



AIR POLLUTION IN MELBOURNE'S INNER WEST

TAKING DIRECT ACTION TO REDUCE OUR COMMUNITY'S EXPOSURE

REPORT

MARCH 2020

Inner West Air Quality

COMMUNITY REFERENCE GROUP



Air Pollution in Melbourne's Inner West

Taking direct action to reduce our community's exposure

Acknowledgment

We acknowledge and respect Victorian Traditional Owners as the original custodians of Victoria's land and waters, their unique ability to care for Country and deep spiritual connection to it. We acknowledge the Traditional Owners of the lands within the Brimbank, Maribyrnong and Hobsons Bay municipalities, the Kulin Nation including the Wurundjeri and other traditional owners. We honour Elders past and present whose knowledge and wisdom has ensured the continuation of culture and traditional practices.

ISBN 978-1-76105-048-0 (print)

ISBN 978-1-76105-049-7 (pdf/online/MS Word)

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Decisions relating to this report’s content and recommendations were made by consensus among members of the Inner West Air Quality Community Reference Group and do not necessarily represent the views of individual members.

Abbreviations

CRG	Inner West Air Quality Community Reference Group
DELWP	Department of Environment, Land, Water and Planning
EPA	Environment Protection Authority
Euro I–VI equivalent, Euro 1–6 equivalent	Equivalent to European emission standards. The acceptable legal limits for exhaust emissions of new vehicles sold in the European Union and European Economic Area member states. Arabic numerals refer to standards for light vehicles; Roman numerals refer to standards for heavy vehicles
IAC	Inquiry and Advisory Committee (for the West Gate Tunnel project)
IARC	International Agency for Research on Cancer
MM2	Melbourne Metro 2 rail project
NEPM	national environment protection measure
NO	nitrogen oxide
NO_x	oxides of nitrogen
NO₂	nitrogen dioxide
PFAS	per- and poly-fluoroalkyl substances
PM	particulate matter
PM₁	atmospheric particulate matter (less than one micrometre in diameter)
PM_{2.5}	fine atmospheric particulate matter (less than 2.5 micrometres in diameter)
PM₁₀	coarse atmospheric particulate matter (less than 10 micrometres in diameter). Also includes PM _{2.5} or smaller particle fractions
PoM	Port of Melbourne
OECD	Organisation for Economic Co-operation and Development
OPELs	Officers for the Protection of the Local Environment
SEPP (AAQ)	State Environment Protection Policy (Ambient Air Quality)
SEPP (AQM)	State Environment Protection Policy (Air Quality Management)
SO₂	sulphur dioxide
VCAT	Victorian Civil and Administrative Tribunal
VOC	volatile organic compound
WAA	works approval application
WGTA	West Gate Tunnel Authority
WGTP	West Gate Tunnel project
WHO	World Health Organisation
WorkSafe	WorkSafe Victoria

Foreword

It is an honour to be entrusted as chair of the Inner West Air Quality Community Reference Group (CRG) to enable the production of this Report. Its findings and recommendations have been carefully considered by a dedicated group of community and local government representatives and I want to take this opportunity to thank them all for their diligent attention to this task. We met on twenty-two occasions to address the terms of reference, however, there was a significant amount of additional study associated with the many reports and research studies provided by many experts to prepare this Report. Likewise, I want to thank our Secretariat (a team provided by the Department of Environment, Land, Water and Planning) who have worked tirelessly to assist in the preparation of this Report.

Finally, I want to thank the Victorian Government for commissioning this Report and entrusting this task to community representatives that live, work and play in the Inner West. The special attention required to improve air quality in the Inner West by our state government is an extremely important initiative and welcomed by the community.

Our terms of reference have been achieved. This included:

- investigating the current air quality concerns across Brimbank, Hobsons Bay and Maribyrnong local government areas, including current transport initiatives such as the West Gate Tunnel project, and
- providing advice and recommendations, for Victorian Government consideration, including feasibility and relative importance of any actions to address air quality issues in the inner west, including in relation to tunnel filtration for the West Gate Tunnel project.

A primary focus of the CRG was to identify the source of airborne pollutants which include:

- the thousands of trucks moving through the Inner West daily, with many travelling along residential streets
- pollution, dust and odour from the high concentration of heavy industry, landfills, materials stockpiles and storage sites, and
- West Gate Tunnel construction and operation.

The CRG was tasked with developing recommendations to reduce community exposure to air pollution to secure healthy lives and promote well-being for all who live in the Inner-West. The Report contains 26 recommendations and 65 supporting actions, identifying what is needed to start effectively reducing poor air quality.

Historically, this region has been the focus of industry and shipping that provides employment to the local community. Unfortunately, this legacy has been responsible for a significant deterioration in air quality in the Inner West with its concomitant health consequences. Professor Louis Irving (Melbourne University Health Research Centre/Department of Respiratory Medicine, Royal Melbourne Hospital) provided insight into this problem when he noted that the incidence of lung disease affecting the 20-30 year age group, who have never smoked, was on the rise, with the majority of cases living in the Inner West. Clearly, exposure to various airborne pollutants is a serious risk factor.

Our Report notes the critical importance of air monitoring stations, without which effective decisions to tackle air pollution cannot be made. As researcher Sebastien de Halleux noted: 'We cannot fix what we can't measure, and we cannot prepare for what we don't know'. The Report highlights the need to continue to analyse data from these stations, to install even more stations and to continue air monitoring long after the West Gate Tunnel project is completed.

Our Report identifies barriers within the regulatory and policy environment which continue to reduce the effectiveness of air pollution management actions. The planning chapter identifies opportunities for the planning framework to be strengthened to enable better protection for our community from air pollution.

The CRG suggests short, medium and long-term recommendations without reference to allocation of resources by government to achieve the outcomes. This is because it was beyond the scope of the CRG to access this information.

We look forward to effective government support and action to address our findings and provide a significant improvement in air quality for the Inner West, with the associated benefits to our community's health, amenity and quality of life.

A handwritten signature in blue ink, appearing to read 'Patsy Toop', with a small blue dot to the right of the signature.

Patsy Toop OAM
Independent Chair

Inner West Air Quality Community Reference Group

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Adam Fletcher	Community representative
Alexandra Damasoliotis	Community representative
Bert Boere	Community representative
Chris Dunlevy	Don't Destroy Millers Road representative
Christine Harris	Spotswood and South Kingsville Residents Group representative
Clare Sheppard	Community representative
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Keith Loveridge	Maribyrnong City Council representative
Kristen Gilbert	Brimbank City Council representative
Louise Keramaris	Community representative
Narelle Wilson	Maribyrnong Truck Action Group representative
Valerie Dripps	Community representative

CRG members were selected through direct invitation (council and community group representatives) and a public expression of interest process (community representatives) in order to reflect the diversity of the Brimbank, Hobsons Bay and Maribyrnong communities.



Acknowledgments

The CRG acknowledges our establishing ministers:

Hon. Lily D’Ambrosio MP Minister for Energy, Environment and Climate Change

Hon. Luke Donnellan MP Minister for Roads, Road Safety and Ports (2014–2018)

The CRG also thanks the following ministers for meeting with representatives of the CRG in the lead-up to this report’s submission

Hon. Jaala Pulford Minister for Roads, Road Safety and the Transport Accident Commission

Hon. Jacinta Allan Minister for Transport Infrastructure

Hon. Melissa Horne Minister for Public Transport, Ports and Freight.

The CRG extends its appreciation to the following people for their assistance, as expert presenters and panellists, often out of hours, in helping to help develop our knowledge base for the report:

Dr Andrea Hinwood Victoria’s Chief Environmental Scientist, Environment Protection Authority

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The CRG also wishes to thank the following former members of our group:

Steven Curry	Community representative, stepped down August 2019
Monika Plekic	Community representative, stepped down May 2019
Rob Boyd	Community representative, stepped down June 2019

We also acknowledge:

EPA Applied Sciences Division for providing an analysis of West Gate Tunnel project air monitoring data.

Our three councils **Brimbank**, **Hobsons Bay** and **Maribyrnong** for hosting all our meetings.

Department of Environment, Land, Water and Planning staff for providing liaison, secretariat and coordination services: Lana Kovac, Eve Graham, Michelle McHugh, Kim Daly, Katherine Evans, Kyle Garland, Megan Liddicoat and Kylie Munro.

Ben Neil of Capire Consulting Group for facilitating several CRG discussions.

Melbourne's Inner West: Brimbank, Maribyrnong, Hobsons Bay municipalities



Key			
	Local government		West Gate Tunnel
	Major road		Tunnel entry/exit
	Other road		Tunnel ventilation

Summary

Our family has loved living in Melbourne's Inner West—a diverse, interesting and welcoming community, located close to the beach and city. Really, the only bad thing about living here is something serious and life threatening—the terrible air quality. As the health impacts of diesel pollution become more well known, I am astounded that this problem has taken so long to gain political recognition. I am sick of worrying about what the long-term consequences will be for my children, sick of fighting an issue that residents have fought for decades and sick of trying to make others understand the serious environmental injustice taking place here. It's well and truly time for action.

—City of Maribyrnong resident

Any toxic environmental incident in any of the industrial estates could have a catastrophic ripple effect on people's lives and health. Neglect, through no action on these recommendations, shows no respect for a democratic process of engagement by passionate citizens that represent the three municipalities of Hobsons Bay, Maribyrnong and Brimbank. Our skies, the air that we breathe and the environment that sustains all life are a collective resource, a commons. We want more than hindsight to manage this and avoid a Tottenham, a tragedy of the commons.

—City of Hobsons Bay resident

Introduction

The Victorian Government established the Inner West Air Quality Community Reference Group to do the following:

- investigate the current air quality issues and concerns across Brimbank, Hobsons Bay and Maribyrnong, including current transport initiatives such as the West Gate Tunnel project
- provide advice and recommendations, for Victorian Government consideration, including feasibility and relative importance of any actions to address air quality issues in the inner west, including in relation to tunnel filtration for the West Gate Tunnel project
- ensure its findings are communicated to the communities of the Inner West.

This report offers 26 recommendations for government's consideration. The Community Reference Group has welcomed the opportunity to provide this important input into work on a matter that is central to Inner West communities' health and amenity.

The municipalities of Brimbank, Hobsons Bay and Maribyrnong—Melbourne's Inner West—represent a major residential, business, industrial and cultural hub for Melbourne. Located near important infrastructure, transport links, the Port of Melbourne and Melbourne's CBD, the Inner West is crucial to Victoria's economic development and its social, environmental and cultural fabric.

Inner West communities are exposed to high levels of air pollution, including dust and odour. Industrial and transport emissions are primary contributors. These levels create serious risks for our communities' health, quality of life and amenity.

There are many reasons for this, the main ones being:

- the historical legacy of industrial sites and associated transport hubs in the Inner West and surrounding areas

- our geographic location, which ‘funnels’ large numbers of vehicles through the Inner West, to and from the CBD, the Port of Melbourne, and the eastern, northern and southern suburbs
- the large number of diesel-fuelled vehicles on our roads
- the extensive areas of open and unsealed land (which creates dust), often containing uncovered material stockpiles and linked by unsealed roads
- the historical lack of effective government action to deal with the pollution.

The situation is being made worse by a rapidly growing population, which is increasingly exposed in many locations to industrial and transport emissions. Urban infill is resulting in residential areas becoming ever closer to industrial areas and transport corridors. Further, the warming, drying climate is also heightening risks from bushfires and dust storms, and exacerbating dust from industry, landfills and unsealed roads and sites.

According to Environmental Justice Australia, the Inner West contains two of Victoria’s air pollution ‘hot spots’, Yarraville and Brooklyn, which rank seventh and eighth in Australia for air pollution concentrations.

Poor air quality poses serious risks for human health. It damages respiratory and cardiovascular systems, and is associated with diabetes, cognitive decline and dementia, inflammatory bowel disease, brain tumours and mental health problems. Pollutants such as diesel exhaust emissions are known to be carcinogenic; science is also showing that adverse health effects can occur at lower levels of concentration than previously thought and that even short-term exposure can aggravate existing heart and lung conditions. Older adults, children, pregnant women and people with underlying chronic health conditions are at greatest risk.

The number of pollutants known to cause health risks is increasing as the scientific evidence develops. For example, particulate matter with a diameter of less than one micrometre is of increasing health concern.

People who live and work in the Inner West experience health problems associated with air pollution at a higher rate than the general Australian population. These include higher rates of hospitalisation for heart failure, asthma and heart disease, and a higher incidence of lung cancer. These problems cannot be fully explained by factors such as socio-economic status, smoking rates, obesity levels and age profiles, and air pollution is likely an important contributory factor.

The high current and historical air pollution levels in the Inner West mean the local community has been and continues to be exposed to greater health and amenity risks than many other Victorian communities and strong action is required to protect the community. Effective government intervention will be necessary to bring about change.

Air pollution from sources in the Inner West—particularly motor vehicles and industry—is controllable and the risks to the Inner West community can be mitigated, if not prevented.

Monitoring, analysis and reporting

Accurate, comprehensive monitoring of and reporting on air pollution are crucial to identifying levels, sources and trends that can be used in developing effective, targeted pollution reduction programs.

Pollution monitoring in the Inner West is currently insufficient. There is a particular lack of monitoring at potential ‘hot spots’ such as main roads, freight corridors and adjacent to industrial sites.

The Environment Protection Authority operates only three long-term monitoring stations in the Inner West. These aim to represent ambient air pollution, and so are situated away from major roads, which means there is no long-term monitoring where pollution levels are likely to be at their highest. There are six temporary air pollution monitoring stations, commissioned by the West Gate Tunnel project. There is limited monitoring for sulphur dioxide, nitrogen dioxide, carbon monoxide and ozone. No monitoring is done for ultrafine particulate matter, which is a known risk to human health.

Although limited, the monitoring that does take place shows that air pollution is a widespread and alarming problem in the Inner West.

For example, in 2019 Victorian standards for particulate matter were regularly exceeded at the majority of monitoring stations. There were between four and eight days on which PM_{2.5} concentrations exceeded the 24-hour objective of 25 µg/m³, and between seven and 41 days when PM₁₀ concentrations exceeded the 24-hour objective of 50 µg/m³. Also, in 2019, average annual PM_{2.5} and PM₁₀ concentrations exceeded the Victorian objectives for these at the majority of Inner West monitoring stations. Detailed information and analysis is provided in Appendix D, which also has comparisons with results from monitoring stations in the CBD and Alphington.

Air quality objectives themselves are not sufficient to protect community health and amenity. Many of the current Victorian objectives are much lower than those in leading international jurisdictions, and there is no apparent government goal to make all objectives equivalent to international best practice.

Because they are non-statutory and are measured at only a limited number of monitoring sites, air quality objectives have a limited impact on driving major polluters to take meaningful action to reduce emissions.

At most sites, West Gate Tunnel project reporting compares monitored emissions with 'intervention levels' rather than reporting objectives. Intervention levels are more lenient than the objectives, being set 20 per cent higher.

To help the Inner West community limit its exposure to and risk from air pollution, it is vital that it is provided with more comprehensive air quality reporting, in accessible formats and in plain English. Current reporting is primarily on websites, which are not accessible for many community members, and the language in the reports is highly technical. Many Inner West residents are not able to obtain air quality information they can understand and act on.

Further, there is no targeted education campaign in the Inner West to explain the health risks posed by poor air quality or action people can take to protect themselves from it.

The Community Reference Group makes four recommendations in relation to improving the monitoring of and reporting on air quality and increasing community awareness.

The regulatory and policy environment

Effective government policy and regulation, and action to ensure compliance, are central to reducing Inner West air pollution.

These apply to all regulation and policy associated with management of air pollution, among them environment protection, transport, planning, public health and wellbeing, occupational health and safety, and emergency management. Aspects of the current regulatory and policy environment, including gaps and loopholes, can limit effective action to manage and reduce air pollution.

For example, there is a functional 'disconnect' between air quality regulators and public health authorities. This is exemplified in the Victorian Public Health and Wellbeing Plan, which has no focus on reducing air pollution despite the large body of evidence on the adverse health effects of poor air quality.

The process for developing policy, legislation and regulation does not provide for sufficient weighting of human health and community amenity benefits. Consideration of economic impacts is given priority over these.

The Victorian Government is reforming the state's environment protection framework, introducing a preventative approach to managing pollution underpinned by a 'general environmental duty' that requires Victorians to take reasonably practical measures to prevent pollution occurring. This is vastly preferable to the approach applied to date, which often focuses on responding to pollution only after it has occurred. Adequate funding and resourcing of the Environment Protection Authority and other authorities will, however, be required so the new powers and tools can be used to best effect.

National laws can restrict Victoria from taking a stronger approach to air pollution management. For example, the main provisions controlling transport-related emissions are set through national emissions standards, fuel quality standards and the National Heavy Vehicle Law. For shipping fuel standards, they depend on an international convention.

If national policy and statutory frameworks are to better deal with air pollution risks, the Victorian Government has a clear role in advocating for improvements.

The Community Reference Group makes four recommendations in relation to improving policy and statutory frameworks governing air quality.

Transport emissions

The Inner West is subject to disproportionate levels of air pollution from transport emissions, especially from trucks. The area is a transport, industry and logistics hub and is close to other major hubs such as the Port of Melbourne. A growing population and increasing urban density, industrial activity and commuter traffic, including future increases in Port of Melbourne activity, are causing its adverse health and amenity impacts on the Inner West community to become worse.

An increasing number of trucks are moving throughout the Inner West each day, many of them using residential streets and going through community areas—past schools, kindergartens, aged-care facilities, shops and recreational facilities. Many are older, more polluting vehicles: the average age of Australia's heavy vehicle fleet is 14.8 years.

In the absence of any action, the adverse effects of increased transport air pollution will continue to grow. For example, the opening of the West Gate Tunnel will result in increased traffic along the tunnel's feeder roads, and truck traffic associated with the expansion of the Port of Melbourne is forecast to grow from about 11,000 trips each weekday in 2016 to 34,000 in 2050.

Of particular concern are the impacts resulting from diesel emissions, which are carcinogenic. There is no safe level of exposure to these. About 80–95 per cent of diesel particulates are PM₁, or ultrafine particulate matter, which is particularly damaging to health. Exacerbating this situation are Australia's fuel quality and vehicle emission standards, which are among the poorest in the OECD. The Commonwealth Government is not taking effective action to improve these standards.

Additionally, there are no effective processes for ensuring that in-service vehicles are maintained in such a way as to comply with vehicle emission standards.

The West Gate Tunnel will emit concentrated streams of exhaust air through two ventilation stacks, with these emissions contributing to an overall increase in local airshed pollution. The Inquiry and Advisory Committee for this project recommended that ventilation stack filtration be added to reduce air pollution emissions, but the Victorian Government decided filtration will be retrofitted only if monitoring shows that air pollutants reach undefined 'trigger' levels. The increased airshed emissions will pose unknown risks for local communities.

Tunnel construction is already causing unacceptable air quality problems, including elevated levels of dust (some of which may contain pollutants of concern, such as PFAS, asbestos, lead, mercury and arsenic), emissions from on-site machinery and idling vehicles, and increased traffic congestion.

Access restrictions for heavy vehicles are planned for some Inner West roads once the West Gate Tunnel has opened. This will, however, probably cause increased traffic and pollution effects for other roads, especially feeder routes such as Millers Road in Brooklyn (4,500 extra trucks projected a day), Williamstown Road, and to and from a new ramp on Hyde Street, Spotswood. There is also a risk that drivers will choose new routes through Spotswood, Williamstown, Newport and Yarraville to avoid tolls.

The Port of Melbourne is another major source of air pollution. Its operations generate large volumes of particulate matter and sulphur dioxide from shipping, onshore diesel machinery and inward and outbound trucks. The port's proximity to the Inner West and its future expansion plans mean it will continue to have major impacts.

The Community Reference Group makes six recommendations in relation to reducing transport emissions.

Industrial emissions

Industry makes a disproportionately high contribution to poor air quality in the Inner West. The area contains 18 per cent of Melbourne's industrially-zoned land. There are some plans to reduce the impacts of heavy industry on the community—for example, through the Brooklyn Evolution Strategy, which was developed to change this precinct's zoning from heavy industrial to light industrial over 20 years—but implementation is occurring too slowly.

Air pollution is very common near industrial areas such as the Brooklyn Industrial Precinct and Altona North, where residential development has been encroaching on industrial areas.

In 2018–19 there were 22 days when dust levels in Brooklyn exceeded Victorian air quality objectives. In 2019, EPA and West Gate Tunnel project monitoring stations near Brooklyn showed exceedances of PM₁₀ objectives for between 26 and 41 days. This has been a long-term problem: for example, the standard was exceeded 40 times in 2009–10.

As well as being a pollutant that has health impacts, dust has major deleterious impacts on amenity; for example, cement dust from rock-crushing plants can clog guttering and cause structural damage to homes and vehicles.

Industrial sites can also cause odour problems, which have serious impacts on community amenity. Residents of Brooklyn, Altona North, Yarraville and South Kingsville are severely affected by odour from the Brooklyn Industrial Precinct. Constant exposure affects people's health, wellbeing and lifestyle, restricting outdoor activity and generally creating an unpleasant environment. In the Community Reference Group's view, odour-causing facilities are not doing enough to control their emissions, and better EPA action in response to community reports of odour is essential.

Sulphur dioxide, which has damaging effects on respiratory health, is released from shipping operations, chemical industries and refinery operations. Licence limits can control this but can also be set very high: for example, one major refinery in the Inner West is licensed to emit over 6,000 tonnes of sulphur dioxide a year.

The Community Reference Group has identified a number of other air quality risks posed by industrial land:

- Landfill operations do not always take due care to prevent emissions, especially of dust and odour, and compliance with planning permit conditions and licence requirements is not always effectively policed.
- Unsealed roads, driveways and industrial sites are a major source of dust. Although some efforts have been made to resolve this (such as the partial sealing of Jones and Bunting Roads in Brooklyn), many unsealed areas, including road verges, remain.
- Storage sites for shipping containers appear to be proliferating in and around the Inner West because of the area's proximity to the Port of Melbourne. Storage sites are often on unsealed land, where heavy vehicles and general site activities lead to large amounts of dust.
- Stockpiling of materials such as waste soil and industrial chemicals often appears to be poorly managed. The stockpiles can create wind-blown dust (which may include unknown hazardous chemicals). Toxic emissions can also occur from industrial fires and other accidents. Given the often-unknown composition of waste materials and industrial chemicals, these can cause significant health risks to the community.

The EPA carries out inspections of industrial sites to assess compliance with licence requirements and in response to community complaints, yet pollution persists. Compliance action is not meeting community expectations. It appears that the onus for reporting and proving instances of pollution is often placed on the community or councils rather than the EPA or industry. The EPA needs to increase the number of its inspections and improve its responsiveness to community complaints. Compliance efforts should be more streamlined and transparent.

The Community Reference Group makes seven recommendations in relation to reducing industrial emissions, dust and odour.

Planning

The Victorian planning system offers limited capacity for effectively controlling air quality. Air quality requirements are difficult to apply effectively and to enforce through planning permits and conditions, and the planning system is biased towards achieving economic benefits.

‘Existing use rights’ can enable a landowner to keep undertaking activities, even if these impact local health or reduce local amenity, making it difficult to address and reduce such sources of air pollution. For example, many sites in the Brooklyn Industrial Precinct received their planning permits over 25 years ago, if they received permits at all. However, because use of the sites has continued for longer than 15 years, site owners are considered to have ‘existing use rights’, enabling them to continue with polluting activities that would not be allowed under a planning permit issued today.

