Pyrmont Peninsula Place Strategy

Air Quality Review

NSW Department of Planning, Industry and Environment

16 July 2021

→ **The Power of Commitment**

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1. Introduction

SJB Planning (NSW) Pty Ltd has engaged GHD to assess key air quality issues at the proposed site of Pyrmont Peninsula (PP), with a focus on emissions from the Cross City Tunnel ventilation stack.

1.1 Purpose of this report

The purpose of this report is to inform the Department of Planning, Industry and Environment (DPIE) about the impact of updating planning controls in the Sydney Local Environment Plan (SLEP) 2012 and Development Control Plan (DCP) as part of implementing the Pyrmont Peninsula Place Strategy.

1.2 Scope and limitations

The air quality assessment was to verify the requirements of the existing planning controls with regards to the Cross City Tunnel stack (CCTS) and review recent modelling undertaken. This report includes:

- Review of Pyrmont Peninsula Place Strategy location in the context of the CCTS and other sources of air emissions surrounding the proposed site
- A summary of the legislative and policy context
- A review of assessment requirements for new buildings near the CCTS
- A review of the latest available data and modelling of the CCTS
- Recommendations

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The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions, and recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring after the date that the report was prepared.

The opinions, conclusions, and recommendations in this report are based on assumptions made by GHD described in this report (refer section(s) 1.3 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.

1.3 Assumptions

GHD has made the following assumptions when undertaking to this assessment:

- The assessment focuses on emissions from the Cross City Tunnel stack (CCTS)
- Only a high-level study of emission sources within the Pyrmont Peninsula has been undertaken
- This assessment relies on information from several reports prepared by PEL and ERM.
- GHD has not checked the assessment modelling or verified the results of the studies.

2. Pyrmont Peninsula

2.1 Location

The Pyrmont Peninsula is located immediately west of the Sydney city central business district (CBD). Figure 1 below shows the Pyrmont Peninsula including the suburbs of Pyrmont, Ultimo, Glebe and Sydney as defined in the Pyrmont Peninsula Place Strategy. The area is identified in the Sydney Local Environmental Plan (LEP) 2012 as Ultimo-Pyrmont.

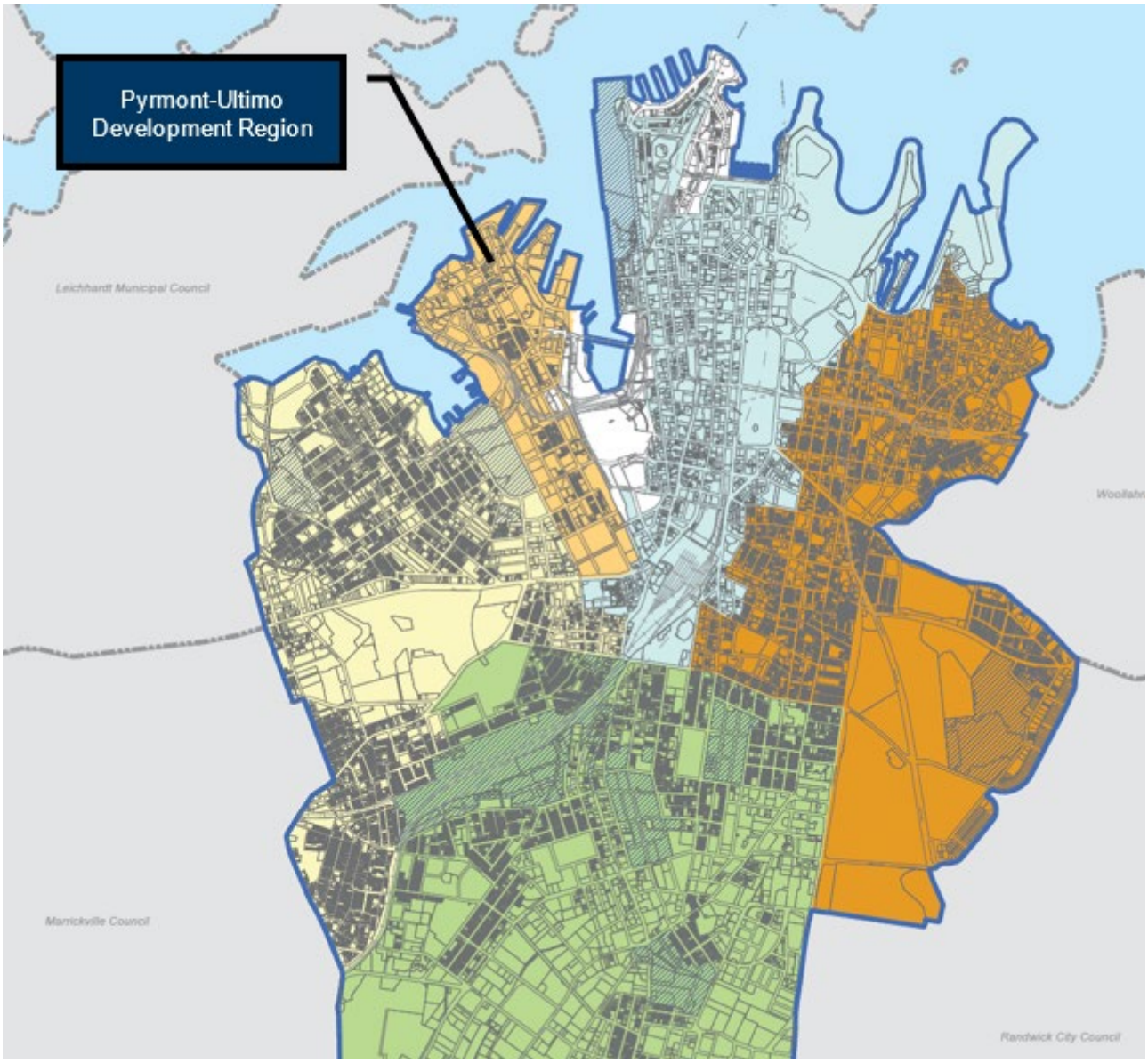

Figure 1 *Sydney Development Control Plan 2012 Areas. Pyrmont-Ultimo Development Region shown. Source: Sydney Development Control Plan 2012*

The location of the CCTS is shown in Figure 2.

