

Air quality

Air quality refers to the degree to which the air is suitable or clean enough for humans or the environment.

Air quality impacts may arise from the emission of air pollutants to the atmosphere due to construction or operation of the motorway and can result in impacts to human health, amenity and the environment if not suitably controlled or eliminated.

During construction, the excavation and management of spoil and construction of civil infrastructure can result in additional emissions of pollutants from construction vehicles as well as the potential for dust particulate matter (PM) generation. During operation, fuel combustion from vehicles using the road can result in emissions of pollutants which include nitrogen dioxide (NO₂), and dust (PM₁₀ and PM_{2.5}).

For a road tunnel, during operation, emissions are generated by vehicles within the tunnel which will be discharged into the environment via a combination of ventilation facilities and managed emissions from the tunnel portals.

Emissions are also generated on the surface roads constructed as part of the project. Measures and requirements are in place to ensure acceptable air quality impacts during construction and operation.

Existing environment

Sensitive receptors

Sensitive receptors are places or areas which are vulnerable to air quality impacts such as hospitals, schools, parks, reserves or households. A mix of land uses, primarily commercial and residential, interface directly with the existing South Road corridor. Areas set back from South Road are primarily residential, however Hindmarsh, Mile End and Edwardstown contain some commercial and industrial areas. There are also several parks and reserves for passive recreation in the vicinity of the project.

Climate and meteorology

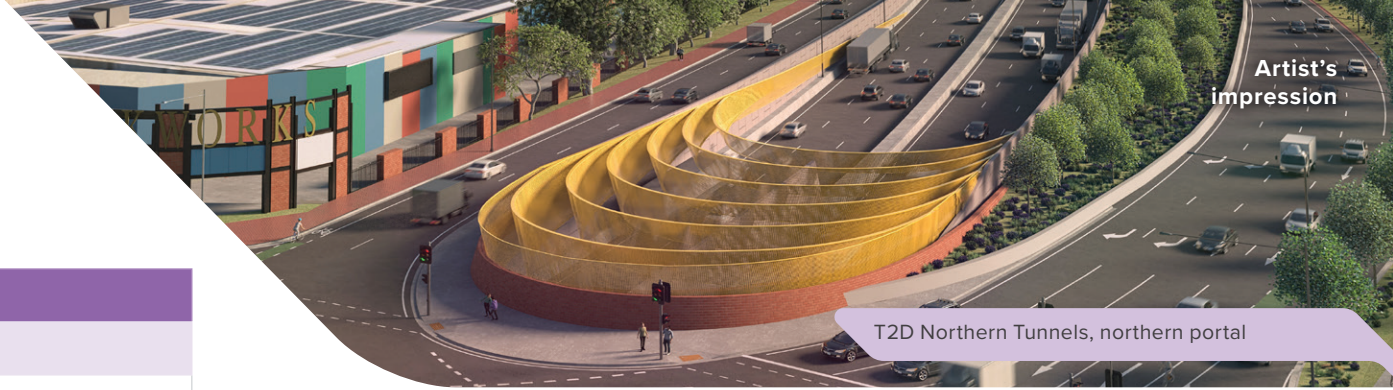
Meteorological conditions are important for determining the direction and rate at which emissions from a source would disperse. The prevailing wind conditions in the area are strong (greater than 5 m/s) from the southwest and light (less than 1 m/s) from the northeast. Higher wind speeds (>5 m/s) typically result in lower concentrations of air quality pollutants.

Ambient air quality

The current local ambient air quality surrounding the project is important to consider when assessing cumulative (project plus background) air quality impacts. This includes ambient concentrations of NO₂, PM₁₀ and PM_{2.5}. A review of the current ambient air pollutant concentrations found that concentrations of NO₂ and PM_{2.5} were satisfactory under the relevant limits outlined in the South Australian Environment Protection (Air Quality) Policy 2016 (Air Quality EPP) and National Environment Protection (Ambient Air Quality) Measure for the assessed period. Concentrations of PM₁₀, on occasions exceeded the relevant limits for the assessed period, with only occasional exceedances of the short-term limit. This is a common occurrence across the nation in similar (urban) locations with exceedances often related to windblown dust, bushfires and other significant dust generating events.

Potential impacts to existing environment

A project-wide evaluation of potential air quality impacts was undertaken for both the construction and operational phases of the project. The key air quality impacts identified through this assessment are outlined overleaf however it should be noted that with appropriate design, it is highly unlikely that impacts to air quality will cause any negative human health or amenity outcomes.



Artist's impression

T2D Northern Tunnels, northern portal

Key air quality impacts and activities

Impact	Activity
Construction	
Deposition and gathering of larger dust particles causing aesthetic impacts at sensitive receptor locations (such as dust settling on a house or garden)	<ul style="list-style-type: none"> • site clearance and construction site establishment • earthworks • construction of surface roads and other civil infrastructure
Generation of PM ₁₀ and PM _{2.5} from soil disturbance causing health impacts at sensitive receptor locations (such as small dust particles being breathed in by a person)	<ul style="list-style-type: none"> • dive structure/portal and tunnel construction • traffic movement associated with material transport.
Operation	
Localised reduction of air quality	<ul style="list-style-type: none"> • vehicles using surface roads (crossroads and motorways) - emissions released locally at road level • vehicles using tunnels - emissions released through a combination of vertical air extraction through ventilation facilities and managed emissions from the portals.

During the operation phase, design measures will be implemented to eliminate or reduce the risk of poor air quality.

Elements will include:

- tunnel ventilation system providing adequate dilution and dispersion of pollutants
- monitoring of air quality levels to provide appropriate control of ventilation systems
- intelligent transport system infrastructure and tunnel traffic monitoring resulting in traffic conditions that minimise vehicle pollution generation
- optimising of barriers such as noise wall heights, numbers and locations, to protect sensitive receptors
- integrated design of the portal geometry to enhance emission dispersion.

Approvals, permits and authorisations

The project must demonstrate that all reasonable and practical measures will be undertaken to eliminate or minimise air quality impacts during construction and operation of the project by demonstrating compliance with the Air Quality EPP which establishes maximum pollutant ground level concentrations to protect the health and amenity of sensitive receptors.

During operation, the project must demonstrate compliance with the Environment and Heritage Technical Manual Attachment 3A – Air Quality Assessment Guideline, which applies to new or major redeveloped road and rail infrastructure projects.

Alternatives, mitigation and opportunities

The project alignment has been developed during the planning and reference design phase to minimise negative air quality impacts so far as reasonably practicable.

During the construction phase appropriate dust management measures will be in place such as ongoing monitoring, managing stockpiles and ensuring adequate water supply for dust suppression. With management measures in place it is unlikely that construction activities will result in exceedances of the air quality criteria.

Scan the QR code to view the suite of assessments included in the PAR or visit [T2D.sa.gov.au/PAR](https://www.t2d.sa.gov.au/PAR).