Rather than matters relating to amenity being open to interpretation, the Community Reference Group considers it should be made clear that if there are any potentially adverse health or amenity impacts associated with an industrial use—regardless of how minor those impacts might be—a planning permit should be required so that some control can be exercised over this. Decisions regarding amenity matters should not be left to a council planner, as this can potentially result in disputes with an applicant, or even referral to the Victorian Civil and Administrative Tribunal (VCAT) to seek a determination.

Given the significant volume of air pollution from traffic, the Community Reference Group understands that the location of sensitive-use facilities close to major road corridors is creating difficulties for local government planning departments. VCAT recently decided to allow a childcare centre to be built on the corner of Williamstown Road and Francis Street in Yarraville, despite Maribyrnong Council’s objections due to concern of the health impacts to vulnerable children, highlights the barriers the planning system can pose when it comes to reducing health risks. In its determination of this application, VCAT failed to recognise a problem with air quality at what is possibly one of the most polluted intersections in Melbourne.

An amendment to the Planning Policy Framework to specify separation distances would remove all uncertainty for developers and provide clear indications for the location of all future sensitive-use facilities.

The Community Reference Group makes five recommendations in relation to improving the ability of Victoria’s planning system to reduce air pollution.

Next steps

The Community Reference Group awaits the Victorian Government’s careful consideration of our findings and recommendations, and its formal public response to these. The Community Reference Group expects the government will release a response to this Report within six months and, shortly thereafter, an action plan articulating how it will respond to the recommendations. We also expect the government to provide regular, public reporting on progress against its commitments. This will be crucial to keeping the community informed of progress to reduce hazardous air pollution in Melbourne’s Inner West and its impacts on our health and amenity.

Recommendations

This is a list of all our recommendations to reduce air pollution and improve the health and amenity of the Inner West.

In line with our Terms of Reference, we have considered the relative importance of these recommendations. Although we strongly recommend that the Victorian Government act on each one, there are several which are particular priorities, addressing key air pollution problems. **All priority recommendations are shown in bold text below.**

Recommendations have also been classified as:

Short-term	Likely to be able to be implemented in the next one to two years at limited or no additional cost to government
Medium-term	Likely to be able to be implemented in three to eight years and will require additional government investment
Long-term	Likely to require eight or more years and significant government investment before recommendation can be actioned

Monitoring, Analysis and Reporting

That the Victorian Government:

Medium-term 3.1 Increases the level of, and access to, Inner West air quality monitoring and information. [Priority]

Through actions such as:

- permanently transferring WGTP monitoring stations to the EPA
- utilising air quality modelling and forecasting processes to complement the monitoring network
- publicly and promptly reporting actions taken in response to significant instances of air pollution, such as industrial fires
- implementing a representative monitoring network, including for key pollution locations such as major roads, the West Gate Tunnel and industrial sites
- publishing all information in as close to real time as possible and maintaining historical data, on a single website
- utilising lower cost monitoring sensors to complement permanent monitoring stations where appropriate to achieve more representative monitoring coverage of the Inner West
- reporting all data in 8-minute, 1 hour, 24-hour and annual average increments

- Medium-term 3.2 Implements an air pollution education campaign to improve Inner West communities and visitors' knowledge of the health risks from local air pollution and what can be done to address and avoid these. [Priority]**
- Actions to achieve this could include:
- creating a phone app (like an upgraded version of AirWatch) to alert local populations of levels of air pollution and specific actions that can be taken, depending on severity
 - using multiple communication tools to target the diverse communities of the Inner West
 - using innovative tools such as environmental health tracking, a community impacts scorecard and/or an Inner West air quality map, to provide information on local pollution levels and their health impacts
 - for the top ten of these pollutants (based on community health risk) demonstrating how premises emitting them will be made to be compliant with their environment protection statutory obligations
 - publishing a comprehensive and transparent list of all major organic compounds emitted as air pollutants by Inner West industrial premises (on the AirWatch website)
- Medium-term 3.3 Identifies pollutants of emerging scientific concern to the Inner West, including PM₁ and ultrafine particles, to inform policies, legislation and programs to manage them.**
- Through actions such as:
- funding epidemiological studies to better understand likely community exposure and health risks
 - identifying ways to effectively monitor and report these pollutants
 - setting reporting standards for these pollutants
- Short-term 3.4 Considers the cumulative impact of historic Inner West community exposure to air pollution when making decisions regarding planning applications, developments and other initiatives, and applies more stringent actions in this area to drive down air pollution.**

The Regulatory and Policy Environment

That the Victorian Government:

Medium-term 4.1 Builds on the reforms to the environment protection framework, ensuring its policy, strategy and statutory framework development, and decision-making, prioritise addressing the health impacts of Inner West air pollution. [Priority]

Through actions such as:

- committing to ongoing funding and expansion on the number of OPLE roles or similar in the Inner West, enabling them to:
 - o respond to air pollution complaints in a timely manner
 - o reduce air pollution risks through prevention and community and industry education
- reviewing other statutory frameworks impacting on air quality management, to assess opportunities for complementary strengthening, including addressing inconsistencies, gaps and loopholes
- including air quality as a priority in the next Public Health and Wellbeing Plan (Vic) and requiring consistent and complimentary Inner West municipal health plans
- improving cooperation between agencies with air quality management, including reporting, responsibilities
- ensuring Inner West air quality solutions are a key focus in the Victorian Air Quality Strategy
- engaging effectively, proactively and transparently with the community wherever appropriate

Medium-term 4.2 Commits to ongoing funding of local medical resources specialising in addressing health risks from air pollution, commensurate with the enhanced risks to Inner West communities.

Medium-term 4.3 Undertakes a health risk assessment of the public health impacts caused by air pollution in hot spot areas in the Inner West, including the Brooklyn residential precinct.

Short-term 4.4 Ensures the environmental and social requirements of the *Transport Integration Act 2010* are upheld such that transport and land use authorities work together to achieve an integrated and sustainable transport system in the Inner West.

Transport

That the Victorian Government:

Medium-term 5.1 Develops a comprehensive policy to drive uptake of low and no emission vehicles, and reduce transport emissions, with a focus on the Inner West. [Priority]

This could accommodate the following actions:

- introducing a low emission zone bounded by Grieve Parade, Geelong Road, Kororoit Creek Road and Whitehall Street. Initially, more polluting vehicles should be banned from entering the zone for three hours per day, and immediately before and after core child care, kindergarten and school hours. Over time the ban should be increased to 24-hours. Introduction of the zone should be complemented by measures to support vehicle owners to upgrade to less polluting vehicles
- incentivising businesses - particularly freight operators - to upgrade fleets to incorporate vehicles that are, at a minimum, Euro 5 / V equivalent or use alternate fuels
- only entering public transport contracts with bus operators that stipulate the use of low and no emission vehicles, for example electric buses
- facilitating the movement of freight from road to rail, including fast tracking the Port Rail Shuttle project and identifying if this can be expanded, and working with the Port of Melbourne to enable rail to Webb Dock
- changing its procurement requirements to ensure all other vehicles used for Victorian Government services and projects are, at a minimum, Euro 5 / V or equivalent compliant or utilise alternative fuels
- investigating other ways to drive greater uptake of alternative fuels

Medium-term 5.2 Develops a comprehensive, evidence-based policy to minimise air pollution associated with the WGTP both during construction and once the tunnel opens. [Priority]

Actions should include:

- installation of green walls - using technology such as the Jungleyf Breathing Wall modules - along the West Gate Freeway between Millers and Melbourne Roads and along the section of Millers Road north of the Freeway
- measures to ensure the operation of the tunnel project does not encourage increased truck traffic on feeder roads through residential communities – particularly along Millers and Williamstown Roads. This could be done, for example, by ensuring trucks are redirected through industrial areas and providing alternate heavy vehicle routes (e.g. through the upgrade of Grieve Parade through to Market Road and upgrade of Paramount Road route) and enforcing bans or restrictions
- anti-idling requirements for vehicles involved in WGTP construction

- action on the IAC's recommendation to install filtration on the tunnel ventilation stacks. Filtration should be installed prior to the tunnel opening
- a requirement that the WGTP plants replacement trees as near to their original location as possible. (e.g. near Primula Avenue, Millers Road and Grieve Parade, and along the West Gate Freeway corridor)
- installation of fixed barriers to shield sensitive uses from traffic pollution, particularly on the Hyde Street on-ramp in Spotswood, adjacent to the Emma McLean Kindergarten
- explore opportunities to better protect existing sensitive uses exposed to significant air pollution sources (e.g. new highways or major roads), such as through installation of on-site monitoring, installation of on-site filtration systems, and/or protection and regeneration of trees and wildlife, funded, for instance, through increasing road tolling charges.

Long-term **5.3** **Prioritises improvements to public transport in the Inner West (including better integration between modes). [Priority]**

Actions could include:

- reopening the Paisley and Galvin train stations
- fast-tracking the MM2 project
- increasing frequency and coverage of bus routes in the Inner West and regularly reviewing to ensure access is maximised
- improving passenger facilities (e.g. bike parking) at train stations in the Inner West
- expanding the MM2 project to include
 - the upgrade of the existing freight line between Newport and Sunshine to accommodate passenger services (e.g. electrification and widening of the rail-line)
 - the opening of new stations at locations such Altona North/South Kingsville and Brooklyn
 - developing and implementing access plans for all Inner West train stations to further encourage patronage.

Medium-term **5.4** **Advocates to the Commonwealth to implement measures that will improve air quality in the Inner West.**

Through actions such as:

- promoting and enabling greater use of alternative fuels and low and no emission vehicles to replace use of diesel and petrol-powered vehicles through e.g. a national plan, incentives and/or disincentives for manufacturers and end-users
- strengthening the eligibility criteria for the Federal Diesel Fuel Tax Credit Scheme to ensure the rebate is only provided for newer, less polluting heavy vehicles

- strengthening fuel quality standards to bring them in line with Australia's trading partners, reducing sulphur content in vehicle fuels to 10ppm or lower
- strengthening vehicle emission standards for heavy vehicles by:
 - requiring that all new heavy vehicles meet, at a minimum, Euro VI equivalent standard.
 - monitoring in-service heavy vehicles in the Inner West to make sure they continue to meet air emission standards
- reducing train emissions by
 - implementing diesel locomotive standards by requiring that all freight locomotives meet the equivalent of the US Tier 4 standard
 - identifying opportunities to promote the adoption of electric trains

Medium-term 5.5 Works with the Port of Melbourne to develop a Clean Port Program. [Priority]

Actions which could incorporate:

- an environmental charge, bans or restricted access to the port for older more polluting vehicles
- financial incentives e.g. discounted berthing fees for 'cleaner' ships with newest engines or equivalent NOx reducing technology
- on-shore electrical power so ships do not need to use diesel generated power while berthed
- electrifying or utilising hybrid fuel systems for port operations such as ship to shore cranes and gantry cranes
- establishing air quality improvement targets, and regular monitoring and reporting of air pollutant levels, from the Port of Melbourne
- working with the Australian Government to enable EPA to have jurisdiction over the development and implementation of Port of Melbourne environment protection controls

Medium-term 5.6 Facilitates all levels of Government to develop targeted 'polluter pays' incentives to fast track air quality improvements and produce resources required to implement this report's recommendations and meet clean energy targets.

Actions could include:

- a new tax or levy for diesel and other polluting fuels, including those used to transport shipping containers, power cruise ships, and manufacture plastics

Industrial emissions

That the Victorian Government:

Medium-term 6.1 Fast tracks implementation of the Brooklyn Evolution Strategy 2016 long term framework plan, providing the necessary support for local government, community and industry to achieve the Strategy's aims. [Priority]

Medium-term 6.2 Provides appropriate resourcing to the EPA to enable it to use its strengthened tools and powers. [Priority]

Short-term 6.3 Identifies and eliminates sources of dust emissions. [Priority]

Actions could include:

- ensuring any industrial and commercial sites with significant vehicular traffic, such as container parks, be sealed
- identifying and sealing roads and verges
- the use of wheel wash facilities for heavy vehicles
- require that all crushing operations be enclosed to contain all dust

Short-term 6.4 Requires that the EPA prioritise its strengthened statutory tools and powers to ensure Inner West industrial premises comply with their air pollution management obligations.

Actions could include:

- implementing a risk-based approach, focusing on premises creating greater air pollution, dust and/or odour risks to human and environmental health and amenity
- commencing with such premises in the Brooklyn Industrial Estate and other major Inner West air pollution emitters, ensuring:
 - o full compliance with all works approval, licence and other permit conditions, general duty obligations and compliance notice obligations, including for major organic compounds being emitted
 - o instances of non-compliance are addressed within three months of their identification
 - o appropriate industry guidance documentation and other information / advice provided
 - o air pollution monitoring and reporting requirements are introduced to enable EPA to assess levels of emissions and compliance with any licence limits
 - o appropriate and regular inspection and/or independent auditing of compliance is undertaken
 - o communities and local governments are supported to effectively comment on draft new or amended works approvals, licences or other permissions, including through provision of adequate technical expertise and increasing formal referrals to local

governments

- dust and odour emissions are treated at source and contained within site boundaries
- undeveloped and/or unoccupied industrial sites are appropriately secured and maintained to prevent emissions

- identifying where it is appropriate to use other new statutory powers (e.g. requiring development of Better Environment Plans) to eliminate emissions of air pollution, and implementing actions to ensure their effective use

Long-term	6.5	Moves existing industrial premises that create substantial air pollution, including dust and/or odour, out of the Inner West to areas where their emissions will have minimal or no impact on local communities. Crushing plants, demolition and materials handling facilities, and materials stockpiles should be prioritised.
Long-term	6.6	Reduces the major risks landfills pose to local air quality. Actions should include: <ul style="list-style-type: none">- not allowing landfills to rise above natural surrounding ground levels and being filled beyond permitted capacity- identifying appropriate means to rapidly fill Altona North landfill with clean fill- monitoring and enforcing landfill environmental management requirements
Short-term	6.7	Assesses the feasibility of transforming the former wholesale fruit and vegetable market on Footscray Road into a container park, to reduce the proliferation of such parks in the Inner West and associated haulage of containers to and from them.

Planning

That the Victorian Government:

- Medium-term 7.1 Amends the Planning Policy Framework to support development of consistent and appropriate local planning policies to improve environmental and amenity outcomes to better protect the community from transport, commercial and industrial induced air pollution.
- Actions could include:
- ensuring that sensitive-use facilities, such as childcare centres, schools, aged care facilities and hospitals, are located at specified distances from existing air polluting industries and major transport corridors, including air, road and rail. The specified distance from transport corridors will be determined by scientific evidence related to vehicle numbers, pollution levels, type of vehicle (truck/car/diesel train), with the specified distance incorporated into the local planning policies of Councils in the Inner West
 - supporting Planning Schemes in the Inner West requiring planning permits for the establishment of all shipping container storage and handling sites, and review and strengthen the decision guidelines (VPP 53.07-1) to reduce on and off-site emissions and reduce the proximity to sensitive use facilities including residential zones
 - supporting development of consistent and appropriate local planning policies in the Inner West to improve environmental and amenity outcomes that include Best Practice Industrial/Commercial Land Use Guidelines and landscaping requirements for industrial and commercial sites.
- Medium-term 7.2 Reviews and amends the planning framework, including the *Planning and Environment Act*, to strengthen enforcement powers and penalties for breaches of Planning Permit conditions relating to offsite emissions, including air pollution and that any fines and penalties arising from breaches of the Act be directed to local environmental improvements.
- Medium-term 7.3 Reviews and amends 'as of right' provisions to stop existing land uses creating excessive air pollution, with a particular focus on premises that do not meet current setback/buffer/siting planning requirements.
- This could be done by:
- providing subsidies or incentives to operators/land owners to support change of use or updating existing facilities or practices to bring them up to current planning system requirements, or negotiating early departure from the sites

Medium-term	7.4	Requires industries that emit a high level of air pollutants to establish ongoing air quality monitoring and reporting as mandatory planning approval requirements.
Long-term	7.5	<p>Prioritises actions in <i>Plan Melbourne 2017-2050</i> that will assist to enhance air quality outcomes, particularly:</p> <ul style="list-style-type: none"> • Direction 6.6 - Improve air quality and reduce impact of excessive noise • Direction 3.4 - Improve freight efficiency and increase capacity of gateways while protecting urban amenity • Direction 5.1 - Create a city of 20-minute neighbourhoods • Direction 1.1 - Create a city structure that strengthens Melbourne's competitiveness for jobs and investments including • Policy 1.1.3 - Facilitate the development of national employment and innovation clusters

1 Introduction

With an area of 220 square kilometres and a population of about 398,000, the Inner West is a major residential, business, industrial and cultural hub for Melbourne. Its population is expected to increase to about 505,000 in 2041, an average annual increase of 1.1 per cent.*¹

Our dynamic municipalities are crucial to Melbourne and Victoria's economic development and their social, environmental and cultural fabric. The Inner West community is highly diverse, and about 37 per cent of residents were born overseas. The area offers unique cultural festivals, a vibrant arts and music scene, and authentic food from all areas of the globe.

The Inner West is located near important infrastructure such as Melbourne and Avalon Airports, the Ports of Melbourne and Geelong, Melbourne's CBD, the national rail network, the West Gate Freeway and other major arterial roads. It is home to a broad range of business types and sizes, including manufacturing industries, petrochemical companies, a growing transport and logistics sector, a dynamic construction industry, and postal and warehousing businesses. It has active local retail, community service, local government and tourism sectors. Together, these enterprises created more than 170,000 jobs and contributed 4.8 per cent to Victoria's gross state product in 2017–18.²

The area is also home to diverse natural landscapes and recreational opportunities - its coastline, views of the Melbourne skyline, sailing on Port Phillip Bay, the Maribyrnong River, and hundreds of wetlands, waterways, parks and gardens, including a well-designed trail network to provide easy access to these facilities for walkers and riders.

Despite all these positives, there are problems that reduce the amenity and liveability of Inner West communities and adversely affect the health of Victorians who live or work in the area.

One major concern is the continuing impact of air pollution, dust and odour, especially from industrial areas, port activities, infrastructure development, logistics hubs and the freight routes that carry millions of vehicles through the Inner West every year, as well as incidents such as toxic industrial fires and the regular dumping of dust during windy weather.

Air pollution is disproportionately spread across the Melbourne metropolitan area, and it is generally worse in the Inner West than elsewhere. Environment Protection Authority monitoring shows that, since 2010-11, there have been 297 instances of air quality exceeding reporting standards across the metropolitan area as a whole, with 201 (71 per cent) of these in the Inner West.[†] Recent analysis of data from six additional monitoring stations established for the West Gate Tunnel project shows poor air quality is widespread across the Inner West. During 2019, the average annual particulate matter concentrations exceeded the government's objectives at five of the seven Inner West monitoring stations for PM_{2.5} and seven of the eight monitoring stations for PM₁₀.

The number of pollution reports to the EPA about poor air quality in the Inner West is also disproportionate for the city as a whole. For example, in the past nine years the EPA has received an average of 463 pollution reports a year about odour from the Brooklyn Industrial Precinct. In 2018-19 alone there were 597 such reports - 15 per cent of all odour reports from the state.³

According to Environmental Justice Australia, Yarraville and Brooklyn are Victoria's air pollution 'hot spots', ranking seventh and eighth in Australia for air pollution concentrations.⁴

* The population for Victoria as a whole is forecast to increase at a rate of between 1.0 to 1.7 percent per annum <https://www.abs.gov.au/AUSSTATS/abs@.nsf/7d12b0f6763c78caca257061001cc588/d2477d6e8c372faaca257c2e001723e4!OpenDocument>
[†] At EPA's two permanent monitoring stations in Footscray and Brooklyn.

Major incidents continue to affect air quality and community health. For example, in August and September 2018 a West Footscray warehouse containing hazardous chemicals burned for a week. This has had a long-term impact: firefighters were still reporting health effects in late 2019.

Industrial and transport emissions are of central concern and make substantial contributions to the Inner West's air pollution burden.

The large amount of industrial land in our municipalities presents a major air pollution, dust and odour risk. The total area zoned industrial is 4206.4 hectares across the Inner West. Brimbank alone has 2076 hectares, which is almost eight percent of the entire industrially zoned land in the metropolitan area.⁵ Other large industrial sites are also spread across the Inner West.

Being close to both the CBD and the Port of Melbourne makes the area an important and growing hub for goods distribution and associated logistics.

The area's location, between the rapidly growing outer western and south-western suburbs and Geelong, and the CBD, means it experiences heavy commuter traffic. This involves growing numbers of vehicles, including diesel-fuelled trucks, travelling to, from and through the Inner West daily, including along many residential streets.

One in four Australian vehicles - and almost all heavy vehicles - uses diesel fuel.⁶ Diesel exhaust emissions pose a serious health risk: they are classified as a Group 1 carcinogen and there is no safe level of exposure to them.^{7,8} Exacerbating these effects are Australia's fuel quality and vehicle emission standards, which are among the poorest in the OECD.

The West Gate Tunnel, now under construction, will add to this problem. Its design, which does not incorporate air pollutant filtration, will lead to increased emissions in the Inner West airshed. Construction is causing unacceptable impacts from airborne dust, construction vehicles and machinery. Soil being extracted for the tunnel contains hazardous contaminants such as PFAS (per- and poly-fluoroalkyl substances), which can be dispersed in wind-blown dust. When the tunnel is operational, traffic and air pollution impacts will become worse along nearby 'feeder' routes such as Millers Road and Williamstown Road.⁹ The risks associated with the tunnel are specifically acknowledged in the CRG's terms of reference (see Appendix A), which require us to provide advice and recommendations in relation to the tunnel's filtration.

Inner West air pollution monitoring is inadequate. The EPA has only two long-term monitoring stations in the area and both are situated away from major roads. This means Inner West pollution levels are not being accurately measured. One of the stations monitors only for coarse particulate matter (PM₁₀); neither monitors for sulphur dioxide, PM₁ or ultrafine particulate matter. There is no way to understand air pollution levels and the risks to Inner West communities without more thorough monitoring.

Reasons for air pollution in the Inner West

The Inner West's high levels of air pollution, particularly that from industrial and transport emissions, are the result of a range of factors, principally:

- a history of industrialisation and growing transport emissions
- a lack of public transport infrastructure and services
- a rapidly growing population
- the design of Melbourne's metropolitan road network, funnelling thousands of commuters through the Inner West on their way to and from the city
- historically, a lack of government action to deal with air pollution sources and impacts in the Inner West
- proximity to the Port of Melbourne and the resulting freight movements and storage.

One example demonstrating the historic lack of action in responding to air quality risks in the Inner West is the response to the Coode Island chemical fire in 1991. Coode Island, at the junction of the Yarra and Maribyrnong Rivers, has historically contained a number of chemical storage facilities. The 1991 fire consumed about 8.5 million tonnes of chemicals and created a cloud of pollution. Fortunately, the pollution was dispersed by winds. Proposals were subsequently made to transfer the facility to an alternative location, but these have never borne fruit.

As recently as March 2018 Victoria's Auditor-General made a series of findings and recommendations in relation to improving the state's air quality.¹⁰ His recommendations - particularly those dealing with expanding air quality monitoring, improving the quality of reporting on air quality, and dealing with air quality problems at the Brooklyn Industrial Precinct - are directly relevant to the Inner West.

Scattered throughout this report are photos from CRG members, their families, friends and neighbours, documenting the impacts air pollution, dust and odour have on their day-to-day lives. The impacts of air pollution, dust and odour remain confronting and distressing and must be tackled. Our communities have been fighting for effective action for decades, and it is now time for the government to heed our recommendations. This report details what the CRG considers should be done.

'I've given up on the idea of growing my own food. I'm really worried about the particulates that fall on the plants and the soil, and the fact that my family could end up eating cancer causing chemicals.'