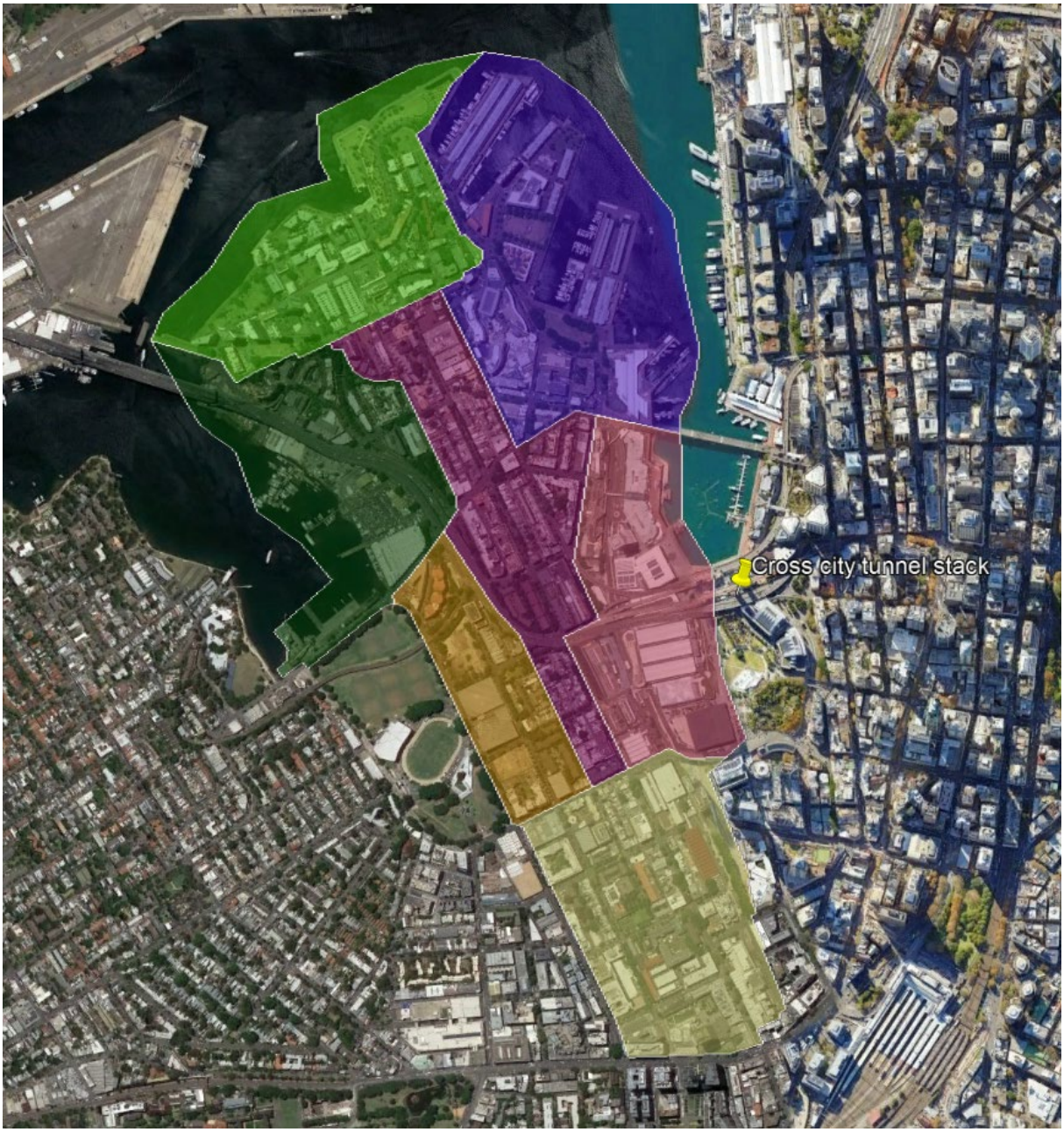

Figure 2 *Cross city tunnel stack and Pyrmont Peninsula (Source: Google Earth)*

2.2 Cross City Tunnel stack

This assessment focuses on potential emissions from the CCTS and the impact on air quality within Pyrmont Peninsula. It includes a review of planning implications on building types and heights in areas located close to the stack. The CCTS is located just outside of PP, approximately 50 m from the boundary of Tumbalong Park Precinct and 100 m from the International Convention Centre (ICC) Sydney, which is the nearest building location within PP.

The CCTS is illustrated in Figure 3, looking west towards PP. The Ribbon development, shown in Figure 4, is currently under construction and is located about 50 metres north and northeast of the CCTS which is outlined in red. The CCTS has an approximate stack height of 60 m, and the Ribbon has a height of about 90m at its highest point.

Any development within 500 meters of the CCTS requires an assessment to ensure potential air quality impacts from the Cross City Tunnel plume of emissions are considered (refer to Section 3.2.2).

