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Guidelines on building design and operation to minimize air quality impacts from major roads in Transit Oriented Development

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Summary: Poor air quality has a huge detrimental effect, both economic and on the quality of life, in Australia. Transit oriented design (TOD), which aims to minimise urban sprawl and lower dependency on vehicles, leads to an increasing number of buildings close to transport corridors. This project aims at providing guidelines that are appropriate to include within City Plan to inform future planning along road corridors, and provide recommendations on when mitigation measures should be utilised.

Keywords: writing, abstract, template

1 Introduction

The Office of Urban Management has recently released the South East Queensland Regional Plan 2005-2026. In response to this plan, options for land use planning in order to meet future population growth in a sustainable and coordinated manner are currently being assessed. One such option includes potential for future densification of residential type living along major road corridors, as part of a TOD focus. Whilst significant benefits exist from aligning future residential development with public transport infrastructure, issues have arisen such as the potential air quality impact of road traffic emissions on resident health.

2 Key Areas of the Guidelines

1) The impact of the location of the building in relation to major roads on air pollution around the building envelope, considering traffic volume on the road, distance from the road, topography of the area and local meteorological conditions.
2) The effectives of air filters in reducing particle load downstream the filters in relation to different particle size ranges.
3) The impact of the design and operation of air filtration and ventilation system on its performance and energy consumption.

3 Specific objectives of the guidelines

1. Building location in urban setting:
   • Assess what is the “safe” distance from the road, outside which under no local conditions the impact on the road on air quality around building envelope is an issue.
   • Identify the conditions for which meaningful assessment of the impact can be conducted using the existing body of information.
   • Identify conditions for which measurements and/or modelling of the impact is required in order to provide meaningful information

Air filters:
• Provide quantitative assessment of the effectiveness of the commercially available filters in removing from the airstream particulate matter of different sizes under different loading conditions during single passage through the filters.
• Provide assessment of the costs of the filters and their usage.

2. Air filtration and ventilation system:
• Provide quantitative assessment of its effectives in removing outdoor pollution from air supplied for the building while removing from indoor air pollutants generated by indoor sources for different design and operation scenarios. The aspects which will be included in the assessment include: orientation of the building in relation to the road, building height, location of the air intakes of the building, fraction of return air in the supply air.
• Provide quantitative assessment of the quality of the climate in the building including thermal, humidity and air flow conditions.
• Provide quantitative assessment of the energy consumption for different operation/design scenarios.

3. Provide overall recommendations for considering the three areas above in urban design and planning and retrofitting in relation to:
   • The existing air quality health guidelines (WHO) and national air quality standards
   • The existing and emerging technologies.

Summary of the completed parts of the guidelines

This paper provides a summary of the completed sections 1 and 2 of the guideline document as well as practical recommendations for using it by planners and policy makers.