Lisel, mother of 2, Yarraville Resident

Report structure

The report is structured in such a way as to help the government and Inner West communities clearly understand the following:

- the risks from air pollution (including dust and odour) and why action to reduce it in the Inner West must be taken
- the primary sources of Inner West air pollution - especially the industrial and transport sectors
- levels of air pollution occurring, including data from six additional air quality monitoring stations established for the West Gate Tunnel project
- the historic and continuing failure to take effective action on air pollution through:
 - limitations in the regulatory and policy environment - including planning frameworks
 - a lack of effective monitoring and understanding of pollution levels
 - a lack of enforcement of current laws and inadequate resourcing to ensure compliance
 - a lack of will and resourcing to implement effective programs and policies to seriously tackle air pollution
- opportunities to take effective action to greatly reduce Inner West air emissions and their impacts - through the CRG's recommendations.

Reforms to statutory controls, and making better use of those controls, are required, as well as direct action on major pollutant sources. The report therefore covers:

- monitoring and information provision
- Victoria's regulatory and policy environment
- industry, dust and odour emissions

- transport emissions - including the West Gate Tunnel project and associated works
- the planning framework
- next steps
- recommendations, with priorities, for short-, medium- and longer-term implementation.

In each chapter the CRG provides background information to demonstrate the air pollution problem, a range of findings on the matters of concern, and recommendations for action to respond to air pollution levels and impacts. Many recommendations have associated actions providing suggestions or examples of what could be done.

Report development process

We developed this report through an iterative, evolving process that included the following:

- clarifying our function and purpose through the terms of reference
- meeting 22 times as a CRG and at other times as sub-committees developing individual report chapters
- extending our knowledge, testing our views and developing a shared understanding of air pollution and likely sources, including through inviting air quality experts (see the Acknowledgments and Appendix B) to inform us on:
 - air pollution sources and health impacts
 - statutory and policy environments
 - best practice in managing air pollution risks
 - how the EPA manages air pollution risks
 - air quality monitoring
 - industrial and transport emissions
 - opportunities to use the planning framework to cut emissions
 - reviewing analysis of air quality monitoring data collected from four EPA and six West Gate Tunnel project monitoring stations and determining what this demonstrates as to actual air pollutant concentrations.

How we expect government to respond to our recommendations

This report's recommendations cover the main sources of pollution. When the recommendations are adopted, emissions and associated health risks should soon begin a downward trajectory.

We trust that the Victorian Government will give careful consideration to the recommendations and provide a formal response, including a comprehensive action plan detailing what will be done, and when, to give effect to the proposals. We expect the government to provide regular, public reports on progress against its commitments.

Although this report is not exhaustive, its recommendations do provide the underpinning for comprehensive, effective and sustained action to start reducing the burden of air pollution in the Inner West.

The future

The CRG wishes to stay involved as the government delivers on our recommendations. We are keen to work with the government on implementation of the recommendations, as well as to monitor the effectiveness of its actions and identify further opportunities to drive down air emissions. Chapter 8 provides further details in this regard.

Notes

¹ .id local area population projections, available via <https://forecast.id.com.au>

² .idCommunity (2018) *The National Economic Indicators Series* <<https://economic-indicators.id.com.au/?StateId=2>>

³ EPA (2019) *Annual Report 2018-10 Transforming environment protection for a better Victoria* p10 <<https://ref.epa.vic.gov.au/~media/Publications/1792.pdf>>

⁴ Environmental Justice Australia 'How to learn more about air pollution where you live' (webpage) <<https://www.envirojustice.org.au/our-work/community/air-pollution/how-your-air/>>

⁵ Department of Environment, Land, Water and Planning (2017) *Plan Melbourne* <<https://www.planmelbourne.vic.gov.au>>

⁶ Australian Bureau of Statistics (2019) *9309DO0012019 Motor Vehicle Census, Australia* 29 July <<https://www.abs.gov.au/ausstats/abs@.nsf/mf/9309.0>>

⁷ ABC (2003) 'Dirty diesel' (webpage) <<http://www.abc.net.au/health/features/stories/2003/07/03/1835282.htm>>

⁸ Kittelson, D.B., W.F. Watts, J. Johnson, (2002) *Diesel Aerosol Sampling Methodology - CRC E-43: Final Report*, University of Minnesota, 19 August <<http://www.crcao.com/reports/recentstudies00-02/E-43%20Final%20Report.pdf>>

⁹ West Gate Tunnel project (WGTP) (2017) *Westgate Tunnel Project. Environment Effects Statement*, Major Transport Infrastructure Authority <<http://westgatetunnelproject.vic.gov.au/library/environment-effects-statement>>

¹⁰ Victorian Auditor General's Office (2018) *Improving Victoria's Air Quality March 2018* <<https://www.audit.vic.gov.au/sites/default/files/2018-03/20180308-Improving-Air-Quality.pdf>>

2 Health effects of air pollution

The single most important reason for working to counteract air pollution is to protect our health. Poor air quality is associated with serious effects on people's health and quality of life. Worldwide, it is the fifth-highest risk factor for mortality and morbidity.¹

There are no data on the actual numbers of premature deaths or morbidity associated with air pollution in the Inner West. According to the Australian Institute of Health and Welfare, however, poor air quality could lead to about 4,880 premature deaths in Australia each year.² This is more than four times the number of lives lost on Australia's roads in 2019.³

There is often a lack of awareness of air pollution's dangers, especially because the pollutants are not always visible.

In the past, air pollution was thought to mainly affect people's respiratory and cardiovascular systems, and there is strong evidence to support this. These impacts alone lead to greater levels of doctor visits, hospital admissions, chronic illness and premature death.

More recent evidence is, however, increasingly showing that air pollutants have impacts on many other bodily organs and systems.⁴ They are associated with diabetes, cognitive decline and dementia, inflammatory bowel disease and inflammation⁵, brain tumours, and mental health problems.⁶ The International Agency for Research on Cancer, which is part of the World Health Organization, has classified some air pollutants, including diesel exhaust emissions, as being carcinogenic for humans.⁷

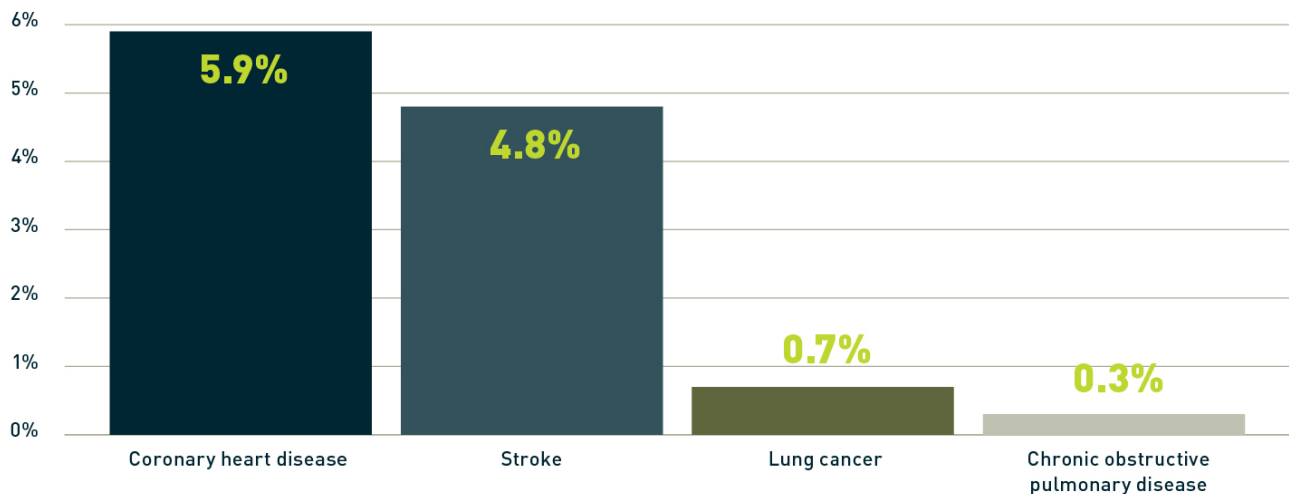
Research is now showing that these health effects cannot simply be explained by other causes such as smoking. For example, up to 20 per cent of lung adenocarcinoma cases in Australia now occur in people who have never smoked.⁸

Recent research also shows that adverse health effects from some pollutants occur at lower concentrations and after shorter exposure periods than previously thought; examples are respiratory problems⁹ and heightened cardiovascular disease risk in older adults.¹⁰ For many pollutants there is no safe level of exposure.¹¹ Further, the World Health Organization asserts that health impacts from air pollution can occur within seconds or minutes of exposure.¹² Recent research notes that the health benefits of reducing exposure to air pollution can be realised within a matter of weeks.¹³

Although everyone can be affected by air pollution, it is older adults, children, pregnant women and those with underlying chronic health conditions who are most at risk,¹⁴ as are people living in more polluted areas, especially with long-term exposure. Such areas include industrial zones, roads with large numbers of polluting vehicles and nearby locations, all of which are found in the Inner West. Children are particularly vulnerable because they spend more time outdoors and their bodies and organs are maturing, potentially causing a lifetime of effects.¹⁵ Their smaller lungs mean that with increased activity they breathe much more frequently than adults. Air pollution is associated with low birthweight, and childhood asthma, allergic sensitisation, eczema, tissue inflammation and poor lung development that can track into adulthood.¹⁶ Black carbon (sooty particulate matter emitted from sources such as diesel engines) can cross the placental barrier and directly reach unborn babies, affecting organ development.¹⁷

Air pollution is the primary contributory factor to 5.9 per cent of deaths from coronary heart disease, 4.8 per cent of deaths from stroke, 0.7 per cent of deaths from lung cancer and 0.3 per cent of deaths from chronic obstructive pulmonary disease (see Figure 2.1), with many of these conditions having their origin in childhood.

Figure 2.1 Fatal burden of disease attributable to air pollution, by linked disease, 2011



Source: Australian Institute of Health and Welfare (2011) Australian Burden of Disease Study - Impact and causes of illness and death in Australia 2011 Commonwealth Government of Australia <<https://www.aihw.gov.au/getmedia/d4df9251-c4b6-452f-a877-8370b6124219/19663.pdf.aspx?inline=true>>

Odour – experienced when chemical compounds in aerosol form stimulate our sense of smell – is also a major concern. Stenches from industrial areas can make it impossible to be outdoors, to open windows or even to have visitors. Odour can have physical effects such as causing retching, vomiting or lack of sleep or simply making it harder to exercise outdoors. Odour impacts are very common in the Inner West because many common sources of it are located there – for example, landfill operations, food processing plants, chemical and petrochemical industries, and sewage treatment.¹⁸

The main pollutants, sources and impacts

Motor vehicles and industry, two of the main pollution sources in the Inner West, are major contributors of harmful emissions (see Figure 2.2).¹⁹

Figure 2.2 Key air pollutants, sources and health effects

POLLUTANT	SOURCE	IMPACT ON HUMAN HEALTH
Particulate matter (PM) Including dust, smoke, aerosols, mould, spores, as PM ₁₀ (particles ≤10 micrometres (µm) diameter), PM _{2.5} (≤ 2.5µm), PM ₁ (≤ 1.0µm) and ultrafines (≤0.1µm)	Motor vehicles Industry Biomass Dust	Can enter the respiratory tract, causing a range of health impacts, especially for children, the elderly, pregnant women and people with lung or heart conditions. Finer particles can penetrate deep into the lungs and enter the bloodstream and lymphatic system.
Ozone (O₃) Secondary pollutant formed through reactions between gases such as oxides of nitrogen and volatile organic compounds on calm sunny days	Motor vehicles Industry Biomass	May be harmful to the lungs, especially for children, the elderly, pregnant women and people with lung conditions. May also exacerbate pre-existing respiratory conditions such as asthma.
Nitrogen dioxide (NO₂)	Motor vehicles Industry	
Sulphur dioxide (SO₂)	Motor vehicles Industry Shipping	
Carbon monoxide (CO)	Motor vehicles Industry Biomass	Exposure to moderate and high levels over long periods is linked to increased risk of heart disease and tissue hypoxia.
Volatile organic compounds (VOCs) Including the hydrocarbons benzene, toluene, xylenes, formaldehyde	Motor vehicles Household materials and products Industry Biomass	Although usually found in very small concentrations, these chemicals are potentially hazardous because of their high toxicity. Benzene and formaldehyde are classified as carcinogens.
Odour Experienced when gaseous chemicals stimulate our sense of smell, usually in an unpleasant manner	Industry	Can have major impacts on amenity and wellbeing, through making it difficult to spend time outdoors, ventilate homes or sleep, and causing physical symptoms such as retching or nausea.

A cocktail of emissions

Emission sources often contain a cocktail of pollutants, and this can create additional risks. An example is diesel engine exhaust, a particular concern in the Inner West because of the presence of high numbers of vehicles, especially heavy vehicles. Diesel engine exhaust has been implicated in elevated risks of cancers of the lung, bladder, liver, stomach and other organs.²⁰ Health professionals expect there is an association between high numbers of diesel trucks and poor local health. A recently published study stated, 'One in 10 lung cancers are now being found to be caused by outdoor traffic pollution'.²¹

The health impacts of diesel engine exhaust are of particular concern to the CRG. Most trucks and other heavy road vehicles use diesel fuel. Between 2014 and 2019 ownership of Victorian-registered diesel cars and trucks increased by 56 per cent; in total 22 per cent of Victorian vehicles are now diesel-fuelled.²²

A retrospective study in Tasmania has shown that exposure to fine particulate matter (PM_{2.5}) is associated with hospital admissions for heart failure.²³ The relationship emerged at a threshold of approximately 4µg/m³ - well below the Australian daily reporting standard of 25µg/m³. Traffic-related air pollution exposure for middle-aged Tasmanians has also been associated with respiratory problems; for example, those living within 200 metres of a major road had increased development and persistence of asthma.²⁴ This is consistent with a meta-analysis showing that, for every 2µg/m³ increase in chronic exposure to traffic-related PM_{2.5}, the risk of developing childhood asthma increased by 14 per cent.²⁵

Emerging science

Some pollutants are of increasing concern as further scientific evidence emerges. An important example is PM₁ - particles with a diameter of less than 1 micrometre - and ultrafine particulate matter which have a diameter of less than 0.1 micrometre. These can more readily penetrate deep into the respiratory tract and subsequently the bloodstream and various body tissues. About 80 to 95 per cent of diesel particulate matter is PM₁ or ultrafine.²⁶

‘When I drive past the Port of Melbourne late at night I can see how the air is thick with pollution under the light shrouds. I worry how this pollution carries across into Yarraville and beyond.’

Martin, father of 2, Yarraville Resident

The health benefits of reducing air pollution

Air pollution caused by human activity is controllable, and many of the adverse health effects can therefore be prevented. In 2016 Australia’s largest ever review of the health impacts of particulate matter found that any reduction in exposure is likely to be beneficial to health.²⁷

California has implemented aggressive air pollution reduction policies that have resulted in major public health gains. Mitigation strategies to reduce children’s exposure to roadside emissions resulted in improved lung function. For example, successful implementation of strategies to reduce children’s exposure to roadside emissions has resulted in improved lung function.²⁸ Given that lung health (like heart health) tracks into adulthood, this presents important opportunities for reducing the occurrence of lung and heart disease and the economic burden these impose on the community.

A recent Cornell University study of the health benefits of reducing diesel pollution found that ‘curbing diesel emissions could reduce big city mortality rates’ and ‘US cities could see a decline in mortality rates and an improved economy by mid-century if federal and local governments maintain stringent air pollution policies and diminish concentrations of diesel freight truck exhaust’.²⁹

Evidence of health impacts

Air pollution risks are exacerbated by a number of factors:

- a growing and ageing population
- greater industrialisation
- large amounts of traffic
- significant sources of odour
- poor vehicle emission standards
- a warming and drying climate

All of these factors apply to the Inner West.

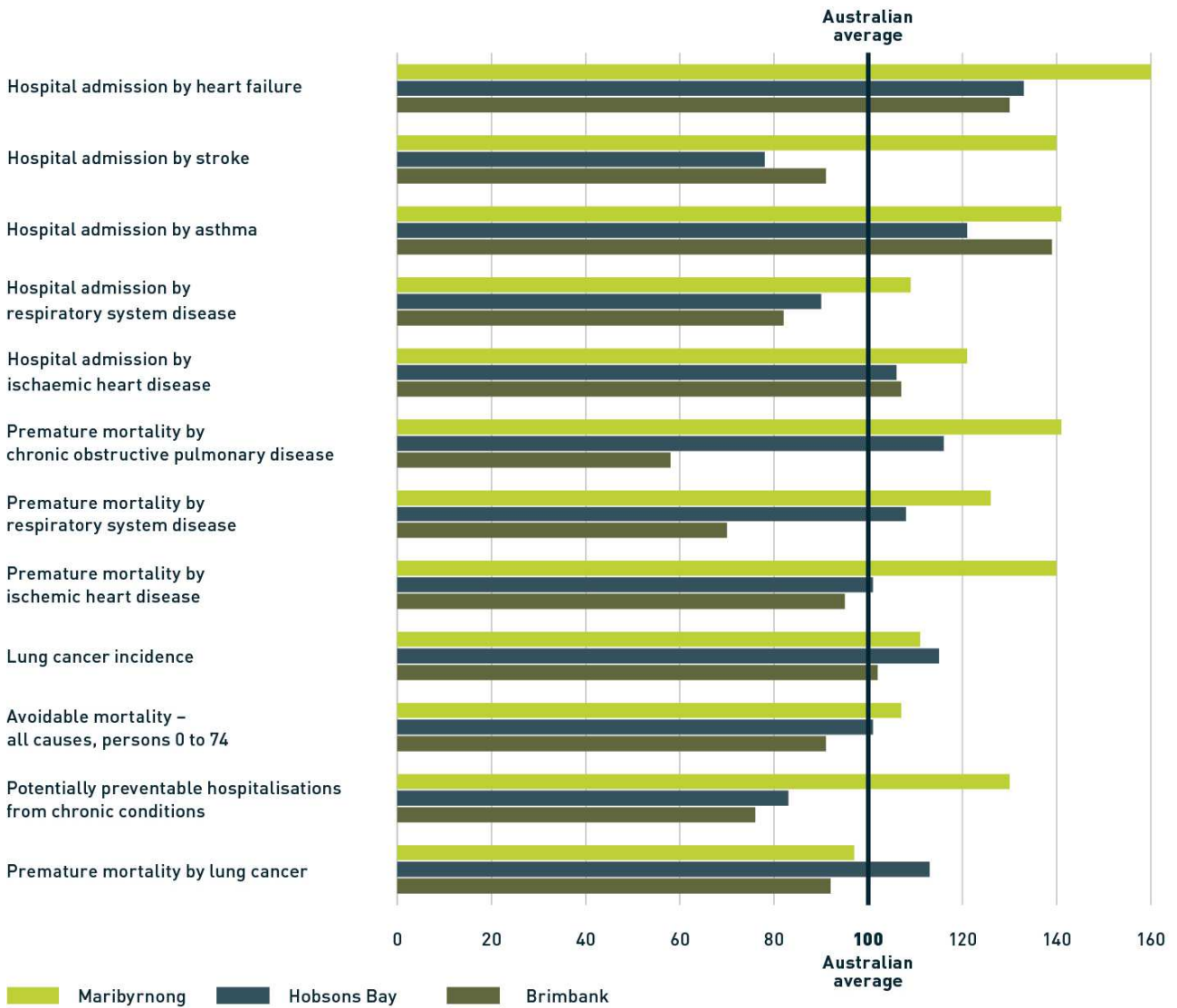
In November 2019, Dr Kate Lycett, Senior Research Fellow at the Murdoch Children's Research Institute, provided to the CRG an assessment of data comparing health outcomes in the three Inner West municipalities with Australia as a whole.³⁰ The data focused on diseases for which air pollution can be a substantial contributory factor and were obtained primarily from Torrens University's Social Health Data Atlas, which categorises health incidence by local government area throughout Australia. The data are presented relatively in Figure 2.3, with the Australian average being designated as 100.

The data look at variations in hospitalisation rates for specific diseases across LGAs. Other health impacts that do not result in hospitalisation were not considered. The estimates are therefore conservative and probably greatly underestimate the actual health impacts that could be attributed to air pollution.

The results are concerning. They show that the Inner West experiences many health problems at a higher rate than the Australian average. Maribyrnong and Hobsons Bay, in particular, have rates of hospitalisation substantially higher than national averages for many diseases strongly linked to air pollution. This variation cannot be readily explained by factors such as socio-economic status, smoking rates or age profiles, which are all close to the Australian average, as shown in Table 2.1. For example, Maribyrnong has the worst cardiorespiratory outcomes across all metrics, even though it has the youngest demographic and the lowest smoking and adult obesity rates in the Inner West. This suggests that air pollution could be an important contributory factor. Even if air pollution is not the only cause of these higher hospitalisation rates, it will at least likely be a strong contributory factor, and reducing it will improve future health outcomes.

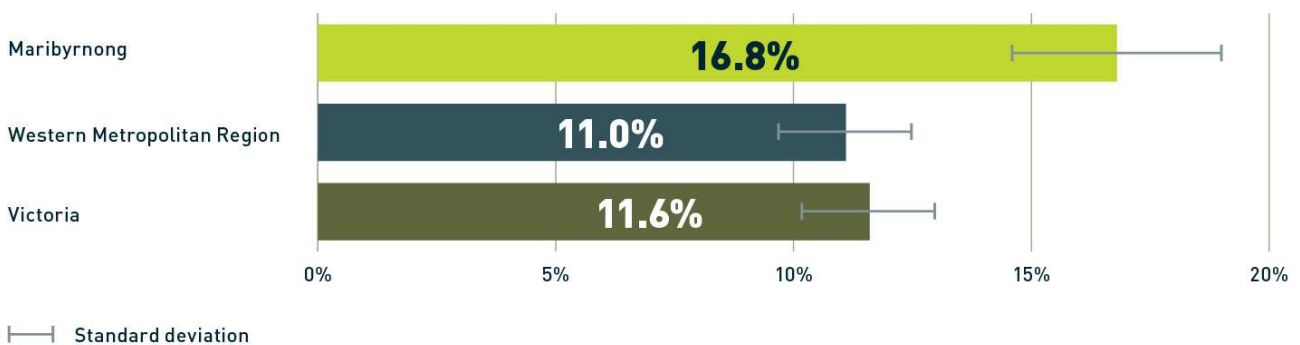
Other data back this up. For example, Maribyrnong also had the highest percentage of paediatric respiratory admissions (adolescent asthma) in Victoria in 2009 (see Figure 2.4).

Figure 2.3 Hospitalisation rates for Inner West municipalities against Australian average



Source: Torrens University Australia (2020) *Social Atlas of Australia: Victoria Local Government Areas (2016 ASGS)*
<http://phidu.torrens.edu.au/current/maps/sha-aust/lga-single-map/vic/atlas.html>

Figure 2.4 Proportion of adolescents with asthma in Maribyrnong, Western Metropolitan Region and Victoria, 2009



Source: Department of Education and Early Childhood Development. (2010) *Adolescent community profile – City of Maribyrnong 2010*
<https://www.education.vic.gov.au/Documents/about/research/acpmaribyrnong.pdf>

The Atlas figures cannot be explained by socio-economic factors, age, smoking rates or obesity, all of which are close to, or even below, the Australian average in Inner West municipalities (Table 2.1).