Pollutants in the context of road traffic include particulate matter, ozone, nitrogen dioxide, carbon monoxide, polycyclic aromatic hydrocarbons (PAHs) and volatile organic compounds (VOCs). A full range of pollutants in the CCTS emissions, including odorous compounds, were assessed in the original Environmental Impact Statement (EIS) for the project. However, nitrogen dioxide was found to be the determining pollutant.

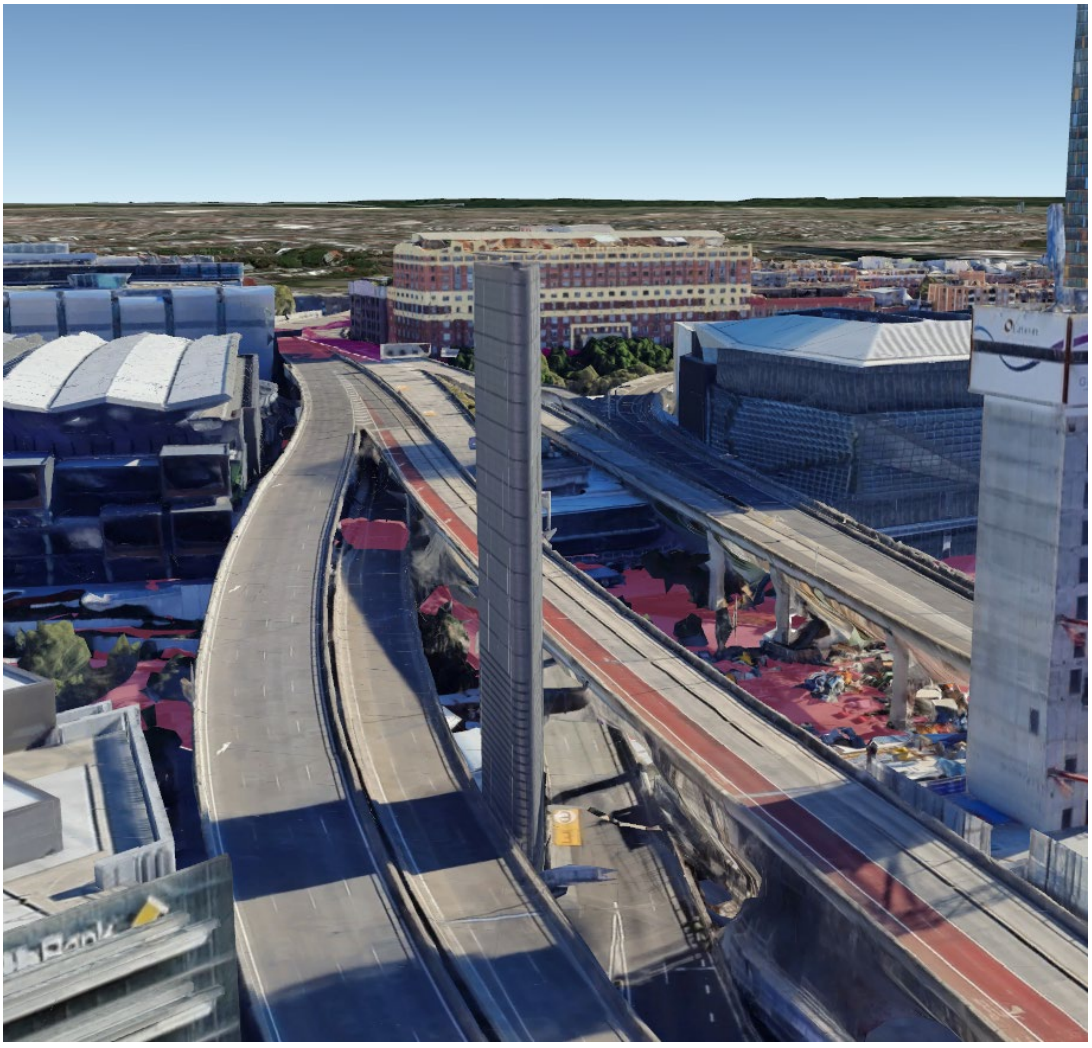

Figure 3 3D view of the cross city tunnel stack looking towards PP (Source: Google earth)

Figure 4 *Artist impression of the Ribbon with CCT stack to the right (Source: Hassell, courtesy NSW Department of Planning and Environment)*

2.3 Other sources of air emissions

A high-level review of potentially significant air emission sources across PP has been undertaken based on mapping, published traffic volumes and a general review of the area. These are summarised below:

- Sydney Fishmarket – a potential source of odour
- White Bay – future industrial uses, shipping
- Blackwattle Bay, Darling Harbour – diesel boats and ferries
- Major roads – roads with greater than 20,000 vehicles per day within the PPPS include:
  - Wattle Street
  - Harris Street
  - Bridge Road
  - Fig Street
  - Allen Street
- Major roads – roads with greater than 40,000 vehicles per day within the PPPS include:
  - Western Distributor
  - Anzac Bridge
  - Broadway
- Any rooftop plant including standby power supply, gas-powered heating, and cooling

High level consideration has been given to major roads in Section 4.2, however no assessment has been undertaken of Sydney Fishmarket, White Bay, Blackwattle Bay and rooftop plant. Occupants of Sydney Fishmarket and White Bay need to ensure they do not impact on their nearest receptors in terms of odour and air quality. Any land use conflicts may arise if new developments within PP are closer to these sources than existing receptors, which is not likely.

Developments adjacent to major roads are considered the main concern regarding potential land-use conflicts and has been discussed more in Section 4.2.

3. Legislative and policy context

A literature review has been undertaken for relevant legislation, planning, and strategic documentation with an air quality context, including federal, state and local guidance for air quality.

