to reduce or remove the 'hot spots'. A range of GIS algorithms were devised to allow quick scenario testing, including traffic reduction schemes, traffic calming and variations in traffic composition. The tools are presented in a user-friendly integrated environment known as IMPAQT. These new tools may be used to help decision makers assess air quality from current and future situations, in addition to increasing the efficiency of air quality assessments.