Table 2.1 Demographics in each Inner West local government area and Australia

DEMOGRAPHICS	MARIBYRNONG	HOBSONS BAY	BRIMBANK	AUSTRALIAN AVERAGE
SEIFA index of disadvantage (2016)*	995	1,015	921	1,000 +/-100
Age (2018)	%	%	%	%
0 – 24	28.4	29.6	32.5	31.7
25 – 44	41.3	30	30.2	28.2
45 – 65	20.6	25.3	23.6	24.4
65+	9.7	14.9	13.9	15.5
Current smokers (2014-15)	%	%	%	%
18+ years	15.7	16.6	17.3	16.1
Obesity (2014-15)	%	%	%	%
2 – 17	8.7	7.3	10	7.5
18+	21.9	24.9	27.4	27.9

* SEIFA refers to the Index of Relative Socio-economic Disadvantage scores 2016. National mean is 1,000 (standard deviation 100), where higher scores represent a lower level of disadvantage.

Source: Adapted from data provided to the CRG by Dr Kate Lycett

Notes

¹ Tong, S. (2019) 'Air pollution and disease burden' *The Lancet* 3:2 PE49-E50

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² Institute for Health Metrics and Evaluation (2017) *Global Burden of Disease* University of Washington

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³ Bureau of Infrastructure, Transport and Regional Economics (2020) Road Deaths Australia - Monthly Bulletins January (webpage)

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⁴ Schraufnagel et al (2019) 'Air Pollution and Noncommunicable Diseases: A Review by the Forum of International Respiratory Societies 2019' *Environmental Committee, Part 2: Air Pollution and Organ Systems' Chest*. 155(2):417-26

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⁷ International Agency for Research on Cancer (WHO) (2012) 'Press Release: 213 IARC: Diesel Engine Exhaust Carcinogenic', 12 June 2012 <https://www.iarc.fr/wp-content/uploads/2018/07/pr213_E.pdf>

⁸ Couraud, S. et al. (2012) 'Lung cancer in never smokers - a review' *European Journal of Cancer* June 48(9):1299-311. <doi: 10.1016/j.ejca.2012.03.007 >

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¹⁰ Huynh, QL. et al. (2018) 'Association of Ambient Particulate Matter with Heart Failure Incidence and All-Cause Readmissions in Tasmania: an Observational Study', *BMJ Open*. 8(5):e021798 <<https://bmjopen.bmj.com/content/8/5/e021798>>

¹¹ EPA (2018) *Air pollution in Victoria – a summary of the state of knowledge* <<https://www.epa.vic.gov.au/about-epa/publications/1709>>

¹² World Health Organisation (2018) 'Ambient (outdoor) air pollution' (webpage) <[https://www.who.int/news-room/fact-sheets/detail/ambient-\(outdoor\)-air-quality-and-health](https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health)>

¹³ Asian News International (2019) 'Reduced exposure to air pollution results in substantial health improvements' (webpage) December 29 <<https://www.aninews.in/news/science/reduced-exposure-to-air-pollution-results-in-substantial-health-improvements20191229162954/>>

¹⁴ United Nations (2018) 'Young and old, air pollution affects the most vulnerable' (blogpost, webpage) 16 October <<https://www.unenvironment.org/news-and-stories/blogpost/young-and-old-air-pollution-affects-most-vulnerable>>

¹⁵ Roberts, S. et al 'Exploration of NO₂ and PM_{2.5} air pollution and mental health problems using high-resolution data in London-based children from a UK longitudinal cohort study.' *Psychiatry Research*. 272:8-17.

<<https://www.sciencedirect.com/science/article/pii/S016517811830800X>>

- ¹⁶ Deng, Q. *et al* (2016) 'Exposure to outdoor air pollution during trimesters of pregnancy and childhood asthma, allergic rhinitis, and eczema' *Environmental Research* 150:119-127 <<https://www.sciencedirect.com/science/article/abs/pii/S0013935116302225>>
- ¹⁷ Bove H *et al* (2019) 'Ambient black carbon particles reach the fetal side of human placenta'. *Nature Communications* 10(1):3866. <https://www.researchgate.net/publication/335873291_Air_Pollution-Induced_Placental_Alterations_An_Interplay_of_Oxidative_Stress_Epigenetics_and_the_Aging_Phenotype>
- ¹⁸ EPA (2012) 'Odour Publication 1468' (fact sheet) <<https://ref.epa.vic.gov.au/~media/Publications/1468.pdf>>
- ¹⁹ Department of Environment, Land, Water & Planning (2018) *Clean Air for All Victorians – Victoria's Air Quality Statement 2018* <https://www.environment.vic.gov.au/__data/assets/pdf_file/0025/125719/Clean-Air-Statement.pdf>
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- ²² Australian Institute of Health and Welfare (2015) *Australian Burden of Disease Study - Impact and causes of illness and death in Australia 2011* <<https://www.aihw.gov.au/getmedia/d4df9251-c4b6-452f-a877-8370b6124219/19663.pdf.aspx?inline=true>>
- ²³ Huynh, QL. *et al* (2018) 'Association of ambient particulate matter with heart failure incidence and all-cause readmissions in Tasmania: an observational study'. *BMJ Open*. 8(5):e021798. <<https://bmjopen.bmj.com/content/8/5/e021798>>
- ²⁴ Bowatte, G. *et al* (2018) 'Traffic related air pollution and development and persistence of asthma and low lung function.' *Environment International* 113:170-6. <<https://www.sciencedirect.com/science/article/pii/S0160412017319037>>.
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- ²⁶ Kittelson, D.B. *et al* (2002) *Diesel Aerosol Sampling Methodology - CRC E-43: Final Report*, University of Minnesota 19 August <<http://www.me.umn.edu/centers/mel/reports/crce43ts.pdf>>
- ²⁷ Trembath, B. (2016) 'Any exposure of particulate matter air pollution harmful, researchers warn' Australian Broadcast Corporation <<https://www.abc.net.au/news/2016-03-31/any-exposure-of-particulate-matter-air-pollution-harmful/7286812>>
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- ²⁹ Science Daily (2019) 'Curbing diesel emission could reduce big city mortality rate' 30 September <<https://www.sciencedaily.com/releases/2019/09/190930131543.htm>>
- ³⁰ Based upon data from Torrens University Australia (2020) *Social Atlas of Australia: Victoria Local Government Areas (2016 ASGS)* <<http://phidu.torrens.edu.au/current/maps/sha-aust/lga-single-map/vic/atlas.html>>

3 Monitoring, analysis and reporting

Accurate and comprehensive monitoring of and reporting on air pollution is vital to identifying the health and amenity risks air pollution poses to communities, and to designing and implementing effective programs, policies and regulation to reduce those risks.

A well-designed monitoring network enables identification of localised air pollution levels and individual communities' exposure to pollutants. Analysis of monitoring data can help identify health and amenity impacts on communities from various pollutants and sources. It can also lead to identification of trends over time, including spikes and the reasons for these. Such information is necessary for the development of effective and targeted pollution reduction strategies. Further, analysis is vital for developing models and processes for forecasting when and where dangerous levels of pollution might occur - for example, under particular weather conditions.

Monitoring and analysis alone, however, are insufficient for managing and reducing air pollution. Information needs to be communicated and acted on. It needs to be effectively communicated to community members in as close as possible to real time as possible, and through channels providing information that can be readily understood by all members. For example, not all Inner West residents or workers might be comfortable using the internet, which is currently the main way government provides air quality information and warnings.

Historically, air pollution monitoring in the Inner West has been limited:

- The Environment Protection Authority operates three monitoring stations - at Footscray and Altona North since 1984 and at Brooklyn since 2008 (Altona North is temporarily closed for relocation, from June 2019 to mid-2020).
- Some industrial premises have monitoring systems to demonstrate compliance with their licenced air emission limits. The results are available to the EPA but are not publicly released.
- There was also a 12-month monitoring program along Francis Street in Yarraville in 2012 and 2013, following earlier, short-term, monitoring programs over several months during 2000 and 2001.

An additional six temporary stations have been commissioned by the West Gate Tunnel project (WGTP) (see Figure 3.1 and Table 3.1), providing baseline data against which any changes to air pollution levels once the tunnel opens can be assessed. The stations were established in 2016 and 2017 and are scheduled to operate for up to five years following the tunnel's opening.

Most stations in the Inner West (both the temporary stations and those operated by EPA) monitor particulate matter (PM₁₀ and PM_{2.5}) only. Only two stations monitor for nitrogen dioxide (NO₂), which is a major transport pollutant. SO₂ monitoring is conducted at Footscray and Altona North: monitoring at Footscray ceased in 2015, but has now recommenced, while monitoring at Altona North occurred until June 2019, and will recommence following its relocation in mid-2020. Table 3.1 lists the currently operating monitoring sites and the pollutants monitored.

Figure 3.1 Location of Inner West Environment Protection Authority and West Gate Tunnel project air quality monitoring stations



In keeping with its terms of reference, the CRG was given access to monitored data for the West Gate Tunnel project sites. The EPA analysed the data for the CRG, which shows that air pollution, especially particulate matter levels, continues to be of concern throughout the Inner West.

This analysis helped the CRG understand the likely levels and risks of transport and industrial / commercial emissions in particular. This information helped us formulate a number of recommendations for reducing transport and industrial emissions, as detailed in Chapters 5 and 6. Appendix D provides the EPA's analysis.

Table 3.1 Pollutants monitored by Environment Protection Authority and West Gate Tunnel project air quality monitoring stations

STATION			POLLUTANT/S MONITORED							
			PM _{2.5}	PM ₁₀	NO ₂	SO ₂	CO	O ₃	NO	NO _x
* EPA	Footscray	Hansen Reserve, West Footscray	●	●	●	●	●	●		
	Brooklyn	Brooklyn Reserve, Heather Avenue, Brooklyn		●						
* West Gate Tunnel Project	Station 1	Barbara Beyer Reserve, 2 Harris Street, Yarraville	●	●						
	Station 2	51-53 Francis Street, Yarraville	●	●						
	Station 3	Railway Reserve, 15 Goulburn Street, Yarraville	●	●						
	Station 4	44 Primula Avenue, Brooklyn	●	●	●		●		●	●
	Station 5	Donald McLean Reserve, Spotswood	●	●						
	Station 6	Corner Millers Road and Nolan Avenue, Brooklyn	●	●						

Air quality standards

Victoria's State Environment Protection Policy (Ambient Air Quality) sets objectives against which air pollution concentrations are reported. These are based on national standards, detailed under the National Environment Protection (Ambient Air Quality) Measure, and shown in Table 3.2. Objectives are set for various periods, from 1 hour to annual average concentrations, based on the known risks from differing exposure times.

The objectives are not statutory: there is no requirement that they be complied with, and there are no penalties for exceeding them.

National ozone, nitrogen dioxide and sulphur dioxide standards are currently under review, and some strengthening is expected in 2020.

Table 3.2 Victorian air quality reporting standards

POLLUTANT	UNIT	MAXIMUM CONCENTRATION					MAXIMUM ALLOWABLE EXCEEDANCES
		1 HR	4 HR	8 HR	DAILY	ANNUAL	
Fine particulate matter (PM _{2.5})	µg/m ³				25	8	None
Coarse particulate matter (PM ₁₀)	µg/m ³				50	20	None
Nitrogen dioxide (NO ₂)	ppm	0.12				0.03	1 day / year (for the 1 hour standard only)
Sulphur dioxide (SO ₂)	ppm	0.2			0.08	0.02	1 day / year (for the 1 hour and daily standards only)
Carbon monoxide (CO)	ppm			9			1 day / year
Ozone (O ₃)	ppm	0.1	0.08				1 day / year
Lead	µg/m ³					0.5	None

Air quality reporting

Continually updated summaries of air quality from the Environment Protection Authority's monitoring stations are on the EPA's AirWatch website. These show whether current air quality is good, moderate, poor, very poor or hazardous. Information on air quality in the preceding 48 hours is also available, along with a forecast. AirWatch provides general health advice for all air pollutants and has a mobile-friendly display.

EPA provides an annual summary of the number of instances when an air quality objective was not met. There is a delay in providing the information: at the time of writing the latest available information was for 2018.

The West Gate Tunnel project's monthly summaries for its six monitoring stations are available on the WGTP website. These summaries provide 24-hour average concentrations for particulate matter and one-hour average concentrations for nitrogen dioxide and carbon monoxide.

Air quality: other data and analysis

Some other data and analysis are available that provide further relevant information when trying to understand the impacts of air pollution on the Inner West. These consist primarily of health assessments. A knowledge of the main health risks and impacts in the Inner West and a comparison of these with risk factors such as age and smoking can help identify the impacts of air pollution on health and wellbeing.

Chapter 2 provides an assessment showing that air pollution is likely to pose substantial risks for many health conditions.

The following are examples of where such information is available:

Victorian Public Health and Wellbeing Outcomes Framework Data Dictionary

<https://www2.health.vic.gov.au/about/publications/policiesandguidelines/victorian-public-health-and-wellbeing-outcomes-framework>

Victorian Agency for Health Information

<https://www.bettersaferecare.vic.gov.au/about-us/about-vahi>

Australian Burden of Disease Study

<https://www.aihw.gov.au/reports/burden-of-disease/australian-burden-disease-study-methods-2015/contents/table-of-contents>

Independent assessments

Independent experts have recently identified opportunities for improving air quality monitoring and reporting. A number of their recommendations are directly relevant to the Inner West:

Victorian State of the Environment 2018 report¹

Victoria's Commissioner for Environmental Sustainability issues five-yearly State of the Environment reports. The 2018 report contains two recommendations for improving air quality:

- that EPA Victoria prioritise the implementation of the EPA Inquiry Recommendations 6.3 and 7.2 to develop a publicly accessible, real-time assessment of air quality across Victoria that incorporates air-quality monitoring data, citizen science observations, air-quality modelling and an up-to-date air-pollution inventory. Future monitoring and assessments should also be expanded to include PM₁ and ultrafine particles and data on indoor air quality
- that EPA Victoria, in coordination with other Victorian Government agencies, improve transport-related air monitoring, including increasing the number of roadside air-monitoring stations and publishing the air data on the internet in real-time.

Improving Victoria's Air Quality audit report²

This Victorian Auditor-General's report on improving air quality, released in March 2018, note major deficiencies in the state's current air monitoring and reporting systems. Among recommendations were that the EPA:

- expand its air monitoring network, including:
 - in addition to its ambient air monitoring, designing and implementing an air monitoring program that better aligns coverage with air pollution risks that Victorian communities are exposed to
- improve its reporting on air quality by:
 - introducing a rigorous quality review process to ensure the accuracy and reliability of the state's air quality data and assessments ... as presented across its various reporting [mechanisms], including on its AirWatch website
 - developing readable and easily accessible annual reports on the results collected from all air monitoring ... highlighting against standards and recorded exceedances
- expand and update its knowledge of Victoria's air quality, including by:
 - determining and preparing an action plan on how best to oversight the air quality monitoring conducted by high-risk operators to ensure monitoring programs are in place and that these plans are appropriately implemented

- work with all relevant councils to address air quality issues at the Brooklyn Industrial Precinct, including by agreeing on the installation and location of additional air monitoring stations to measure the impacts of air discharges on nearby residential communities.

Findings

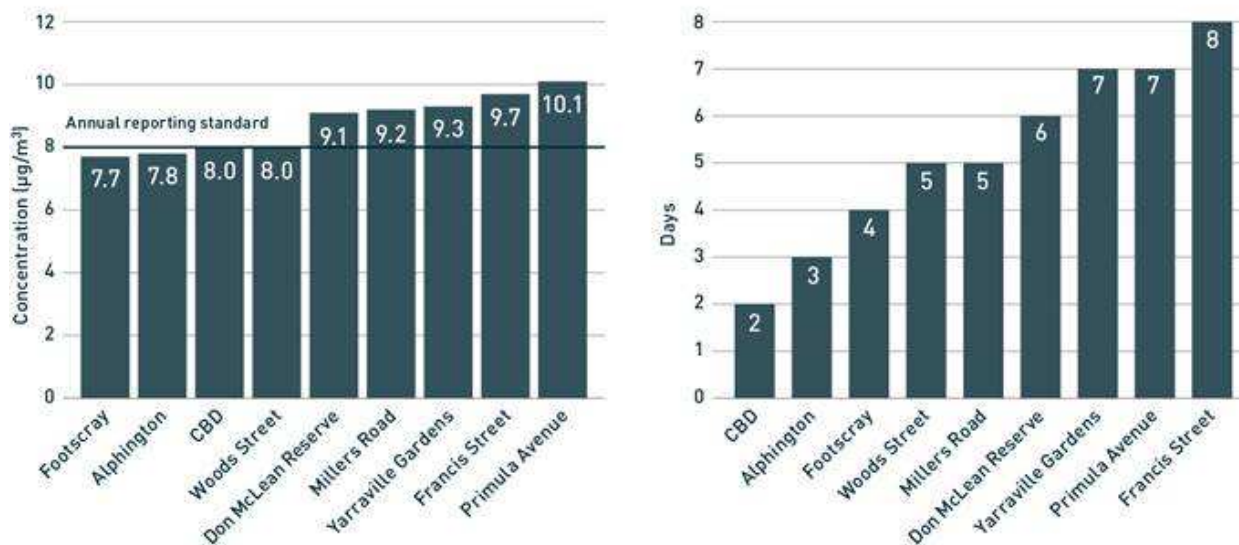
Analysis of West Gate Tunnel air monitoring data

- Emissions of both fine and coarse particulate matter (PM_{2.5} and PM₁₀) are very high in much of the Inner West. In 2017 and 2019, annual average concentrations of both fine and coarse particles exceeded Victorian objectives at most Inner West monitoring stations. Although the Environment Protection Authority's past Footscray and Brooklyn monitoring had indicated instances of objectives being exceeded, the more comprehensive information now available confirms this is a widespread problem in the Inner West (refer Appendix D).
- In 2019, instances of standards being exceeded occurred at the majority of monitoring stations, regardless of whether the stations are on roadsides (e.g. Millers Road, Donald McLean Reserve, Francis Street) or near industrial areas (e.g. EPA Brooklyn) or more representative of background air quality (e.g. EPA Footscray).
- EPA's analysis indicates that air pollution is dependent on its generation from local sources and, in some cases, regional events and prevailing weather conditions transporting and dispersing pollution in the air.
- Given that exceedances of standards are occurring for both PM_{2.5} and PM₁₀ at most monitoring stations, it is likely that excessive air pollution is resulting from high traffic-related road emissions including vehicle exhausts, vehicle non-exhaust emissions (such as raised dust and brake and tyre wear) and raised dust from industrial and commercial activities.

Fine particulate matter (PM_{2.5})

- During 2017, the annual average concentration of PM_{2.5} exceeded Victoria's State Environment Protection (Ambient Air Quality) Policy (SEPP AAQ) objective of 8 µg/m³ at five of the six Inner West stations where it was measured. This fell to two in 2018, but in 2019, the average concentration again exceeded the objective at five of the seven sites at which it was measured.
- From 2017 to 2019, all stations recorded at least three days each year when standards exceeded the 24-hour objective of 25 µg/m³. In 2019, there were between four and eight days on which concentrations exceeded this objective.
- The CRG notes that the SEPP (AAQ) states that no instances of objectives being exceeded are allowable.
- Exceedances of the average annual SEPP AAQ objective also occurred in EPA monitoring stations in the CBD and Alphington in 2017 and 2018. For example, in 2017, the second highest annual average concentration of PM_{2.5} was recorded at Alphington. These stations also recorded multiple days where concentrations exceeded the 24-hour SEPP AAQ objective in each of 2017, 2018 and 2019. Further information is provided in Appendix D.

Figure 3.2 Average PM_{2.5} concentrations and number of days above the ambient air quality objective, 2019

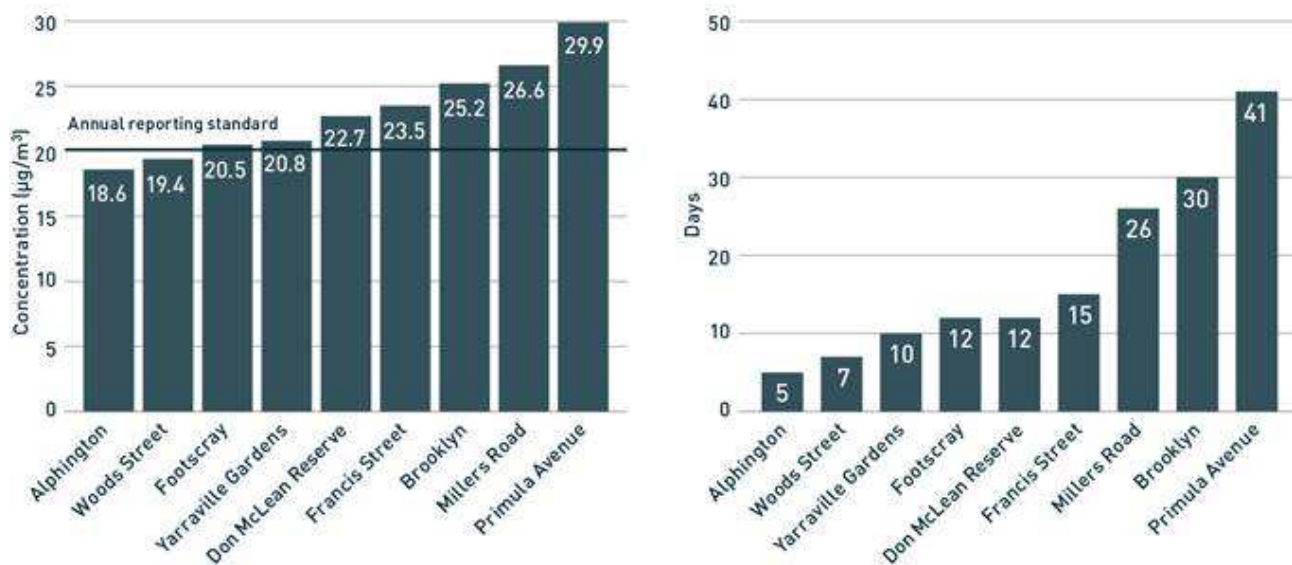


Source: EPA (2020) 'Analysis of West Gate Tunnel air monitoring data'

Coarse particulate matter (PM₁₀)

- During 2017, the average annual concentration of PM₁₀ exceeded the objective of 20 µg/m³ at four of the seven Inner West monitoring sites where it was measured. This fell to three in 2018 but then rose to seven in 2019. Sites adjacent to the Brooklyn Industrial Precinct were substantially above the standard in 2019 - by between 26 and 49 per cent.
- There were between seven and 41 days during 2019 on which concentrations exceeded the daily objective of 50 µg/m³ at every Inner West monitoring station. Instances of objectives being exceeded at sites adjacent to the Brooklyn Industrial Precinct were particularly numerous:
 - 30 exceedances at the EPA's Brooklyn station
 - 26 exceedances at the WGTP's Millers Road station.
 - 41 exceedances at the WGTP's Primula Avenue station.
- The CRG notes that the State Environment Protection Policy (Ambient Air Quality) states that no instances of objectives being exceeded are allowable.
- Monitoring cannot pinpoint the exact causes of these exceedances. The EPA's analysis suggests it is likely that the higher number of exceedances at the three sites adjacent to the Brooklyn Industrial Precinct is probably due to or affected by local dust from the precinct. Road traffic emissions would also be a significant source at Millers Road. The PM₁₀ levels measured at Primula Avenue are associated with dust impacts within the construction area – although on a roadside, the Primula Avenue station is surrounded by solid construction barriers and in an area of major West Gate Tunnel construction activity.