3.1 Assessment criteria

3.1.1 Commonwealth legislation

The National Environment Protection Council (NEPC) has established uniform standards for ambient air quality concentrations and air toxics concentrations in Australia. These standards are known as the National Environment Protection (Ambient Air Quality) Measure (NEPM AAQ) and then National Environment Protection (Air Toxics) Measure (NEPM Air Toxics). The standards set non-binding air quality objectives and ten-year goals.

NEPM AAQ outlines maximum concentrations for key pollutants carbon monoxide (CO), nitrogen dioxide (NO_2), ozone, sulfur dioxide (SO_2), lead, PM_{10} and $PM_{2.5,}$ which are provided in Table 1 below. The 10-year goal for each pollutant outlined in NEPM AAQ, states there are no allowable exceedances per year.

The 2021 update to Air NEPM resulted in an approximate reduction in NO_2 of 33% for one-hour criteria and 50% for annual criteria.

The new standard for SO_2 and $PM_{2.5}$ will come into effect in 2025.

Table 1 Standards for pollution (Source: Air NEPM 2021)

Pollutant	Averaging period	Maximum concentration standard
Carbon monoxide	8 hours	9.0 ppm
Nitrogen dioxide	1 hour	0.08 ppm
	1 year	0.015 ppm
Photochemical oxidants (as ozone)	8 hours	0.065 ppm
Sulfur dioxide	1 hour	0.10 ppm (0.075 ppm from 2025)
	1 day	0.02 ppm
Lead	1 year	0.50 µg/m^3
Particles as PM_{10}	1 day	50 µg/m^3
	1 year	25 µg/m^3
Particles as $PM_{2.5}$	1 day	25 µg/m^3 (20 µg/m^3 from 2025)
	1 year	8 µg/m^3 (7 µg/m^3 from 2025)

3.2 Local legislation

3.2.1 Sydney Local Environmental Plan 2012

Sydney Local Environmental Plan 2012 in Clause 7.24 Development near Cross City Tunnel ventilation stack states the following:

1) This clause applies to land identified on the Locality and Site Identification Map as “Land Affected by Cross City Tunnel Ventilation Stack.”

2) Development consent must not be granted to develop land to which this clause applies unless the consent authority is satisfied that:

> (a) the proposed development will not adversely affect the dispersal of emissions from the Cross City Tunnel ventilation stack, and

(b) persons using the proposed development will not be unduly affected by those emissions.

3.2.2 Sydney Development Control Plan 2012

The Sydney Development Control Plan 2012 sets out provisions for developments near the Cross City Tunnel. Section 3.13.2 of the plan states the following.

3.13.2 Air quality for development near the Cross City Tunnel

Objective

(a) Ensure potential air quality impacts from the Cross City Tunnel plume of emissions are considered in the assessment of a development.

Definitions

Sensitive receptor means a location where people are likely to work or reside and may include a dwelling, school, hospital, office or public recreational area. An air quality impact assessment should also consider the location of known or likely future sensitive receptors.

Provisions

(1) These following provisions apply to development that:

(a) has a building height relative to distance from the Cross City Tunnel ventilation stack as nominated in Table 3.6 Development near the Cross City Tunnel ventilation stack;

(b) may, in the opinion of the consent authority, have an adverse impact on air quality of any sensitive receptor, including neighbouring buildings and/or any area open to air due to the developments potential to disperse the plume of emissions from the Cross City Tunnel ventilation stack; or

(c) may be adversely impacted in terms of the effect of the emissions from the Cross City Tunnel ventilation stack on occupants of the development.

(2) The consent authority is to consider:

(a) the impact of the development on the occupants of other existing and future development and people using a place open to the public due to the potential of the development to disperse the plume of emissions from the Cross City Tunnel ventilation stack;

(b) the likely impact of emissions from the Cross City Tunnel ventilation stack on occupants of the proposed development;

(c) whether the concentration of emissions at any sensitive receptor exceeds the Air Quality Goal of 246ug/m3 of NO2 due to emissions from the Cross City Tunnel;

(d) an Air Quality Impact Assessment Report which:

(i) has been prepared by a suitably qualified person in accordance with the Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales, published by the Department of Environment and Climate Change in 2005 and any relevant Council guideline or the Air Quality Assessment Process – Cross City Tunnel: Protocol to Address Provisions of Condition of Approval 247 (Roads and Traffic Authority 11 February 2008); and

(ii) identifies the predicted concentration of Nitrous Oxide at all sensitive receptors; and

(iii) includes an assessment of the matters outlined in sub-clauses (a) through to (c).

Table 3.6: Development near the Cross City Tunnel Ventilation Stack

Distance of development from Cross City Tunnel ventilation stack in metres	Height of proposed development above ground level Proposed building height in metres
0 – 50	greater than 25
50 – 100	greater than 30
100 – 150	greater than 40
150 – 200	greater than 50
200 – 250	greater than 60
250 – 300	greater than 70
300 – 400	greater than 90
400 – 500	greater than 100

Figure 5 *Development near Cross City Tunnel Ventilation Stack (Source: Sydney Development Control Plan 2012)*

As displayed in Figure 6, areas within PP are inside the distances from the CCTS that require additional air quality assessment under the DCP if building heights as per Figure 5 are exceeded on any future developments. The relevance of this requirement based on latest emission data from the CCTS is discussed in Section 4 of this report.

Figure 6 *500 m buffer from the CCTS stack*

Section 4.2.5.3 Development on busy roads and active frontages

Provisions applying to sensitive uses on active frontage map or site with a frontage to a busy road that carries more than 20,000 vehicles per day, included residential/mixed-use buildings, worship buildings, hospitals, educational establishments, and childcare centres.