Figure 3.3 Average PM₁₀ concentrations and number of days above the ambient air quality objective, 2019



Source: EPA (2020) 'Analysis of West Gate Tunnel air monitoring data'

Nitrogen dioxide (NO₂) and carbon monoxide (CO)

- The EPA's analysis (Appendix D) shows low levels of nitrogen dioxide and carbon monoxide, although the CRG notes that data is available only for two Inner West sites - EPA Footscray and WGTP Primula Avenue. Due to its proximity to major roads with high traffic volumes, Primula Avenue showed a higher level than EPA stations at Footscray or Alphington which are located away from major roads.
- It is possible that NO₂ and CO emissions, even if below objectives, indicate greater population exposure at other sites in the Inner West nearer to main roads with high traffic volumes.

EPA analysis conclusions

- The EPA concluded that air pollution levels in 2019 across the West Gate Tunnel project station sites were generally higher than at EPA background sites because of proximity to local air pollution sources. Regardless of proximity, however, the stations are showing that excessive levels of pollution are occurring at multiple sites in the Inner West, with detrimental effects for community health and amenity.

Air quality monitoring in the Inner West

- The current EPA air quality monitoring network in the Inner West is not adequate to accurately determine pollution levels. There is a particular lack of monitoring at potential pollution 'hot spots' such as along major roads and freight corridors and adjacent to industrial sites. The monitoring network is also designed to measure background, or 'ambient', air pollution levels. It is unlikely to be accurately indicating the levels to which many Inner West residents living nearer to major roads or industrial areas, or even in residential areas, have already been exposed.
- It is not feasible to identify air pollution levels and the resultant risks to Inner West communities in the absence of more comprehensive monitoring.
- Although the West Gate Tunnel monitoring network is helping to fill knowledge gaps, it was not fully established until 2017 and might be decommissioned in 2027.

Air quality standards

- Many of the current Australian air quality standards are much lower than best-practice international standards.
- There is no apparent Victorian or national government objective to make all standards equivalent to international best practice.
- There are no standards for some pollutants of concern - particularly PM₁ and ultrafine particulate matter. As a result, such pollutants are not monitored and the risks they pose to the Inner West community are not known.
- Because they are non-statutory and reported only on a whole-of-airshed level, air quality standards have limited impact on driving polluters to take action to reduce pollutant emissions.
- In view of the cumulative impact of historic air pollution our communities have been exposed to, there is a clear case for setting stronger reporting standards for the Inner West when compared with those set for other locations.

Air quality reporting

- The limited number of formats for reporting - primarily electronic - means that many Inner West residents will not be able to effectively obtain air quality information. Government decisions in relation to establishing these reporting formats do not appear to have taken into account the requirements of community sectors such as culturally and linguistically diverse groups and older residents.
- The large number of analyses available potentially provide a rich source of information on the levels and impacts of air pollution on Inner West communities. There appears, however, to be no consolidation of this information into a simple format.
- Reporting alone is not enough. It needs to be aligned with a targeted education campaign explaining the effects of poor air quality, the risks it poses and action that can be taken to reduce emission levels and protect people from these impacts.

West Gate Tunnel project monitoring reports

- The West Gate Tunnel project monthly reports compare emissions from most monitoring stations with 'intervention levels' rather than State Environment Protection Policy (Ambient Air Quality) reporting objectives. These levels are set 20 per cent higher than the objectives.
- Reporting against intervention levels leads to an under-representation of the days on which concentrations of particulate matter exceed reporting objectives.
- EPA recommends the use of air quality objectives to compare and assess air pollution levels measured near roads, rather than intervention levels. This is clear from its 2019 submission to the Mordialloc Bypass Project Environmental Effects Statement IAC³.
- EPA undertook its own monitoring of Francis Street air quality in 2012-13 and reported results against air quality objectives⁴.

Recommendations

Priority recommendations are shown in bold.

That the Victorian Government:

Air monitoring network and reporting	3.1 Increases the level of, and access to, Inner West air quality monitoring and information. [Priority] Through actions such as: <ul style="list-style-type: none">- permanently transferring WGTP monitoring stations to the EPA- utilising air quality modelling and forecasting processes to complement the monitoring network- publicly and promptly reporting actions taken in response to significant instances of air pollution, such as industrial fires- implementing a representative monitoring network, including for key pollution locations such as major roads, the West Gate Tunnel and industrial sites- publishing all information in as close to real time as possible and maintaining historical data, on a single website- utilising lower cost monitoring sensors to complement permanent monitoring stations where appropriate to achieve more representative monitoring coverage of the Inner West- reporting all data in 8-minute, 1 hour, 24-hour and annual average increments	Medium-term
Education	3.2 Implements an air pollution education campaign to improve Inner West communities and visitors' knowledge of the health risks from local air pollution and what can be done to address and avoid these. [Priority] Actions to achieve this could include: <ul style="list-style-type: none">- creating a phone app (like an upgraded version of AirWatch) to alert local populations of levels of air pollution and specific actions that can be taken, depending on severity- using multiple communication tools to target the diverse communities of the Inner West- using innovative tools such as environmental health tracking, a community impacts scorecard and/or an Inner West air quality map, to provide information on local pollution levels and their health impacts- for the top ten of these pollutants (based on community health risk) demonstrating how premises emitting them will be made to be compliant with their environment protection statutory obligations- publishing a comprehensive and transparent list of all major organic compounds emitted as air pollutants by Inner West industrial premises (on the AirWatch website)	Medium-term

Research	3.3	<p>Identifies pollutants of emerging scientific concern to the Inner West, including PM₁ and ultrafine particles, to inform policies, legislation and programs to manage them.</p> <p>Through actions such as:</p> <ul style="list-style-type: none"> - funding epidemiological studies to better understand likely community exposure and health risks - identifying ways to effectively monitor and report these pollutants - setting reporting standards for these pollutants 	Medium-term
Air quality standards	3.4	<p>Considers the cumulative impact of historic Inner West community exposure to air pollution when making decisions regarding planning applications, developments and other initiatives, and applies more stringent actions in this area to drive down air pollution.</p>	Short-term

Notes

¹ Commissioner for Environmental Sustainability (2018) *State of the Environment 2018* <<https://www.ces.vic.gov.au/reports/state-environment-2018>>

² Victorian Auditor General's Office (2018) *Improving Victoria's Air Quality* <https://www.audit.vic.gov.au/sites/default/files/2018-03/20180308-Improving-Air-Quality.pdf>

³ https://s3.ap-southeast-2.amazonaws.com/hdp.au.prod.app.vic-engage.files/7915/4501/3669/Submission_98_EPA_Victoria.pdf

⁴ <https://www.epa.vic.gov.au/about-epa/publications/1546-1>

4 The regulatory and policy environment

Effective government regulations and policies, and government action to ensure compliance with them, are crucial to reducing air pollution in the Inner West.

Commonwealth, Victorian and local laws, policies and budgetary priorities have major impacts on the levels of air pollution and the pollution's effects on communities. They affect the total amount of emissions generated, the sources and types of emissions, and the effectiveness of management and control measures. Other vital matters such as the extent of air pollutant monitoring and reporting and the extent of community knowledge of pollution risks and effects, also depend on government priorities and investments.

The legal and policy frameworks impinging on air pollution generation, monitoring and management are complex. As well as frameworks such as environment protection, transport and planning, which directly affect pollution emissions, other factors, such as occupational health and safety, emergency management and public health and wellbeing, also influence aspects of air pollution generation and control. Much government regulation and policy making can therefore indirectly or inadvertently restrict the effective management of air pollution and protection of the community from its impacts.

This chapter summarises the main frameworks that influence the levels and management of Inner West air pollution and opportunities to strengthen them in order to bring about emission reductions.

Rights of existing property owners and users

In addition to individual legal and policy frameworks, there are fundamental legal principles that can result in increased community exposure to air pollution. Property rights are an example. Victorians have the right to use and enjoy property as they please as long as they comply with the law and respect others' legal rights and property. Various laws and legal principles enshrine this, such as the following:

- the legal requirement that Victorians not be deprived of their property rights other than in accordance with the law (the *Charter of Human Rights and Responsibilities Act 2006*)
- existing use rights, which aim to stop people being forced to discontinue the legal use of a property because of a change in planning controls (see also Chapter 7)
- section 51(xxxi) of the Australian Constitution, which protects property from acquisition by the Commonwealth on other than 'just terms'.

Such rights can inadvertently protect legacy operations from being required to minimise their pollution impacts on adjacent communities. If an organisation is operating legally, there is limited opportunity in law to require it to move or take unreasonable and impracticable measures to upgrade its operations so as to achieve today's best practice in emissions reduction. This occurs even though (as stated in Chapter 2) there is now greater evidence of the impacts of air pollution on people's health and wellbeing.

Environmental and social considerations for policy and regulation development

Legal obligations apply to assessing the impacts of proposed regulations, policies and programs on the community. For example, Victoria's *Subordinate Legislation Act 1994* requires that proposed regulations 'likely to impose a significant economic or social burden on a sector of the public' be accompanied by a 'regulatory impact statement' assessing such impacts. Major projects are subject to an environment effects statement, which must assess impacts such as the generation of air pollution.

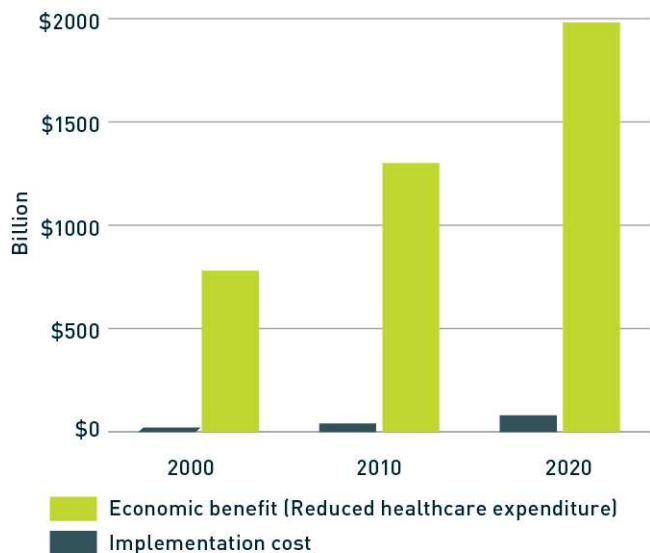
It is the CRG's view, however, that when government assesses the costs and benefits of new regulations or projects that create or have an impact on air pollution, health costs to the community and government (such as the impacts of illness and consequent required investment in medical services) are often not given sufficient weight. There is generally a greater focus on economic effects and benefits.

Stronger weighting assigned to health and amenity impacts would enable the wider impacts of such projects or regulations to be more accurately identified. This would lead to the use of appropriate controls for reducing air pollution, delivering a greater net benefit to the community.

There has been some assessment of the cost-effectiveness of placing stronger controls on air pollution, although Australian data is lacking.

An assessment of implementing the *US Clean Air Act 1963* shows that the costs of meeting the Act's requirements are projected to result in substantial air quality improvements, significant reductions in air pollution-related premature death and illness, improved economic welfare, and better environmental conditions. The economic value of this will vastly exceed the cost of compliance (see Figure 4.1). Figures are provided in 2006 US dollars.

Figure 4.1 Direct benefits and costs of the US Clean Air Act, 2000 to 2020



Source: US EPA (2011) The Benefits and Costs of the Clean Air Act from 1990 to 2020 – Summary Report p2
<<https://www.epa.gov/sites/production/files/2015-07/documents/summaryreport.pdf>>

The scope of government policy

Government policies complement legal requirements by emphasising the government's legal, program and budgetary priorities. Policy frameworks are set to achieve a range of aims, such as the following:

- keeping Victorians safe
- creating jobs and economic growth
- directing development to particular areas
- ensuring that services such as health and education are effective and accessible
- supporting Victorians through social safety nets
- promoting fairness and equity, community amenity and cohesion
- protecting our environment.

Protection of public health and amenity is not always a priority when setting strategic policies and when government agencies implement them. For example, provision of jobs and encouragement of economic development can be given greater priority than protection of the environment or public health.

Regulatory and policy frameworks relevant to air quality management

Governments, businesses and the community all have roles and responsibilities that relate to the generation of air pollution and its effective monitoring and/or management.



The following sections summarise the main frameworks affecting Inner West air quality. Among other things, they demonstrate the complexity of the frameworks and their interactions.

Reformed environment protection framework

In 2016 an independent ministerial advisory committee considered the extent to which the EPA was equipped to meet current and future environment and human health challenges. It found the EPA was not equipped to deal with future pollution and waste challenges and that a major reform program was required.

One result was the development of a new Act, the *Environment Protection Act 2017*, with a stronger emphasis on preventing pollution as opposed to 'cleaning up' after incidents have occurred. The Act will come into force in July 2020. Its cornerstone is the 'general environmental duty', which requires Victorians to take all 'reasonably practical' steps to prevent harm to humans and the environment from pollution and waste. The Act also provides for the following:

- new licensing tools and requirements
- strengthened powers and stronger penalties to hold polluters to account
- requirements for licensees to make emissions monitoring information publicly available
- strengthened inspection powers

- Better Environment Plans, allowing the EPA to promote and compel innovative approaches to environmental protection; for example, businesses operating in an industrial estate could develop a collective plan to reduce air pollutants.

Air quality reporting standards

The National Environmental Protection (Ambient Air Quality) Measure sets concentration standards for six key ambient air pollutants:

- fine and coarse particulate matter (PM_{2.5} and PM₁₀)
- nitrogen dioxide
- sulphur dioxide
- ozone
- carbon monoxide
- lead.

All jurisdictions must monitor and report against these (see Chapter 3).

There are no standards set for PM₁.

National Environmental Protection Measures

The National Environmental Protection Measures covering air toxics and diesel vehicle emissions also require action to reduce air pollutants.

Air Quality Strategy

The Victorian Government has committed to releasing a comprehensive, statewide Air Quality Strategy, which will articulate policies and programs to underpin future air quality and empower Victorians to reduce air pollution and their exposure to it. The Government had intended to release it in 2019.

Transport

The main provisions dealing with transport-related emissions are set nationally through vehicle emission standards, fuel quality standards and the National Heavy Vehicle Law (emission standards and controls for vehicles over 4.5 tonnes).

The Victorian Government sets on-road (“in-service”) vehicle emission standards for light vehicles (under 4.5 tonnes) and petrol vapour limits. It also operates a reporting service, through the EPA, for smoky light vehicles and has power to reduce transport sector emissions through its controls for public transport provision, infrastructure development, industry regulation, ports management, and establishing initiatives such as environmental freight zones.

The state’s *Transport Integration Act 2010* clarifies that the transport system must be sustainable in environmental terms and that social and environmental considerations must be given prominence equal to economic considerations in decision making. This includes avoiding, minimising and offsetting harm to the environment from transport-related emissions and pollutants. The Act mandates an integrated Victoria Transport Plan.

Planning

Victoria’s land use and development planning framework provides the basis for uses and activities on land and contains various provisions covering how air quality must be considered when making planning decisions. Further details are provided in Chapter 7.

Public health and wellbeing

Victoria's *Public Health and Wellbeing Act 2008* covers 'nuisances' that are liable to be dangerous to health or offensive, among them nuisances arising from or constituted by noise or emissions. These could include excessive smoke from chimneys or dust from yards. Local councils must investigate any notice of a nuisance and have a duty to remedy, as far as reasonably possible, all nuisances in their municipality.

Occupational health and safety

National and state and territory OH&S frameworks aim to protect people from dangers to their health and safety when at work or doing things associated with work. Where air pollution is a recognised danger to health or safety, employers are required to implement all reasonably practical measures to avoid or reduce exposure to it. In Victoria WorkSafe is the relevant regulatory agency.

Emergency management

Victoria's emergency management system provides a guide to managing fires and industrial accidents that can create air emissions. Such incidents can give rise to substantial risks for local air quality, as demonstrated by the 2018 West Footscray Warehouse Fire. Emergency management actions can include monitoring of air quality by the EPA and reporting and giving advice on the environmental impacts and health risks associated with pollution and waste (such as smoke and poor water quality).

Officers for the Protection of the Local Environment (OPLEs)

The Victorian Government has established a network of officers for the protection of the local environment - authorised EPA officers embedded in 23 councils (including Brimbank, Hobsons Bay and Maribyrnong) to help councils better focus on responding to smaller scale, lower risk pollution problems, including dust and odour. These officers do not at present have responsibility for dealing with other air pollutants.

The Environment Effects Act

Under Victoria's *Environment Effects Act 1978* assessment of the potential environmental impacts of proposed developments can be required by the Minister for Planning through an environment effects statement. Statutory decision makers - ministers, local governments and statutory authorities - must take account of the Minister for Planning's assessment of a proposal's potential environmental impacts (including contributions to air pollution) before granting any statutory approvals for the proposal. Decision makers can specify controls to reduce air pollution in response to such assessments.

Public-private partnerships

Partnerships Victoria policy provides a framework for developing contractual relationships between the state and the private sector for delivering public infrastructure through public-private partnerships. Depending on the project, various air pollution control mechanisms can be required. An environment effects statement is often required to be produced during the planning process.

International conventions

The Commonwealth Government is responsible for ensuring compliance with international conventions, some of which place controls on emissions of air pollutants. An example is MARPOL (the International Convention for the Prevention of Pollution from Ships), which contains requirements aimed at preventing pollution, including sulphur dioxide emissions, from shipping.

Findings

- The high levels of historic and current air pollution in the Inner West means that the area's communities have been and continue to be exposed to higher health and amenity risks compared with much of the rest of Victoria. The Inner West therefore requires greater protection from air pollution impacts, and stronger government policy and regulatory interventions will be needed to achieve this.
- The processes for developing air quality policy, legislation and regulation (such as impact assessments) do not provide for sufficient weighting of human health and community amenity benefits when compared with economic effects and benefits. Potential negative effects on our communities' health and amenity from increased pollution and environmental degradation are often not adequately costed or assessed - often simply because it is harder to place a monetary value on them.

Statutory frameworks

- Gaps and loopholes across current statutory frameworks limit their ability to effectively control air pollution. Although some of these deficiencies might be redressed by the reformed environment protection framework, this has yet to be proven and covers only one of the frameworks.
- Nevertheless, introduction of a preventative approach to managing pollution, underpinned by a general environmental duty, is vastly preferable to the current approach whereby polluters may be required to respond to pollution only after it occurs.
- The EPA and local governments are responsible for policing air pollution. There are, however, fundamental practical and legal obstacles to the Victorian Government and local governments being able to do this. For example, the EPA is not able to collectively regulate air pollution from dispersed sources, such as cumulative effects from multiple industries and vehicles. Additionally, some air pollution matters are the responsibility of the Commonwealth Government.
- National laws restrict Victoria from taking different and/or stronger approaches to air pollution management compared with other jurisdictions. Even so, the Victorian Government still has a clear role to advocate for improvements to national policy and statutory frameworks in order for these to better deal with air pollution risks - for example, in strengthening fuel quality and vehicle emission standards.
- The sheer complexity of the regulatory environment makes progress in tackling air quality problems challenging.
- If Victoria's reformed environment protection framework is to be effective, the EPA and other authorities will need to be adequately funded and resourced so that they can perform their strengthened roles and use their powers to best effect.
- There will need to be reforms to Victorian statutory frameworks to enable effective reductions in Inner West air pollution. Specific recommendations throughout this report deal with this.
- The powers provided for in the *Transport Integration Act 2010* are not being sufficiently used to control air pollution.

Government policy

- Even though the EPA now has a public health team, there remain functional disconnections between air quality regulators and public health authorities. Senior health officers such as the Chief Health Officer, the Chief Preventive Officer and the Chief Advisor on Cancer are not sufficiently involved in developing policies for the management of air pollution.
- There is no focus on reducing air pollution in the current Victorian Public Health and Wellbeing Plan 2019–2023, although the plan does refer to other legislation that imposes controls for preventing or minimising air and other pollution. The Brimbank and Hobsons Bay municipal public health and wellbeing plans do not deal directly with air pollution; the Maribyrnong plan, on the other hand, includes air pollution as one of its priorities.

Legacy sites

- Many industrial sites continue to emit levels of pollutants that would be unacceptable if the sites were established today.
- Once a business has been established, land has been approved for industrial development or a vehicle is on the road, it is very difficult to require retrospective improvements in its air quality performance, even if practical technical solutions become available. There is little opportunity to achieve continuous improvement in air quality management in an existing business.

Government operations

- In his Improving Victoria's Air Quality report, the Victorian Auditor-General, Andrew Greaves, acknowledged limitations in Victorian Government air pollution management processes and services. He recommended that the roles and responsibilities of relevant government agencies be clarified with respect to air quality management and that protocols be developed to ensure that accountabilities are understood, and coordination is achieved.

Recommendations

Priority recommendations are shown in bold.

That the Victorian Government:

Statutory framework	<p>4.1 Builds on the reforms to the environment protection framework, ensuring its policy, strategy and statutory framework development, and decision-making, prioritise addressing the health impacts of Inner West air pollution. [Priority]</p> <p>Through actions such as:</p> <ul style="list-style-type: none"> - committing to ongoing funding and expansion on the number of OPLE roles or similar in the Inner West, enabling them to: <ul style="list-style-type: none"> o respond to air pollution complaints in a timely manner o reduce air pollution risks through prevention and community and industry education - reviewing other statutory frameworks impacting on air quality management, to assess opportunities for complementary strengthening, including addressing inconsistencies, gaps and loopholes - including air quality as a priority in the next Public Health and Wellbeing Plan (Vic) and requiring consistent and complimentary Inner West municipal health plans - improving cooperation between agencies with air quality management, including reporting, responsibilities - ensuring Inner West air quality solutions are a key focus in the Victorian Air Quality Strategy - engaging effectively, proactively and transparently with the community wherever appropriate 	Medium-term
Medical resources	<p>4.2 Commits to ongoing funding of local medical resources specialising in addressing health risks from air pollution, commensurate with the enhanced risks to Inner West communities.</p> <p>4.3 Undertakes a health risk assessment of the public health impacts caused by air pollution in hot spot areas in the Inner West, including the Brooklyn residential precinct.</p>	Medium-term
Statutory framework	<p>4.4 Ensures the environmental and social requirements of the Transport Integration Act are upheld such that transport and land use authorities work together to achieve an integrated and sustainable transport system in the Inner West.</p>	Short-term

5 Transport

Truck emissions and children of the Inner West

Children, older adults and those with pre-existing medical conditions are particularly vulnerable to health impacts from air pollution. In the Inner West, buildings where such people spend much of their time – their homes, aged-care facilities, kindergartens, schools and childcare centres – can be located on or near major transport routes, exposing them to increased levels of air pollution. For decades the local community has called for action on the growing volume of trucks using local streets near such facilities and the inappropriate siting of new facilities on or near what have become major transport routes.

Francis Street in Yarraville links the Port of Melbourne to large clusters of factories, warehouses and container parks in the Inner West, which results in very high numbers of freight vehicles using this route. Wembley Primary School is less than 150 metres from this roadway. A 2015 survey showed that 20 per cent of the school's students were suffering from asthma - twice the national average. This prompted concerned parents to lobby for changes to truck movements on nearby roads, and from July 2016 the existing Francis Street curfews were extended to include drop-off and pick-up times during school terms.¹

Many other schools and childcare facilities in the Inner West are located on and near major truck routes, among them some projected to attract more trucks when the West Gate Tunnel opens.

Air pollution from transport

The transport sector - including business, private and public vehicles - is the primary source of air pollution in urban areas including the Inner West.² The pollution is greatest and (as outlined in Chapter 3) often at alarmingly high levels along streets and roads where the communities of the Inner West live, work, shop and play.

The level of transport pollution is higher in the Inner West than in the Melbourne metropolitan area as a whole, and heavy vehicles contribute disproportionately to this. This is because the Inner West contains a substantial number of transport and industry hubs, industrial sites and port facilities.³

The main emissions from vehicles and ships are particulate matter, oxides of nitrogen, carbon monoxide, volatile organic compounds (as hydrocarbons), sulphur dioxide and, indirectly, ozone. As detailed in Chapter 1, these all pose hazards to human health.

Increasing vehicle movements in and through the Inner West are having major impacts on our communities' health and amenity - including exposure to ever more carcinogens. As Maribyrnong City Council identifies, residents continue to 'subsidise the movement of goods around the country with their health'.⁴ The true costs of providing freight services for Victorians should not continue to be disproportionately borne by Inner West communities.

Increasing traffic in the Inner West

Increasing population, urban density, industrial activity and commuter traffic have meant that, in recent decades, the volume of traffic in the Inner West has grown and congestion has become worse, greatly increasing residents' and workers' exposure to vehicle pollutants and the consequent health risks. More traffic is diverting to residential roads and streets lined with shops and community facilities as drivers search for ways to avoid congestion.



Heavy vehicles outside a primary school

Increasing transport emissions from outside the Inner West

Population growth in Melbourne's outer west, in Geelong and on the Bellarine Peninsula has led to more vehicles travelling through the Inner West to reach other metropolitan locations, especially when commuting to and from work.

The planned Port of Melbourne expansion will further increase freight and container transport to, from and through the Inner West. Under business-as-usual conditions, truck traffic from the Port of Melbourne is forecast to grow from about 11,000 trips per weekday in 2016 to 34,000 in 2050. Even if truck productivity and infrastructure improvements, including the Port Rail Shuttle, were adopted, the increase will still be almost 100 per cent.⁵

Diesel emissions

The health impacts of diesel exhaust emissions are of particular concern to the CRG. As noted, most trucks and other heavy road vehicles use diesel (diesel exhaust emissions are a declared Group 1 carcinogen).

Diesel vehicles emit significantly more pollution (oxides of nitrogen and particulate matter) than petrol vehicles per kilometre travelled.⁶ There is no safe level of exposure to these substances. Diesel emissions have been implicated in elevated risks of lung, bladder, liver, stomach and other organ cancers, and in an elevated risk of cardiovascular disease.⁷ According to one recent study, 'one in ten lung cancers are now found to be caused by outdoor traffic pollution'.⁸



Heavy vehicles in Francis Street Yarraville

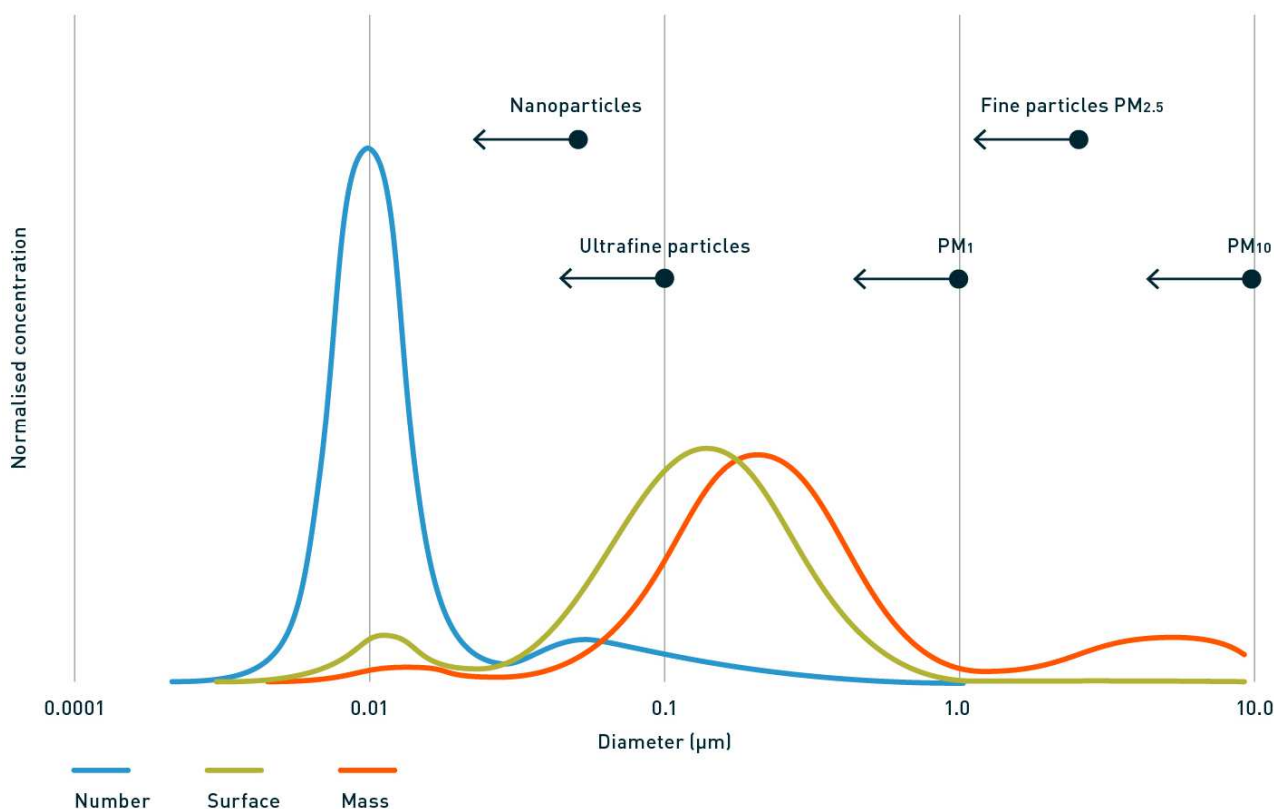
Figure 5.1 shows PM₁₀ and PM_{2.5}, which are the only particulate matter components currently monitored by the EPA, account for a minority of particulate emissions from diesel. Approximately 80–95 per cent of diesel particulates are PM₁ or ultrafine particulate matter (less than 1.0 micrometres and 0.1 micrometres in diameter, respectively).⁹ As noted in Chapter 1, these are particularly damaging to human health, readily penetrating deep into the respiratory tract and from there into the bloodstream and the body's organs.

Even short-term exposure to diesel exhaust emissions can generate acute irritation of the eyes, throat and bronchial tubes, neurophysiological symptoms such as light-headedness and nausea, and respiratory symptoms such as coughing and phlegm.¹⁰

'I have lived on a busy arterial road in Melbourne's Inner West for three years. The road is heavily used by freight trucks, many of them old and smoky. The air is often thick with the odour of diesel fumes and our house needs to be frequently cleaned inside and out to remove the sooty residue, so logically it means we are breathing in this material as well. My wife's asthma has worsened considerably since we moved in and I worry a lot about the adverse long-term health effects on me and my family as the air quality continues to worsen.

Male, mid-50's, father of 2, Seddon Resident

Figure 5.1 Diesel particulate matter components



Source: Majewski, WA.; Jääskeläinen H. 'Exhaust particulate matter (webpage) *DieselNet* < <https://dieselnet.com/tech/dpm.php> >

Vehicle emission standards

The Commonwealth Government introduced emission standards for heavy vehicles in 1976 through the Australian Design Rules (ADR30). Equivalent to the European Union's Euro I standard, the Australian standards set limits on the amount of carbon monoxide, volatile organic compounds, oxides of nitrogen and particulate matter a new vehicle sold in Australia is allowed to emit. Before 1976 there were no requirements for heavy vehicles to be fitted with air pollution controls.

Australian emission standards have been tightened over time. The current minimum standards for new heavy vehicles, fully introduced in 2016 (ADR 80/02 and ADR 80/03), are based on Euro V standards. The strengthened standards, as depicted in Figure 5.2, greatly reduce particulate matter and oxides of nitrogen (NO_x) emissions from new vehicles.¹¹ Australia's main trading partners now require minimum Euro 6-VI standards for new vehicles.

The Commonwealth Government has also made a commitment to harmonising Australian standards with UN vehicle standards wherever possible. However, no actions have commenced to deliver on this commitment.

In 2016 the Commonwealth Government released an impact assessment of the adoption of more stringent emissions standards, equivalent to Euro VI, but no further action has been taken in adopting strengthened standards. Australia's major trading partners have adopted Euro VI or equivalent standards for new heavy vehicles. Such vehicles sold in Australia are therefore more polluting than those sold in many other countries, and Australia's standards do not meet UN-sanctioned standards. Moreover, some vehicles sold in Australia - those with complex parts, for example - are permitted to be more polluting than Australian standards prescribe.¹²

Figure 5.2 Euro vehicle emission standards: maximum particulate matter (PM) and oxides of nitrogen (NOx) emissions allowed (g/kWh)

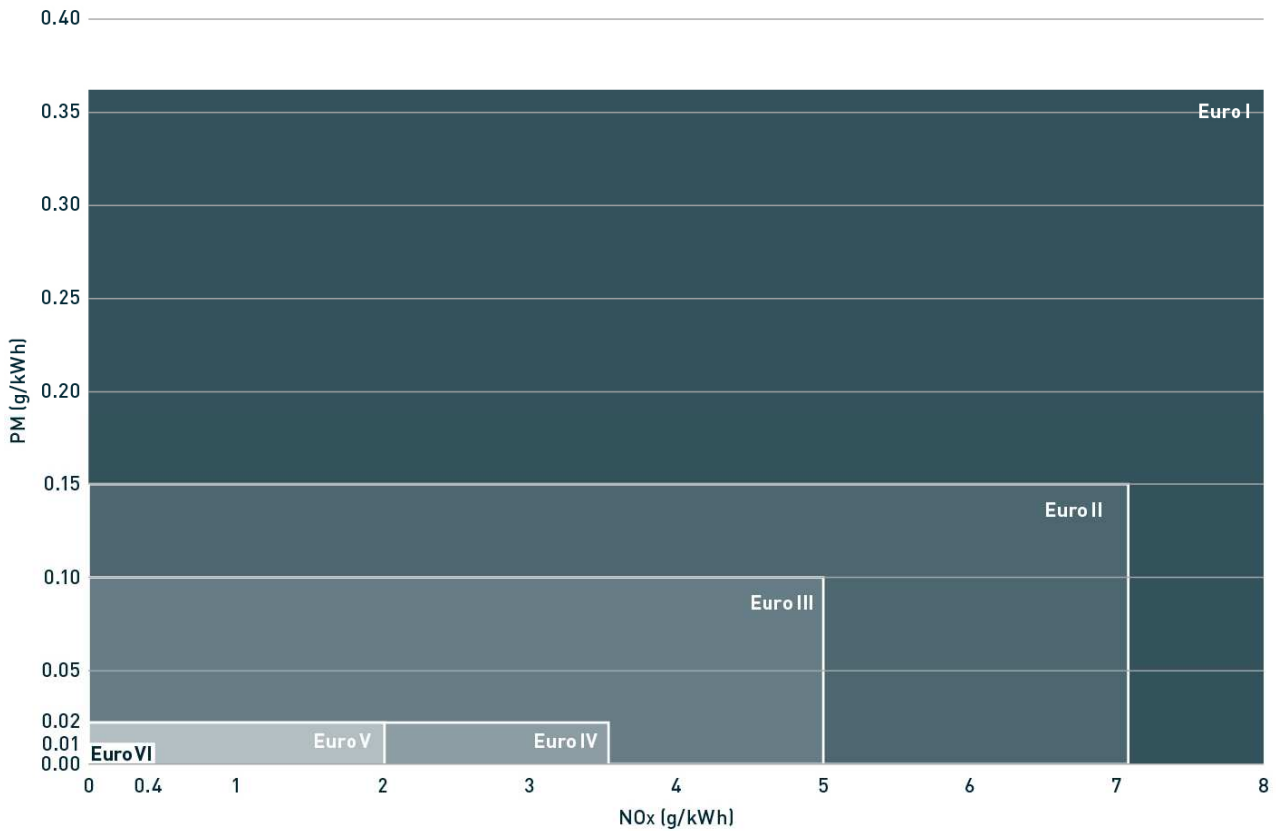
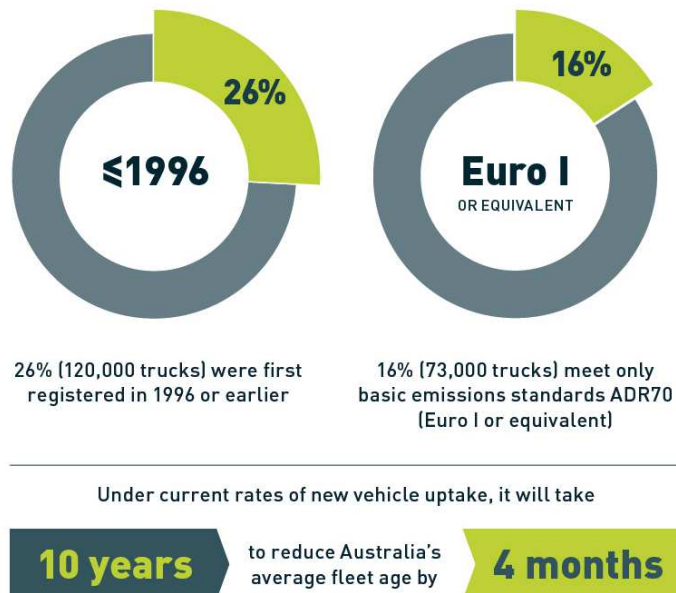
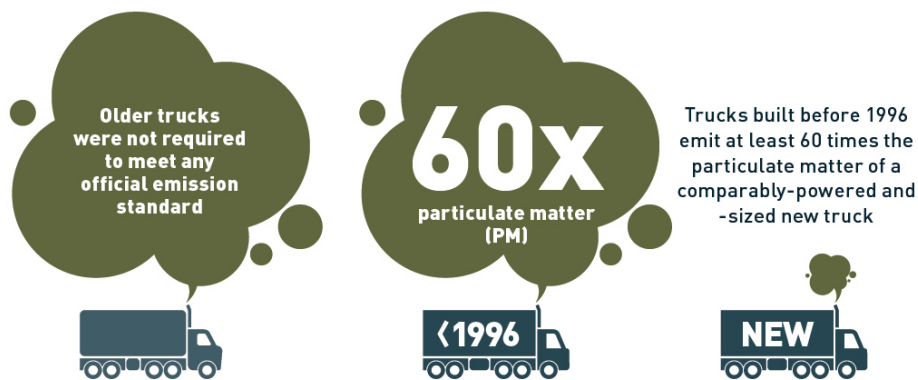


Figure 5.3 Pollution from Australia's truck fleet





Source: Adapted from Truck Industry Council <<https://www.truck-industry-council.org/>>

According to the Truck Industry Council, the average age of the Australian heavy vehicle fleet is 14.8 years, which is older than that of many trading partners and one of the oldest in the developed world. Many vehicles meet Euro 3/III standards only and might in fact not be fitted with any pollution controls. In Victoria almost two-thirds of the fleet falls into this category.

Also, according to the Truck Industry Council, at the current rate of fleet renewal it will take 10 years to reduce Australia's average truck age by four months, from 14.8 to 14.4 years.¹³

Vehicles in the Inner West

Vehicles travelling through the Inner West – particularly heavy vehicles – are much more polluting than current Australian standards allow.

Many vehicles doing short-haul freight trips between the Port of Melbourne and nearby distribution centres and container parks in the Inner West ('first' or 'last mile trips') are older, more polluting heavy vehicles. Such vehicles are also used to carry waste or raw materials to industrial areas and local landfills.

Vehicle movements to the Port of Melbourne are projected to grow substantially by 2050.

Opportunities for decreasing vehicle emissions

It is possible to reduce transport emissions successfully with strong government leadership. In the past half century improved fuel standards and advances in engine technology have led to greatly reduced emissions. A number of other steps can be taken to further decrease vehicle emissions, among them the following:

- tightening vehicle emission (design) standards for new heavy vehicles. The standards are currently equivalent to Euro 5/V, while most of Australia's trading partners mandate minimum Euro 6/VI equivalence and stringent testing to measure real-world driving emissions
- tightening fuel quality standards. Australia is ranked 79th in the world for petrol quality (based on sulphur content) - the lowest ranking of any OECD country¹⁴
- use of alternative fuels such as methanol, dimethyl ether, LPG, biodiesel and hydrogen. Some of these (such as green hydrogen) can be produced using renewable energy, in which case they will be carbon neutral
- adoption of zero-emission vehicles powered by electricity from renewable sources and green hydrogen
- traffic management measures such as operating traffic lights to reduce congestion and more polluting stop-start traffic.

Worldwide action to reduce the use of more polluting vehicles

While diesel vehicles are becoming increasingly popular in Victoria, other jurisdictions are acting to discourage and prevent the use of more polluting vehicles, particularly in urban areas. They are introducing a suite of far-sighted, strategic and complementary actions, using a balance of incentives and disincentives to cut emissions and reduce their health impacts.

Many European cities plan to ban the entry of diesel vehicles. The sale of both new diesel and petrol cars will be banned in France and the United Kingdom by 2040.¹⁵

Low-emission zones, which restrict access for more polluting vehicles, were first introduced in Sweden in the mid-1990s and are now used in at least ten European countries. Interestingly, in Sweden large trucking companies with the resources to upgrade to low-emission vehicles benefited from the competitive advantages the zones deliver and have called for the zones to be expanded.¹⁶

An ultra-low emission zone was introduced for central London in April 2019. It operates 24-hours a day, seven days a week and in time will be expanded to cover more of the Greater London area. All diesel vehicles travelling in the zone must meet Euro 6/VI standards: failure to do so incurs a charge. The minimum standard for petrol cars is Euro 4. According to the Greater London Authority, the ultra-low emission zone led to a 36 per cent reduction in air pollution (as measured by NO₂) within the first six months of operation.¹⁷

From 2021 diesel cars will be banned from entering Bristol's central city between 7am and 3pm every day, while heavy diesel vehicles entering the city will incur a charge. Bristol City Council introduced this "Clean Air Zone" as one way of complying with new legal limits on NO₂. The UK High Court has ordered the government to significantly reduce air pollution in urban areas in the shortest possible time. The Clean Air Zone will be complemented by a car scrapping scheme to help diesel car owners buy alternative vehicles.¹⁸

In February 2019 Singapore doubled its excise duty on diesel fuel, to S\$0.20 a litre, to discourage diesel consumption, the nation's main domestic source of fine particulate pollutants. All new diesel and petrol trucks must meet Euro VI standards, and there is a turnover scheme to support replacement of Euro II and Euro III vehicles with Euro VI-compliant ones.¹⁹

Hong Kong's Clean Air Plan is '... the best world-wide example of a policy package response to the problem of poor air quality [from traffic] and older trucks.'²⁰ It provides incentives for truck owners to replace older trucks, and a prohibition on pre-1996 trucks - a carrot-and-stick approach. Hong Kong residents were told about the Plan eight years before its introduction, and when it came into effect 90 per cent of old, more polluting vehicles had been phased out. The average age of heavy goods vehicles (from first registration) fell from nine years in 2011 to four years in 2015. This suggests that a combination of incentives and disincentives can be highly effective for phasing out older vehicles.²¹

In California a Clean Air Action Plan for the port areas of Long Beach and Los Angeles was adopted in 2006. The ports pledged to reduce existing levels of air pollution by at least 45 per cent within five years. The plan has helped the ports authority maintain a social licence to operate. From 2012 the plan has banned trucks older than those manufactured in 2007 from picking up or dropping off containers at either port. The 2012 Port of Los Angeles annual emissions inventory showed it was on track to meet, and in some cases exceed, even stricter emission reduction goals for diesel particulate matter and oxides of nitrogen by 2014.²²

The Port of Los Angeles Clean Air Action Plan has strategies for reducing pollution from ships, trucks, trains, cargo-handling equipment and harbour craft. Since 2005 these have reduced emissions by 85 per cent for particulate matter, 50 per cent for oxides of nitrogen and 95 per cent for sulphur oxides.²³

Clean air initiatives have also been in operation at many other ports around the world for several years, among them Oakland, Vancouver, New Orleans, Rotterdam, Stockholm and Hamburg.

The diesel emissions scandal

From 2014 some car makers installed software in light diesel vehicles that manipulated air pollution tests. The software recognised when factory-based testing was being done and adjusted the engine to emit lower levels of pollutants. Independent tests proved that under normal driving conditions some Volkswagen, Volvo, Renault, Citroën, Fiat and Jeep vehicles exceeded European NO_x emission limits by more than 10 times.²⁴

Researchers proposed introduction of the UN-sanctioned Worldwide Harmonized Light Vehicles Test Procedures, which better reflect real-life driving conditions. The test did not come into force until 2017: critics say car firms lobbied fiercely to delay its implementation because of the high cost of meeting stricter environmental controls.²⁵ The UN procedures are not in use in Australia.

Low-emission zones

Environmental and low-emission zones also encourage the transition to cleaner vehicles. In these zones vehicles that do not meet strict emission standards have their access to designated roads restricted or are banned from entry altogether.

Environmental and low emission zones not only reduce the interface between residents and diesel emissions, but importantly they also encourage the transition to cleaner vehicles.

Victoria's Smart Freight Partnership, which was to be introduced in 2020 on some Inner West Streets, would have provided greater access rights to less polluting vehicles and reduced the impact of diesel exhaust emissions on residents of the Inner West. Unfortunately, it didn't have community or industry support due to State Government's unwillingness to implement it on more than three streets. This meant it was not a true low-emissions zone and therefore would not have been effective in incentivizing cleaner newer trucks.

Use of vegetation to reduce community exposure to vehicle pollution

Vegetation can help protect local communities from transport pollution by acting as a barrier, filtering and capturing air pollution, and separating residents from road traffic.²⁶ For example, Junglefy Breathing Wall modules have been installed with air quality monitors on the Eastern Distributor and Hills M2 motorways in Sydney to test how effectively living infrastructure can improve air quality on transport thoroughfares. Microbes in the soil 'treat' the captured air pollution.²⁷

Rail freight

The Inner West contains three important rail corridors that service Melbourne's and Victoria's west and have the capacity to divert large volumes of road freight. Metropolitan freight trains on short trips - such as those proposed for the Port Rail Shuttle, can carry up to 84 containers. Regional trains can carry about 200 shipping containers, keeping 50 B-double trucks off the road.²⁸

The West Gate Tunnel Project

The West Gate Tunnel project involves a toll road that will link the West Gate Freeway at Yarraville with CityLink at Docklands via a tunnel beneath Yarraville. Its design, construction and operation present major risks for Inner West air quality and have been a focus of the CRG's assessments. Our terms of reference require us to 'provide advice and recommendations for government consideration including in relation to tunnel filtration for the West Gate Tunnel project' (see Appendix A). Additionally, the former Minister for Roads made commitments to the Maribyrnong Truck Action Group, advising that the CRG would be 'tasked with forming a final and conclusive position' on tunnel filtration and that our timeline would align with the construction program for the tunnel to ensure that any future measures can be adopted (see Appendix C).

The Project is scheduled for completion in 2022.