Air quality mitigation measures are required for new developments along road corridors carrying more than 20,000 Annual Average Daily Traffic (refer to Figure 7). Key provisions which are also for noise include:

– Where development fronts roads with more than 40,000 vehicles per day, non–residential uses are required on the ground floor and first floor
– Where development fronts roads with more than 20,000 vehicles per day, non–residential uses are required on the ground floor

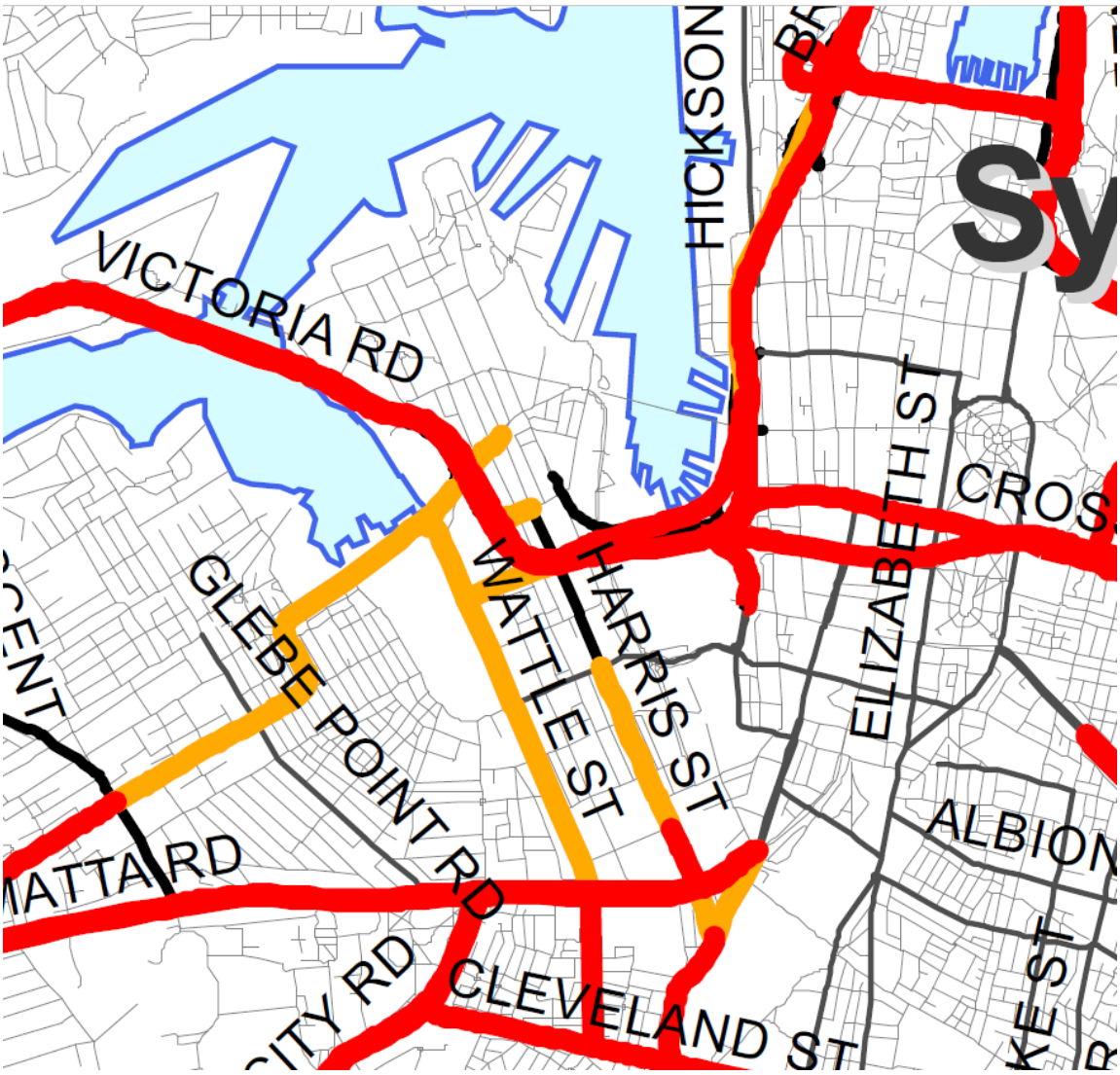

Figure 7 *Traffic volume maps for noise assessment for building on land adjacent to busy roads (RTA, 2008)*

Section 5 Specific Areas

Section 5 of the DCP applies to specific sites with the Sydney LGA, including Ashmore, Central Sydney, Epsom Park, Green Square, Lachlan, North Rosebery, Rosebery Estate, Southern Employment Lands and Danks Street South. None of the areas are within the Pyrmont Peninsula. However, provisions of this are relevant to any land within the Pyrmont Peninsula along busy roads, including:

- The council may require an Air Quality Assessment report, prepared by suitably qualified consultants, submitted with development applications where sensitive uses are proposed. The Air Quality Assessment report should demonstrate that air quality is within acceptable limits or impacts can be mitigated.
- Where dwellings will have mechanical ventilation for sensitive land uses on busy roads, air inlets must be located at the rear of the building where possible, away from vehicle emissions.
- Where sensitive development uses are proposed, the design should minimise any impact of air pollution. Design considerations provided in the *NSW Government's Development near Rail Corridors and Busy Roads – Interim Guideline 2008* are to be addressed
- For all development types, to reduce canyon effects and improve air circulation on busy roads, architectural treatments including variations in wall heights are required to disperse air pollutants. Refer to Figure 5.196.