Findings

Road freight

- Action to remove diesel vehicles from our roads would be the most significant measure the government could take to limit particulate matter pollution from the Inner West airshed.
- The number of polluting vehicle movements through the Inner West will increase in the coming decades, even with truck bans associated with the West Gate Tunnel project:
 - There will be 10 million more trips a day in the Melbourne metropolitan area by 2050, including both passenger and freight trips²⁹
 - The planned Port of Melbourne expansion will lead to more trucks travelling to container parks in the Inner West and, when the West Gate Tunnel opens, travelling through the tunnel. The Port of Melbourne is planning for 'constant growth in the demand for container trade' and for larger ships that carry more and more containers.³⁰
- The Commonwealth Government's Fuel Tax Credit Scheme effectively means that taxpayer money is both subsidising diesel, through paying rebates for its purchase, and picking up the costs of addressing the corresponding health impacts from diesel emissions. Any company operating trucks that meet a least one of four 'light-touch' environmental criteria can receive the subsidy.^{†,31} This means that old trucks (for example, pre-1996) and even some very old trucks with no emission controls fitted are eligible to benefit from this rebate scheme. The scheme incorporates very minimal environmental conditions and provides minimal incentives for owners to upgrade to lower-emission vehicles. This contrasts with initiatives in many countries that actively support the uptake of low- and zero-emission vehicles.
- The Commonwealth Government is not taking effective action to improve vehicle emission or fuel quality standards. For example, it does not intend to mandate low sulphur-content fuel, which is necessary for the effective operation of Euro 6/VI vehicles, until 2027.³²
- There is no comprehensive process for ensuring that in-service vehicles are maintained so that they comply with government emission standards. If a smoky light vehicle is reported to it, the EPA can issue a letter advising the owner that the vehicle should be tested. No follow-up action is taken. To the knowledge of the CRG, the National Heavy Vehicle Regulator has not yet established processes for ensuring heavy vehicles in use are compliant with standards.
- Alternative vehicle fuels and alternative vehicle technologies can support the phase-out of diesel use, including in heavy vehicles. Their adoption would lead to a reduction in the amount of particulate matter and nitrous oxide emitted in the Inner West.³³

^{*} A partnership between the Victorian Government's Major Transport Infrastructure Authority and Transurban, to be built by CPB Contractors and John Holland

[†] These pertain to the age of the vehicle, its maintenance and in-service air emissions performance.

Environmental and low-emission zones

The success of environmental and low-emission zones depends on integrated measures such as the following:

- effective enforcement and policing - technology such as intelligent access program telematics and compliance cameras installed on trucks
- financial support to help vehicle owners upgrade to newer, less polluting vehicles
- early announcement of planned bans or restrictions on truck movements to give owners time to upgrade their vehicles and adapt operations.

Use of vegetation to reduce community exposure to vehicle pollution

- Green walls could be particularly useful along busy roadways: they occupy less space than individual trees and can trap and deflect pollution. The CRG notes that Junglefy Breathing Wall modules have been installed with air quality monitors on the Eastern Distributor and Hills M2 motorways in Sydney to test how effectively living infrastructure can improve air quality on transport thoroughfares.³⁴
- There are opportunities to exploit the Greening the West* initiative to mitigate air pollution by planting vegetation near roadways to shield communities from transport pollution. Such action aligns with the initiative's goal of improving residents' health and social wellbeing.

Rail freight

- There are a number of opportunities for mitigating the impact of diesel freight train emissions, including:
 - Commonwealth regulation of diesel train emissions (as in the United States), noting that a non-government code of practice for locomotive emissions has recently been introduced
 - installing attenuation measures such as green walls
 - transitioning freight trains from diesel to diesel-electric hybrid technology (using electric power in cities and diesel in country areas).
- Opportunities to increase use of rail freight will be greatly improved through planned rail infrastructure and metropolitan intermodal terminals such as the Western Interstate Freight Terminal and Port Rail Shuttle.

West Gate Tunnel project

Ventilation and filtration

- The Inquiry and Advisory Committee (IAC) appointed to advise the Minister for Planning on the West Gate Tunnel proposal† noted 'Parts of the Project area already have poor air quality, and the IAC considers that the Project should aim to contribute to an improvement in that situation. The IAC has recommended that pollution control equipment be installed on the tunnel ventilation system' and that 'pollution control equipment should be fitted at construction, rather than just provided for'.³⁵
- Contrary to this advice, the Minister for Planning determined that filtration did not need to be installed during construction since that would not be cost effective. This determination was based on costs associated with only one other Australian tunnel, the Sydney M5 East Tunnel. Project approvals did, however, require that the stacks be designed and built so that filtration could be retrofitted in future if monitoring showed that air emissions reached specific levels.

* 'Greening the West' is a regional initiative led by a large consortium of industry, government and community stakeholders such as City West Water, local councils and DELWP. Its Strategic Plan calls for a doubling of the tree cover of the western suburbs by mid-century.

† The IAC was appointed to consider the environment effects statement, a draft planning scheme amendment affecting Hobsons Bay, Maribyrnong, Melbourne, Port of Melbourne, Brimbank and Wyndham planning schemes, works approval application and public submissions associated with the West Gate Tunnel project in accordance with the approved terms of reference.

- The community's ability to find out whether pollution is increasing and whether retrofitting is required will be further compromised if the tunnel project's air quality monitoring is discontinued five years after the tunnel is completed. This would also affect the EPA's assessment of whether the ventilation system is operating as it should and if or when stack filtration needs to be retrofitted.



A Westbound southern portal and ventilation structure (artist's impression)*

- The CRG was told it was too late for filtration to be installed before the tunnel's opening. Given our terms of reference (see Appendix A) and commitments from the former Minister for Roads (see Appendix C), the CRG notes its disappointment that our ability to provide advice and recommendations for government consideration has been curtailed. Stack emissions will contribute to an overall increase in local air pollution, although if filtration were fitted it could greatly reduce these emissions. When such a major risk to community health presents itself, there is no choice but to do everything possible to prevent the emission of air pollutants from the tunnel stacks.
- The CRG received expert advice on the need for and advantages of fitting tunnel filtration. The advice was that air pollution mitigation measures such as strengthening engine emission standards, reducing sources of diesel pollution and increasing the availability of public transport would be preferable. Nevertheless, although they are vitally important, these measures cannot be relied on to make a significant difference to Inner West air quality in the short or medium term.
- Through the reforms to its environment protection framework the Victorian Government is moving towards a prevention-based approach to environment protection, yet the decision to require filtration only after harm is caused is a clear example of old-school, consequence-based decision making.
- Dispersal of pollutants via stacks is not the same as removing the pollutants. Given the transport sector's contribution to the Inner West's poor air quality, and the fact that the community's health is already compromised, mitigation measures such as filtration are important. The government objective for ambient air pollution is already exceeded in the Inner West many times a year without the further contribution of tunnel emissions.

* Acknowledgement: West Gate Tunnel project

- The CRG was told that the design of the stacks and the dispersal range would result in the pollutants being diluted to safe limits once they reached ground level. The emissions from the stacks are, however, predominantly vehicle exhaust - an especially noxious subset of ambient particulate matter that produces health risks at even minimal levels. The contribution to background levels might only be small, but it still raises the toxicity levels of the background emissions. Any reduction in vehicle exhaust emissions, however small, will result in public health gains.
- A 2012 study found that, despite air monitoring for the Lane Cove Tunnel in Sydney showing no increase in NO₂, PM₁₀ or PM_{2.5} near a ventilation stack during study period, residents living within a 650-metre radius of the stack reported more upper and lower respiratory symptoms after the tunnel opened.³⁶ The study concluded that an increase in PM₁ and ultrafine particles, which were not being monitored, was the most likely cause of the adverse health effects for people living in the stack zone. Filtration has the ability to remove these particulates, which are most harmful to human health: no other air pollution mitigation measure can effectively remove PM₁ and ultrafine particles from the airshed.
- The determination that it was not 'cost effective' to install filtration - on the basis of the M5 East Tunnel case study alone - was flawed. Retrofitting filtration on the M5 East Tunnel was a complicated process since it had not been designed to accommodate such equipment, unlike the West Gate Tunnel. The resulting system for the M5 East Tunnel was unreliable and expensive to operate, with pollution removal efficiencies far lower than expected and what are being achieved internationally.³⁷ In view of the speed of technological advances in the past decade, it stands to reason that today's systems would be more efficient.
- The West Gate Tunnel project intends to monitor air pollution near the tunnel for only up to five years after the tunnel opens and to report summary data quarterly. The community's opportunity to know whether pollution is increasing, and whether retrofitting is required, will be further compromised after this time. Notably, the EPA does not have automatic access to project monitoring data - and because of the discrepancy between monitoring conclusions and EPA analysis of the same data (see pp 18 to 20 and Appendix D) - the CRG is concerned that the project will be able to obscure the tunnel's contribution to poor air quality in the Inner West.
- It is unclear to the community what level of stack emissions will set a 'trigger' for installation of tunnel filtration, so we cannot easily know when we should expect retrofitting. By the time such a decision is made, and filtration is installed, harm would have already been done. This is particularly unacceptable considering that the community is already adversely affected by long-term cumulative air pollutant exposure.

Construction impacts

- Construction of the West Gate Tunnel is causing unacceptable air quality problems for residents of the Inner West, among them the following:
 - Elevated dust levels are resulting from excavation works and above-ground roadworks such as road widening. Given the historical legacy of industry in the Inner West, it is possible some of this dust may contain pollutants such as PFAS, asbestos, lead, mercury and arsenic, which could then be breathed in by people in the Inner West.
 - The EPA's analysis (see Appendix D) indicates the potential for some contribution from West Gate Tunnel construction activity in the local area to the extremely high levels of PM₁₀ at Primula Avenue in Brooklyn.
 - Pollution is generated by on-site machinery and other construction equipment and vehicles, especially trucks.
 - Additional vehicle exhaust emissions result when vehicles idle in heavy traffic, and would be a particular concern at major intersections that are congested as a result of construction work. For example, waiting times for access to the West Gate Freeway on and off ramps during peak periods have increased considerably since widening of the freeway began.

- Up until recently the West Gate Tunnel project did not supply enough information to the community or the EPA on the actual effects of tunnel construction on local air quality. It publishes monthly summary reports of data from six local air quality monitoring stations, but they contain relatively limited information (see Chapter 3).

Monitoring data

In keeping with its terms of reference, the CRG received comprehensive data from the West Gate Tunnel project air quality monitoring stations. This consisted of hourly measurements from all six stations - well beyond what is publicly provided, which is mainly 24-hour averages.

The EPA analysed the raw data on behalf of the CRG. Chapter 3 provides an overview of this analysis; Appendix D provides the full EPA report.

Raw data was initially provided in early November 2019 with further data in February 2020, late in the CRG's term, so we had insufficient time to fully consider the implications of the EPA's analysis.

Displaced traffic

Although it is predicted that the West Gate Tunnel will lead to the removal of many trucks from specific streets in the Inner West and although new truck bans and restrictions will be introduced to ensure that heavy vehicles use specific routes and avoid some residential and community areas, the traffic and pollution impacts will become worse for some Inner West locations. The following are examples:

- Millers Road in Brooklyn and Williamstown Road in Yarraville, Seddon and Kingsville will become the primary north-south truck routes in the Inner West. Trucks that would have travelled along routes banned with the opening of the tunnel will start using these routes. Homes and community facilities (including recreation reserves, childcare centres and schools) are located on and very near both roads. Millers Road is projected to carry an additional 4,500 trucks a day. Truck movements along Williamstown Road between Somerville Road and Geelong Road are expected to more than double, to 5,000 a day. Planning permission has been granted for a new childcare centre just metres from Williamstown Road. A primary school and major local recreation reserve are already located along this mostly single-lane undivided road.
- A new ramp, to be built at Hyde Street in Spotswood, will carry a projected 800 trucks a day past sensitive sites such as the Donald McLean Reserve and the Emma McLean Kindergarten. No fixed barriers along the ramp to protect such sites have been planned.
- Simcock Avenue in Spotswood is projected to attract about 500 per cent more trucks travelling to the Hyde Street ramp.
- Truck drivers and operators will choose routes through Spotswood, Williamstown, Newport and Yarraville to avoid paying the Transurban charge.

Widening of the West Gate Freeway

- Widening of the West Gate Freeway will lead to poorer local air quality and a net loss of vegetation.
- Annual PM_{2.5} levels on the Freeway between Millers and Williamstown Roads, and along Millers Road itself, would be above national reporting standards by 2030.³⁸ Annual reporting PM_{2.5} levels along Millers Road are, in fact, already above national reporting standards.*

* Refer Appendix D.

- Although the project involves planting five trees for every one cut down, this will not happen in highly polluted areas because of space restrictions resulting from widened and heavily trafficked roads. There will be an overall reduction in vegetation where it is most needed to help shield communities from air pollution - along Millers Road, for example.

The Port of Melbourne

- The Port of Melbourne generates significant volumes of particulate matter including sulphur dioxide as a result of ship movements and ships idling while berthed, the presence of onshore diesel machinery and the operations of inward and outbound trucks.
- Although the port is not actually in the Inner West, the CRG expects that shipping pollutants will affect our air quality because of the port's proximity.
- Unlike many other ports, the Port of Melbourne does not adopt best-practice methods for minimising emissions from its operations. For example, it does not take the following measures:
 - have onshore power to reduce ships' idling on diesel when in port
 - have a clean truck program whereby access to the port is banned or restricted for trucks that do not meet strict emission control standards
 - offer financial incentives for ships with more efficient engines
 - have a program for electrifying or using hybrid fuel systems for port operations - such as ship-to-shore cranes, gantry cranes and tugboats.



Cargo ship docked at the Port of Melbourne

Reducing the impacts of international shipping on coastal communities

It is estimated that ship-related PM_{2.5} emissions, were responsible for 60,000 cardiopulmonary and lung cancer deaths worldwide in 2002.³⁹ A 2015 New South Wales study estimated that at locations close to ports ships are responsible for between 1 and 15 per cent of ambient PM_{2.5} emissions.⁴⁰

The International Convention for the Prevention of Pollution from Ships - the MARPOL Convention - requires the shipping industry to progressively reduce the proportion of sulphur and other pollutants in shipping fuel over time. From 2020 the global cap on sulphur content in ship fuel has been lowered to 0.5 per cent; the previous limit was 3.5 per cent.

Some jurisdictions (predominantly those receiving a higher number of cruise ships) impose stricter fuel requirements on ships at berth. Port cities in, for example, France and Norway require berthed ships to use fuel with a maximum sulphur content of 0.1 per cent. One study estimated that if shipping operators were required to use fuel with a maximum of 0.1 per cent sulphur when within 300 kilometres of Sydney, the concentration of PM_{2.5} from ship exhaust would reduce by 56 per cent.⁴¹

Public transport

- The establishment of more medium- and high-density residential areas in the Inner West means there is a need for expanded public transport.
- Melbourne's outer western suburbs are among the state's highest growth areas but are inadequately serviced by public transport. This means more people needing to travel by car through the Inner West to reach their home or their workplace.
- Fast-tracking Melbourne Metro 2 so it is completed by 2032 would create a new cross-city mass transit corridor linking the Werribee and Mernda lines through Fishermans Bend, where it is expected an additional 48,000 jobs will be created. This will provide for up to 24 trains an hour ultimately operating between the CBD and Werribee.⁴²
- Although Melbourne Metro 2 has been proposed and refined by several government and independent reports and proposals, these have not been backed by any funding commitments.
- The Altona loop is a single track for much of its length, thus reducing the number of trains that can run on it. In 1985 Paisley/Altona North and Galvin stations were bypassed and closed, greatly reducing locals' access to public transport.
- Demand management measures such as transit and priority bus lanes and express bus routes can help reduce the volume of traffic and traffic congestion.
- Other jurisdictions are purchasing a number of low and no emission vehicles such as electric buses.

Recommendations

Priority recommendations are shown in bold.

That the Victorian Government:

Low and no emission vehicles	5.1	Develops a comprehensive policy to drive uptake of low and no emission vehicles, and reduce transport emissions, with a focus on the Inner West. [Priority]	Medium -term
		<p>This could accommodate the following actions:</p> <ul style="list-style-type: none">- introducing a low emission zone bounded by Grieve Parade, Geelong Road, Kororoit Creek Road and Whitehall Street. Initially, more polluting vehicles should be banned from entering the zone for three hours per day, and immediately before and after core child care, kindergarten and school hours. Over time the ban should be increased to 24-hours. Introduction of the zone should be complemented by measures to support vehicle owners to upgrade to less polluting vehicles- incentivising businesses - particularly freight operators - to upgrade fleets to incorporate vehicles that are, at a minimum, Euro 5 / V equivalent or use alternate fuels- only entering public transport contracts with bus operators that stipulate the use of low and no emission vehicles- facilitating the movement of freight from road to rail, including fast tracking the Port Rail Shuttle project and identifying if this can be expanded, and working with the Port of Melbourne to enable rail to Webb Dock- changing its procurement requirements to ensure all other vehicles used for Victorian Government services and projects are, at a minimum, Euro 5 / V or equivalent compliant or utilise alternative fuels- investigating other ways to drive greater uptake of alternative fuels	
West Gate Tunnel	5.2	Develops a comprehensive, evidence-based policy to minimise air pollution associated with the WGTP both during construction and once the tunnel opens. [Priority]	Medium -term
		<p>Actions should include:</p> <ul style="list-style-type: none">- installation of green walls - using technology such as the Junglify Breathing Wall modules - along the West Gate Freeway between Millers and Melbourne Roads and along the section of Millers Road north of the Freeway- measures to ensure the operation of the tunnel project does not encourage increased truck traffic on feeder roads through residential communities – particularly along Millers and Williamstown Roads. This could be done, for example, by ensuring trucks are redirected through industrial areas	

and providing alternate heavy vehicle routes (e.g. through the upgrade of Grieve Parade through to Market Road and upgrade of Paramount Road route) and enforcing bans or restrictions

- anti-idling requirements for vehicles involved in WGTP construction
- action on the IAC's recommendation to install filtration on the tunnel ventilation stacks. Filtration should be installed prior to the tunnel opening
- a requirement that the WGTP plants replacement trees as near to their original location as possible. (e.g. near Primula Avenue, Millers Road and Grieve Parade, and along the West Gate Freeway corridor)
- installation of fixed barriers to shield sensitive uses from traffic pollution, particularly on the Hyde Street on-ramp in Spotswood, adjacent to the Emma McLean Kindergarten
- explore opportunities to better protect existing sensitive uses exposed to significant air pollution sources (e.g. new highways or major roads), such as through installation of on-site monitoring, installation of on-site filtration systems, and/or protection and regeneration of trees and wildlife, funded, for instance, through increasing road tolling charges

Public Transport	5.3	Prioritises improvements to public transport in the Inner West (including better integration between modes). [Priority]	Long-term
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Actions could include:

- reopening the Paisley and Galvin train stations
- fast-tracking the MM2 project
- increasing frequency and coverage of bus routes in the Inner West and regularly reviewing to ensure access is maximised
- improving passenger facilities (e.g. bike parking) at train stations in the Inner West
- expanding the MM2 project to include
 - the upgrade of the existing freight line between Newport and Sunshine to accommodate passenger services (e.g. electrification and widening of the rail-line)
 - the opening of new stations at locations such as Altona North/South Kingsville and Brooklyn
 - developing and implementing access plans for all Inner West train stations to further encourage patronage

Advocacy	5.4	Advocates to the Commonwealth to implement measures that will improve air quality in the Inner West.	Medium -term
		Through actions such as:	
		<ul style="list-style-type: none"> - promoting and enabling greater use of alternative fuels and low and no emission vehicles to replace use of diesel and petrol-powered vehicles through e.g. a national plan, incentives and/or disincentives for manufacturers and end-users - strengthening the eligibility criteria for the Federal Diesel Fuel Tax Credit Scheme to ensure the rebate is only provided for newer, less polluting heavy vehicles - strengthening fuel quality standards to bring them in line with Australia's trading partners, reducing sulphur content in vehicle fuels to 10ppm or lower - strengthening vehicle emission standards for heavy vehicles by: <ul style="list-style-type: none"> • requiring that all new heavy vehicles meet, at a minimum, Euro VI equivalent standard. • monitoring in-service heavy vehicles in the Inner West to make sure they continue to meet air emission standards - reducing train emissions by <ul style="list-style-type: none"> • implementing diesel locomotive standards by requiring that all freight locomotives meet the equivalent of the US Tier 4 standard • identifying opportunities to promote the adoption of electric trains 	
Port of Melbourne	5.5	Works with the Port of Melbourne to develop a Clean Port Program. [Priority]	Medium -term
		Actions which could incorporate:	
		<ul style="list-style-type: none"> - an environmental charge, bans or restricted access to the port for older more polluting vehicles - financial incentives e.g. discounted berthing fees for 'cleaner' ships with newest engines or equivalent NOx reducing technology - on-shore electrical power so ships do not need to use diesel generated power while berthed - electrifying or utilising hybrid fuel systems for port operations such as ship to shore cranes and gantry cranes - establishing air quality improvement targets, and regular monitoring and reporting of air pollutant levels, from the Port of Melbourne 	

- working with the Australian Government to enable EPA to have jurisdiction over the development and implementation of Port of Melbourne environment protection controls

Polluter pays	5.6	Facilitates all levels of Government to develop targeted 'polluter pays' incentives to fast track air quality improvements and produce resources required to implement this report's recommendations and meet clean energy targets.	Medium -term
		<p>Actions could include:</p> <ul style="list-style-type: none"> - a new tax or levy for diesel and other polluting fuels, including those used to transport shipping containers, power cruise ships, and manufacture plastics 	

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6 Industrial emissions

Most industrial processes generate some degree of air pollution, with emissions including particulate matter, sulphur dioxide, nitrogen dioxide, carbon monoxide and, indirectly, ozone¹, all of which, as detailed in Chapter 2, pose risks for human health. As EPA's analysis of monitoring data shows (see Chapter 3), industrial sites are also substantial contributors to dust and odour.

About one-third of air pollution in Victoria results from industrial activity; this includes about 90 per cent of sulphur dioxide emissions.² Although the CRG has not been able to obtain a detailed breakdown of Inner West air emission sources, we expect there will be a disproportionately high contribution from industry because of the substantial level of industrial activity in the area. Industrial zones account for 4,196 hectares in the Inner West.³ Brimbank alone has 2,320 hectares, which is 10 per cent of total industrially zoned land in the Melbourne metropolitan area.

Monitoring data show that risks from industrial air pollution are likely to be especially severe in places adjacent to industrial areas, such as Brooklyn and Altona North. Given that it is easily dispersed, however, such pollution creates risks throughout the Inner West. Pollution from outside Inner West municipalities (for example, from ports and landfills) further adds to the load. Substantial pollution impacts on and risks to the community's health and amenity arise from these industrial sites, including risks posed by dust, odour and sulphur dioxide.

Inner West industrial premises with EPA licences including air pollution controls



- 1 Peerless Holdings Pty Ltd, 2 Cargill Processing Limited, 3 Graincorp Foods Australia Pty Ltd, 4 Valspar Paint (Australia) Pty Ltd
 5 Sugar Aust Pty Ltd, 6 Dow Chemical (Australia) Pty Ltd, 7 Caltex Australia Petroleum Pty Ltd, 8 Hyde Park Tank Depot Pty Ltd
 9 Viva Energy Australia Pty Ltd, 10 Chemprod Nominees Proprietary Limited, 11 Ecogen Energy Pty Ltd, 12 Mobil Oil Australia Pty Ltd
 13 O-I Operations (Australia) Pty Ltd, 14 Sustainable Energy Infrastructure Pty Ltd, 15 Mobil Refining Australia Pty Ltd
 16 Enviropacific Services Pty Ltd, 17 Qenos Pty Ltd, 18 JBS Australia Pty Ltd, 19 Hexion Pty Ltd, 20 IXOM Operations Pty Ltd
 21 ORICA Australia Pty Ltd, 22 AKZO Nobel Pty Ltd

Industrial sites

Industrial activity is an integral legacy of the Inner West's history, industry having been established in and near this area soon after Melbourne was founded. As time passed, much heavier industry was replaced by lighter industry and commercial and residential developments in many other parts of Melbourne, but in the Inner West and adjacent suburbs it has retained a substantial presence. Today, this includes heavy and lighter manufacturing processes, oil refining, rock crushing, landfills, and demolition and materials handling sites. Industrial areas also contain large areas of open, unsealed land, unsealed roads and material stockpiles.