Figure 5.196
Roadway canyons and their effect on winds and air pollutants

Source: Department of Planning and Infrastructure 2008: Development near Rail Corridors and Busy Roads – Interim Guideline

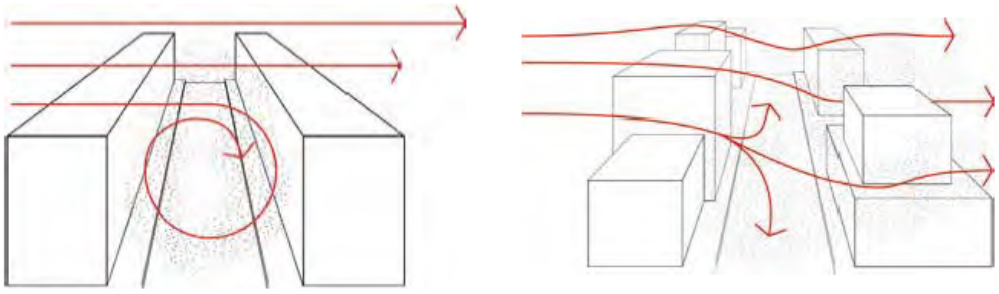

Figure 8 Roadway canyons and their effect on winds and air pollutants (Source: DCP 2012)

3.3 The Protocol

The DCP refers to the Air Quality Assessment Process – Cross City Tunnel: Protocol to Address Provisions of Condition of Approval 247 (Roads and Traffic Authority 11 February 2008) (Protocol for COA 274) as suitable guidance for assessing air quality for buildings located in proximity to the CCTS. Specifically, how to evaluate potential impacts from stack emissions and how to not adversely affect the dispersal of emissions from the stack.

Under the Protocol, there are two parts. Part 1: Air Quality Assessment Triggers, comprises an initial screening procedure developed on the basis of the height of the building and distance from the CCTS and modelling results for existing buildings. This is described in the DCP.

Part 2 provides guidance on how to conduct an assessment if triggered in Part 1, and provides two levels of assessment, namely a simplified Level 1 assessment or a more advanced Level 2 as per the Approved Methods. If a building is found to be affected by the CCTS plume in the Level 1 assessment, the more detailed Level 2 assessment is required.

Section 1.5 of the Protocol states that the Protocol was originally prepared in 2004 and should be reviewed from time to time, and if necessary, be revised if there are substantial adverse changes to motor vehicle fleet emissions or background concentration of pollutants in the CBD.

The need for this is discussed in Section 4.1 of this report.

3.4 PPPS submissions

3.4.1 City of Sydney

City of Sydney included in their submission the following issue:

– Air pollution and noise from the ANZAC Bridge approach (caused by traffic type, volume, and speed).

Air pollution from traffic on the ANZAC Bridge approach would need to be considered as per requirements listed in Section 4.2.5.3 of the DCP Development on busy roads and active frontages

3.4.2 NSW EPA

EPA provided the following comments about the strategy recognising the benefits for air quality:

– Multi-utility hubs as precinct infrastructure will provide positive elements to support improved air quality. These include electric vehicle charging, grid-scale batteries to store locally generated power, bicycle end-of-trip facilities and precinct car-parking. This will reduce emissions from traffic-circulation, enable streets within the precinct to be green and active spaces and separate vehicle emission sources from areas where people live, work and exercise.
– Green streets and active spaces will also support improved air quality outcomes. As well as encouraging non-polluting transport. The Strategy involves a proposal for vegetation with a target of 25% canopy in streets and parks. The proposal for canopy cover recognises the importance of vegetation in benefiting local air quality. Low shrubs and hedges also reduce air pollution and should be considered alongside roads (for example, under trees) to help protect pedestrians from vehicle pollution. The major foreshore park and other parks will also provide opportunities to exercise away from any traffic pollution.
– High performance resilient buildings will support reduced air emissions from power generation through measures to minimise energy demand for solar power and energy efficiency to minimise energy demand. This could be reinforced by Pillar 4: Offsetting to deliver a net zero outcome.
– Consideration should be given to setting buildings back from busy roads and ensuring that utility rooms, rather than living rooms and bedrooms, face busy roads. Vegetation between the road and the building can help reduce air pollution entering the building. It is also important that apartments near busy roads be built with private open space facing away from busy roads, so that it provides amenity and relief and is separated from air and noise pollution. Measures such as those in the *Development near rail corridors and busy roads – interim guideline* should be integrated into the Strategy.
– Natural ventilation should also be an important design element because, even near busy roads, apartments can be opened in the evenings when there is less traffic. It is also important that microclimates are understood to help support the sustainable design of buildings that capitalises on natural ventilation and minimises the risk of canyoning.

The first three comments above recognise general benefits within PP that can support improved air quality. The last two are considered further in this report in Section 4.2.

4. Key air quality issues

4.1 Cross City Tunnel stack

4.1.1 Requirements under the LEP and DCP

The SLEP (2012) requires that developments do not adversely affect the dispersal of emissions from the CCTS and that persons using any developments will not be unduly affected by those emissions. Provisions outlined in the DCP describe how to demonstrate this.

A review of the distances from the CCTS to the precincts within PP has been undertaken. Under current DCP requirements, new buildings within PP precincts may require an air quality assessment, depending on the height of the proposed building and distance from the stack. Under this methodology, new developments within PP potentially require air quality assessment based on the triggers in Table 2.

Future building heights are currently under development and only general heights are known. The Tumbalong Precinct is the main area where the distance from the stack and future building heights would trigger an assessment. The PPPS states that Tumbalong Park will transition building heights from more elevated areas to the waterfront meaning the tallest buildings will be at the most elevated areas and building heights will gradually reduce closer to the waterfront and open space. Consequently, future buildings as part of the strategy will less likely trigger assessment under the requirements of the DCP.

A review of the latest data used in modelling inputs has been undertaken in subsequent sections to determine if the modelling referred to in the DCP is still relevant.

Table 2 Precincts requiring additional air quality assessment under the DCP

Precinct	Nearest distance to stack	Triggers assessment
Tumbalong Precinct	50 m from CCTS stack	For all buildings over 25 m high
Ultimo	400 m from CCTS stack	For buildings greater than 100 m high
Pyrmont Village	340 m from CCTS stack	For building greater than 90 m high
Darling Island	420 m from CCTS stack	For building greater than 100 m high
Wentworth Park	>500 m from CCTS stack	No
Blackwattle Bay	>500 m from CCTS stack	No
Pirrama	>500 m from CCTS stack	No

4.1.2 Review of modelling inputs

GHD has undertaken a review of the most recent modelling, including inputs to determine the need for additional air quality assessment for future developments within PP.

Traffic

The latest Transurban traffic data was obtained from the 15 April 2021 ASX release "March Quarter Update 2021". The year-to-date average daily trips for the Cross City Tunnel was 39,000 in 2019, 40,000 in 2020 and 37,000 in 2021. Current traffic volumes are about 39% of the 2002 air quality assessment (101,700 vehicles per day).

Emissions from the CCTS are directly proportional to traffic volumes and vehicle emissions. The predicted pollutant concentrations would also be dependent on this, meaning that the levels anticipated in the 2002 air quality assessment are conservative.

Emissions

Cross city tunnel air quality data is available on the Linkt website[1] in the summary form, including minimum, maximum, and average NO_2 concentrations. GHD has conducted an additional review to provide more detailed data.

GHD reviewed the Air Quality Report prepared for the IMAX Redevelopment S96 Mod 6 – SSD7388 titled Assessment of Level 29 Pool Area with Operational CCTV Data (ERM, 2018). ERM references measured NO_2 data from the tunnel stack provided by Transurban based on twelve months of Continuous Emissions Monitoring System (CEMS) reporting for the CCTV (referred to as CCTS in this report). ERM (2018) provided the following summary of emissions in Figure 9.

Emission sampling from the CCTS shows pollutant concentrations at least five times lower than estimated in the original EIS (HAS, 2002) and Protocol estimates used to develop the buffer distances around the CCTS in the DCP. Original EIS NO_2 emission rates ranges from 1.0 g/s up to 1.7 g/s depending on the traffic scenario assessed.

The emission sampling results below show a maximum in stack NO_2 concentration of 816 µg/m³, indicative low risk of NO_2 concentrations above the criteria at locations within PP due to dilution and dispersion.

ERM also identified that "NO_2 measured inside the CCTS indicates that concentrations are below the 1-hour average ambient air quality criterion (246 µg/m³) within the vent for 79% of the time".

In summary, emissions from the CCTS are much lower than originally anticipated meaning subsequent modelling and requirements in the DCP may need to be reviewed.

Table 3.1: Summary statistics for CCTV operational in-stack NO_2 concentration and NO_2 emission rates

Statistic (7,599 valid hourly records)	In-Stack NO_2 Concentration (µg/m³)	NO_2 Emission Rate (g/s)
Maximum	816	0.21
99.9th Percentile	519	0.13
99th Percentile	411	0.11
90th Percentile	300	0.07
Mean	183	0.04
Minimum	0	0.00

Figure 9 Summary of CCTV in stack NO_2 concentrations (Source: ERM 2018)

Modelling

Updated CCTS modelling was undertaken for the IMAX Redevelopment (SSD-7388), now known as The Ribbon project. The Ribbon is located 50 m from the CCTS stack and is about 30m taller than the CCTS stack at its highest point.

The original air quality assessment was undertaken in 2013 by PEL, with various updates to the modelling undertaken by ERM in 2015, 2016, 2017 and 2018). The latest versions of the assessment used actual emission data (NO_2) of the Cross City Tunnel as provided by Transurban.

GHD has undertaken a preliminary review of these documents and determined that the assessment methodology has only considered wind directions when the plume is blowing directly towards the proposed Ribbon building. Significant potential wake effects the Ribbon would have on the CCTS plume in all other directions and subsequent increases in ground level and receptor level pollutant concentrations (i.e., to the south of the CCTS and potentially PP).

[1] https://www.linkt.com.au/sydney/using-toll-roads/about-sydney-toll-roads/cross-city-tunnel/tunnel-air-quality

The Ribbon building (still under construction) will significantly influence the CCTS plume due to building wake effects, increasing ground level and elevated pollutant concentrations under certain meteorological conditions. It is unclear what wake effects The Ribbon would have on emissions from the stack in the direction of PP without undertaking dispersion modelling

As discussed above, measured NO_2 concentrations are low and unlikely to lead to any adverse impact on receptors within PP however there is no way to determine potential wake effects of the Ribbon building on the CCTS plume without additional modelling which considers all meteorological conditions.

4.1.3 Summary and recommendations

The most recent air quality assessment undertaken for the Ribbon considers emissions from the CCTS stack, which demonstrates a very low risk of any impacts on land within PP. This review however has identified the following:

– A recent update of the Air NEPM resulted in reductions of the NO_2 of approximately 33% for the 1-hour criteria, and 50% for the annual criteria
– Emission sampling from the CCTS shows pollutant concentrations greater than five times lower than those previously applied in the original EIS and Protocol for COA 274
– Traffic volumes are currently about 39% of the volumes assumed in the original EIS, however may continue to grow towards the tunnel design capacity
– Traffic emissions are expected to continue to reduce due to vehicle fleet modernisation. PEL (2016) estimated a 46% reduction in emissions due to the modernisation of the vehicle fleet between 2017 and 2030
– The Ribbon development, currently being constructed, will significantly influence the plume from the CCTS stack and increase ground level (and other heights) pollutant concentrations. During the EIS and approval process, only impacts on the Ribbon were assessed, not how this would impact other receptors.
– It is unlikely that CCTS emissions could have any impact on Pyrmont Peninsula meaning that there will not likely be any restrictions for any future building heights and density.

Based on these changes, GHD finds the air quality methodology used in the Protocol for COA 274, and subsequently referred to in the DCP to be outdated and based on input data and air quality goals that are no longer current. Based on a review of model inputs it is unlikely that CCTS emissions could have any impact on Pyrmont Peninsula. However, an up-to-date dispersion modelling assessment can be undertaken to confirm this and remove the need for individual air quality assessments for future buildings located within the Pyrmont Peninsula and potentially lead to updated Protocol provisions for COA 274 in the DCP.

4.2 Busy roads and active frontages

Busy roads and active frontages are considered to be the key concern in regards to land use conflicts within the Pyrmont Peninsula.

Provisions of the DCP as discussed in Section 3.2.2 for consideration in the Pyrmont Peninsula relate to busy roads and sensitive uses such as residential areas, place of worship buildings, hospitals, educational establishments, and childcare centres. Any future development along the identified roads below should have specific development requirements or an air quality assessment undertaken by a suitably qualified consultant.

Comments provided by EPA in the PPPS submission process refer to developments along busy roads and the need to integrate measures such as those in the *NSW Government's Development near Rail Corridors and Busy Roads – Interim Guideline 2008* into the Strategy.

Major roads – roads with greater than 20,000 vehicles per day within the PPPS include:

– Wattle Street
– Harris Street
– Bridge Road
– Fig Street
– Allen Street

Where development fronts roads with more than 20,000 vehicles per day, non–residential uses are required on the ground floor. Future development of place of worship buildings, hospitals, educational establishments, and childcare centres should not occur adjacent to these roads without key air quality design considerations as per the *NSW Government's Development near Rail Corridors and Busy Roads – Interim Guideline 2008.*

Major roads – roads with greater than 40,000 vehicles per day within the PPPS include:

– Western Distributor
– Anzac Bridge
– Broadway

Where development fronts roads with more than 40,000 vehicles per day, non–residential uses are required on the ground floor and first floor.

The *NSW Government's Development near rail corridors and busy roads – interim guideline 2008* provides the following design considerations to be considered in any developments near the roads list above:

– Minimising the formation of urban canyons that reduce dispersion
– Incorporating an appropriate separation distance between sensitive uses and the road using broad-scale site planning principles such as building siting and orientation
– The location of living areas, outdoor space and bedrooms and other sensitive uses (such as childcare centres) should be as far as practicable from the major source of air pollution
– Ventilation design and open-able windows should be considered in the design of development located adjacent to roadway emission sources
– When mechanical ventilation is proposed, the air intakes should be sited as far as practicable from the primary source of air pollution.
– Using vegetative screens, barriers, or earth mounds where appropriate to assist in maintaining local ambient air amenity

4.2.1 Recommendations

Based on the requirements discussed above, busy roads should be included in the DCP, so areas that require additional assessment and consideration are readily identified.

5. Conclusions

GHD has reviewed air emissions from the Cross City Tunnel stack (CCTS) and a high-level review of emission sources within the Pyrmont Peninsula.

The SLEP (2012) requires that developments do not adversely affect the dispersal of emissions from the CCTS and that those who use the development will not be unduly affected by those emissions. Provisions outlined in the DCP describe how to demonstrate this.

Areas of Pyrmont Peninsula are within the distance from the stack that potentially requires additional air quality assessment under the DCP, depending on the building height.

A review of critical inputs that influence emissions from the CCTS has been undertaken, including traffic volumes and measured emission concentrations significantly lower than previously assumed.

A new building is under construction directly adjacent to the CCTS, which may influence the plume and adversely affect other buildings or ground level receptors.

The Air NEPM was updated in 2021, which resulted in an approximate reduction in NO_2 of 33% for 1-hour criteria, and 50% for annual criteria.

The assessment found that it is unlikely that CCTS emissions could have any impact on Pyrmont Peninsula meaning that there will not likely be any restrictions for any future building heights and density.

Based on these changes, GHD finds the inputs used in the air quality assessment in the Protocol for COA 274 and subsequently referred to in the DCP to be outdated and refers to air quality goals that are no longer current. It is unlikely that CCTS emissions could have any impact on Pyrmont Peninsula. However, an up-to-date dispersion model and assessment could be undertaken to confirm this and remove the need for individual air quality assessments for future buildings located within the Pyrmont Peninsula and potentially lead to updated Protocol provisions for COA 274 in the DCP.

The main land use conflict in terms of air quality for PP was identified as development adjacent to busy roads and active frontages. It is also recommended that busy roads should be included in the DCP, so areas that require additional assessment and consideration are readily identified.

6. References

Air Quality Assessment Process – Cross City Tunnel Condition of Approval 274 Protocol

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PE 2013 Air Quality Impacts for Redevelopment of 31 Wheat Rd Revised Design, Pacific Environment, August 2013.

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