Significant industrial sites, those that have the potential to be especially polluting, operate under licences issued by the Environment Protection Authority (see map on previous page). These licences are meant to control emissions and prevent the exceeding of air quality standards.

Brooklyn Industrial Precinct

The Brooklyn Industrial Precinct (Figure 6.1) is a major industrial hub situated less than 12 kilometres from Melbourne's CBD and now close to many residential areas. Within the precinct there are over 60 industries - among them quarrying, former landfills, abattoirs, materials recycling, tallow production and container storage - as well as numerous small businesses, from light industrial to retail and manufacturing. There are about 120 individual businesses, and 10 operators are licenced by the EPA.

The precinct is a major source of industrial emissions. EPA and West Gate Tunnel project monitoring at Brooklyn and the nearby sites of Millers Road and Primula Avenue show substantial exceedances of air quality standards: PM₁₀ standards were exceeded from 31 to 34 days at various locations between September 2018 to August 2019 and the average concentration of PM₁₀ was up to 43 per cent higher than the PM₁₀ annual reporting standard.

The concentration of industrial sites has often made it difficult for the EPA to pinpoint precise air pollution sources. Instances of exceeding licence conditions appear common: the EPA receives multiple reports every year about pollution emanating from the precinct.

Some attempts have been made to reduce pollution, dust and odour from the precinct. The EPA details the work it is doing on its website. For example, in 2011 it carried out dust dispersion modelling and found that Bunting and Jones Roads were the single largest sources of road dust in the precinct; these roads, as well as some private roads, were subsequently sealed.⁴

There are also longer-term plans to reduce the precinct's impacts on its surroundings. In particular, the 2012 Brooklyn Evolution Strategy was developed, in part, to change the precinct's zoning from heavy industrial to light industrial over 20 years.

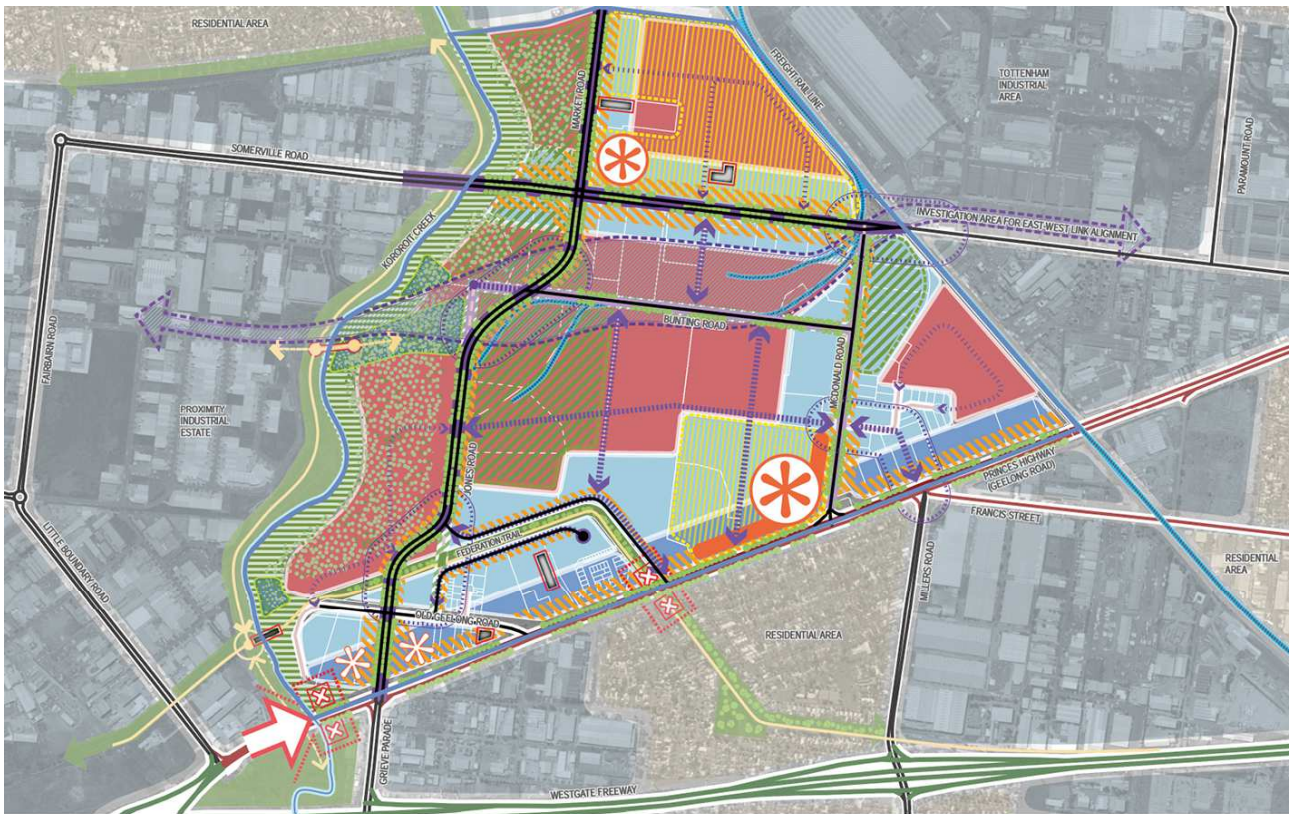
The Brooklyn Industrial Precinct Strategy (or Brooklyn Evolution Project) aims to develop a long-term land use, activity and transport strategy. This aims to improve precinct image and amenity, economic, infrastructure, and environmental outcomes for the precinct.

Once completed, the changeover would theoretically resolve many of the its dust, odour and noise problems. The Plan can be found at:

<http://records.brimbank.vic.gov.au/ExternalLinkAPI/api/document/?docKey=dXR4VnZ3dDVGbDNaN21RM0IFN0xXQzdMckJNaFBWVG8raHNIenZ5c3JRaDdCU1VvbXdRKzFWV3pFaHZEcVdpRQ2>

In the meantime, concerns remain. EPA and West Gate Tunnel monitoring data show that substantial exceedances of PM₁₀ reporting standards are continuing, which will be having major effects on local communities' health and amenity.

Figure 6.1 Brooklyn Industrial Precinct



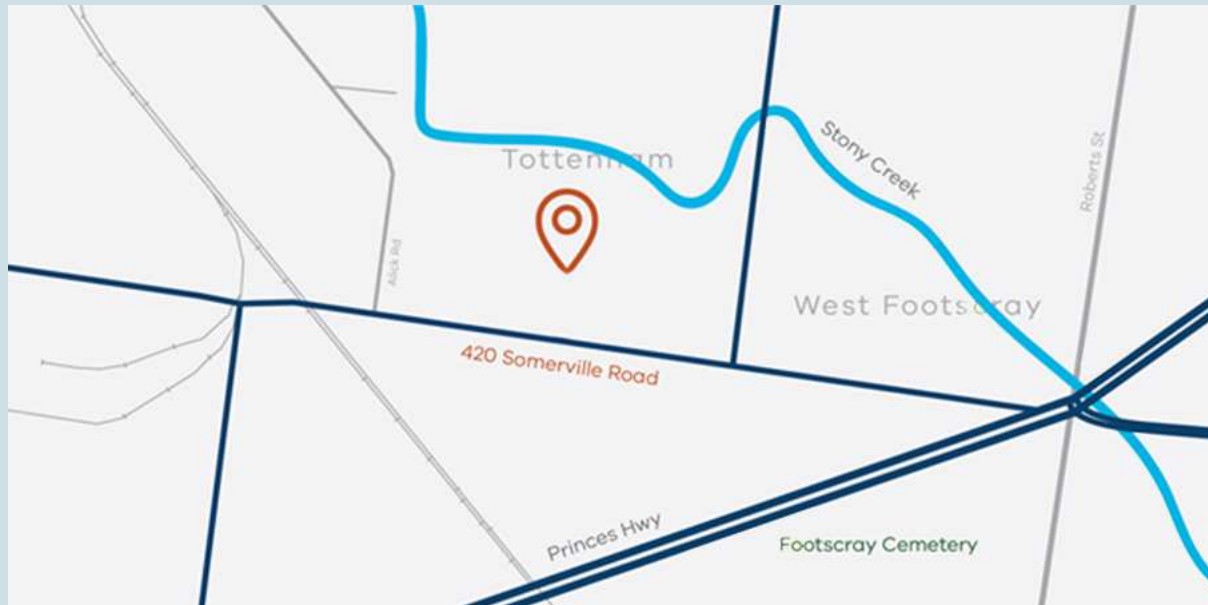
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- | | | | |
|--------------------------------------|---------------------------------------|------------------------------------|---|
| Industry / Logistics Use | Gateway Development Site | Freeway | Major Road Upgrade |
| Commercial / Light Industrial Use | Prominent Landmark Building | Major Arterial Road | Minor Road Upgrade |
| Commercial / Large Format Retail Use | Key Street Interface | Arterial Road | Future Minor Local Road |
| Open Space Corridor | Further Design Investigation Required | Freight Train Line | Potential Future Road |
| Vegetated Landfill Cap | Symbolic Placemaking Opportunity | Shared Bike and Pedestrian Path | Investigation Area East-West Link Alignment |
| Dust Abatement Works Required | Heritage Place | New Cycle & Pedestrian Bridge Link | Road Extension |

West Footscray Industrial Fire

On 30 August 2018 a major industrial fire began in a warehouse at 420 Somerville Road, Tottenham. The fire, known as the West Footscray Industrial Fire, burned for several days and emitted a large plume of toxic black smoke, visible across the Melbourne metropolitan area. The warehouse was not registered to store dangerous chemicals.

Figure 6.2 West Footscray Industrial Fire location



During the fire, the EPA monitored air and water quality in the local area. In the hours after the fire began a 'community advice warning' for Brooklyn, Kingsville, Tottenham, West Footscray, Altona North, Braybrook, Footscray, South Kingsville, Spotswood, Sunshine and Yarraville was issued. Residents were advised to close windows and doors.

Contaminated fire water flowed into nearby Stony Creek, and a range of chemicals, such as hydrocarbons, solvents, herbicides and heavy metals, entered the creek. This led to significant losses of plant and animal life in the creek. The impacts are summarised at: <https://ref.epa.vic.gov.au/our-work/current-issues/west-footscray-fire-2018-and-impacts-on-stony-creek>

Following the fire Worksafe Victoria set up a taskforce, of which the EPA was a member, to oversee the clean-up of the site. The EPA has continued to monitor the controls introduced to mitigate potential discharges from the site and to safeguard local air quality.

Residents, firefighters and other first responders reported health problems potentially arising from exposure to toxic chemicals for many weeks after the fire.⁵

Dust

Dust is a key component of coarse particulate matter, or PM_{10} . It poses a huge problem in the Inner West, especially, but not exclusively, in areas closer to industrial precincts, on vacant land, at construction sites such as in Brooklyn, Altona North and near the West Gate Tunnel, and in areas of residential development. In 2018–19 there were 22 days when dust levels in Brooklyn alone exceeded the limit set out in the State Environment Protection Policy (Ambient Quality Management), during one of the driest periods recorded since the EPA started monitoring dust in Brooklyn.

Among the kinds of premises likely to produce considerable dust emissions are the following:

- material crushing facilities
- demolition and material handling and processing sites
- landfills
- shipping container storage areas and container parks
- open, unsealed land in industrial facilities
- undeveloped and vacant sites
- unsealed roads and verges
- major construction and development sites.

Dust can be especially concerning during particular weather conditions. This is often the case during drier and windy weather in the warmer months. Nevertheless, it needs to be dealt with year-round. Wet weather can cause indirect effects when, for example, mud is transported on vehicle wheels, dries out and is then distributed as dust.

A range of conventional processes are available to manage dust - spraying sites with water, sealing areas that are subject to extensive vehicle movements, using wheel-washing facilities to avoid spreading caked-on dirt, and similar.



Undeveloped site and neighbouring residences, Altona North

Victoria's State Environment Protection Policy (Ambient Air Quality) sets a maximum limit for PM₁₀ concentrations, averaged over any 24-hour period, at 50 micrograms per cubic metre. The policy specifies that no exceedances are allowed.

As discussed in Chapter 3 and Appendix D, however, this 24-hour objective is being exceeded throughout the Inner West: for example, in 2019 monitoring sites in community locations recorded between seven and 30 days when this objective was exceeded. Seven of eight sites showed average concentrations above the annual objective. Both industrial / commercial and transport emissions are most likely contributing to these exceedances.

Sulphur dioxide

Sulphur dioxide is also a major air pollutant in the Inner West. High volumes are released from shipping operations in the adjacent Port of Melbourne, from chemical industries and from refinery operations. For example, in 2018 Exxon Mobil's Altona refinery released about 2,680 tonnes of sulphur dioxide into the local environment; its licence allows it to release over 6,000 tonnes a year, which the CRG considers excessive. Transport is likely another major emitter as a result of the high levels of sulphur permitted in Australian vehicle fuels; this is discussed in Chapter 4.

Sulphur dioxide emissions can be reduced if fuels with lower sulphur content are used. Limits on sulphur content in shipping fuels have come into effect in 2020; this too is discussed in Chapter 4.

Emissions can also be reduced by fitting 'scrubbers' to industrial stacks. The scrubbers capture and remove part of the sulphur dioxide from exhausts before the emissions are released.

The State Environment Protection Policy (Ambient Air Quality) sets a maximum limit for sulphur dioxide concentrations averaged over any one-hour period at 0.2 parts per million, over any 24-hour period at 0.08 ppm and over a year at 0.02 ppm. The policy specifies that no more than one exceedance of the hourly and daily standards in a year is permitted.

Odour

Odour is experienced when chemical compounds in aerosol stimulate our sense of smell and produce unpleasant sensations. Odour from industrial operations and landfill sites in the Inner West has substantial impacts on community's amenity and remains a priority concern, particularly for people living close to such businesses. Brooklyn, Altona North, Yarraville and South Kingsville residents are severely affected by noxious odours emanating from the Brooklyn Industrial Precinct. The odours can be particularly concentrated in some areas, such as streets nearer Geelong Road.

'We can't open our windows, we can't sit outside or let the children play outside, we can't hang out our laundry, or even have people over as the odours are not only strong, unpleasant and offensive but embarrassing'.

Alexandra, Hobsons Bay

Constant exposure to unpleasant smells can have considerable effects on people's health, wellbeing and lifestyle, restricting outdoor activity and generally creating an unpleasant environment. The impacts of odour are well recognised by the EPA, which requires that 'all businesses ... correctly manage odour they produce'.

Substantial impacts from odour remain, however, and this is reflected in the number of odour pollution reports the EPA receives - 4,090 in 2018-19, for example. Fifteen percent of the 2018-19 reports were about the Brooklyn Industrial Precinct. However, pollution abatement notices were issued to only two precinct businesses for odour emissions in 2017-18.

Odour – impacts and actions

Inner West residents have many stories to tell about the impacts of odour on their lives. It can be impossible to enjoy time playing and gardening at home or to invite people to visit. On summer evenings some residents are unable to open their house windows to let in fresh air or use their air-conditioning.

Yarraville On the Nose Community Group

Yarraville On the Nose Community Group Inc was formed in 2005 to take action to improve air quality in West Yarraville. It received \$50,000 in funding under the EPA's 'Inspiring Environmental Solutions' community program to improve the liveability of West Yarraville, where residents had been experiencing discomfort and inconvenience for many years as a result of foul odours. The group used the initial funds to plant 300 trees to absorb pollution, filter atmospheric dust and enhance streetscape character. Ongoing funding comes from companies and individuals found guilty of environmental pollution. A court may direct the guilty party to fund a community environmental project instead of, or in addition to, paying a fine.⁶

Australian Tallow

In 2015 the EPA successfully prosecuted Australian Tallow Producers for air pollution offences related to producing offensive odours, impacting on the Brooklyn residential area. The company was ordered to pay \$200,000 to Hobsons Bay City Council for an environmental project that contributed to the Brooklyn Reserve Master Plan (under section 67AC of the state's *Environment Protection Act 1970*). A park with a playground was built adjacent to Brooklyn Community Hall, providing direct benefits for the local community.⁷

Findings

Health, amenity and aesthetic risks to communities

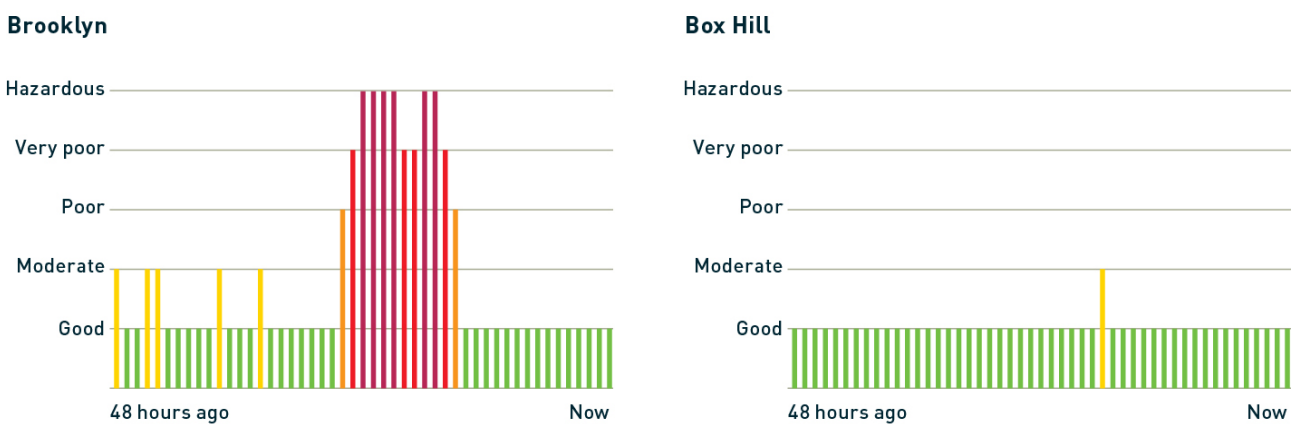
- Over time residences and industries have become located closer and closer together, partly as a result of urban infill. This has led to particular health and amenity risks for people being exposed to industrial emissions, including dust, sulphur dioxide and odour.
- Dust is a major concern for many residents of the Inner West. In particular, cement dust from crushing plants can settle and solidify in guttering and can be exceptionally difficult to move without scraping and high-pressure hosing. Dust can also pose serious health risks for residents when, for example, they breathe it in as they try to remove it. And it can cause structural damage to homes and vehicles.
- Many heavy industrial businesses appear to wish to remain well into the future - for example, one major demolition company intends to remain for more than 40 years.

- Implementation of the Brooklyn Evolution Strategy is not occurring quickly enough. The CRG considers that much greater efforts should be made by the Victorian Government to provide funding to support and hasten implementation. Without this, the Inner West will continue to experience the problems of heavy industrial pollution.

Disproportionate impacts

- Emissions impacts are worse in the Inner West. For example, on windy days, when dust is blown into many areas of Melbourne, causing exceedances of reporting standards across the metropolitan area, the Inner West can experience exceedances well in excess of those in other areas. The most probable reason for this is the substantial amounts of additional local dust from industrial areas. Figure 6.3 demonstrates this: a dust storm in June 2019 caused only one moderate exceedance of standards in Box Hill, whereas multiple instances of hazardous air pollution levels were experienced in Brooklyn.

Figure 6.3 Dust storm in Melbourne, 21 June 2019 – impact on air quality

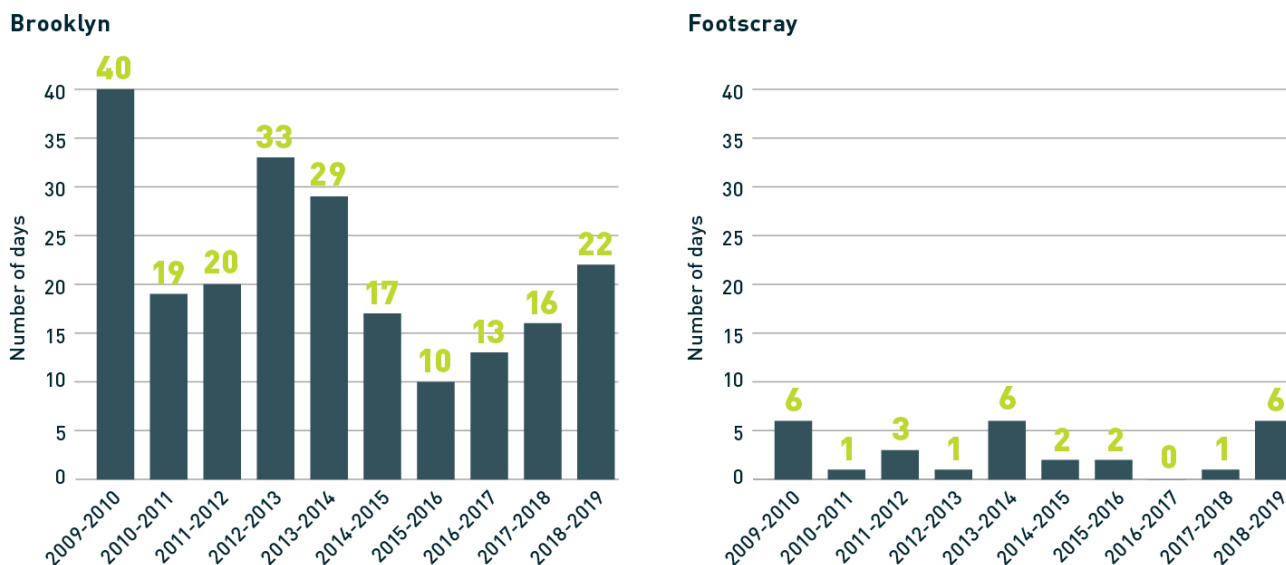


Source: EPA (2019) *AirWatch*

Regular exceedances of air quality reporting standards

- Despite the EPA's efforts, the number of days on which the State Environment Protection Policy (Ambient Air Quality) 24-hour reporting standard for PM₁₀ is exceeded remains unacceptably high. PM₁₀ levels in Brooklyn were higher than the standard on 21 occasions between August 2018 and June 2019. This has been a long-term issue – for example, the standard was exceeded 40 times in 2009–10.
- As shown in Figure 6.4, it is a significant problem around Brooklyn.
- EPA records show PM₁₀ levels as high as 400 micrograms per cubic metre being measured in Brooklyn's residential area in 2014.
- Much stronger enforcement and greater action to enforce standards and licence limits are necessary.

Figure 6.4 PM₁₀ air quality standard exceedances, 2009–10 to 2018–19



Source: EPA (2019) (newsletter) 'Brooklyn Community Reference Group Community Forum May 2019' State Government of Victoria <http://www.brooklynip.com.au/wp-content/uploads/2019/07/Att1_BCRG-May-2019-EPA-Update-Daniel-Hunt.pdf>

Enforcement of legal obligations

- Industrial premises should be held accountable for compliance with all legal obligations, including environment protection, occupational health and safety, environmental health, planning permissions, and EPA licensing and works approval conditions. Industries should establish better processes and systems for demonstrating compliance. This is particularly important for sites that have a history of creating excessive air emissions, including dust and/or odour, whether deliberately flouting their obligations or doing so inadvertently.
- The EPA carries out inspections to assess compliance with licence requirements and in response to community complaints, yet pollution impacts persist.
- It seems that the onus for reporting and proving instances of pollution is often placed on the community rather than the EPA or the industries concerned. Further, it is inappropriate to burden the community with the responsibility for alerting the EPA to instances of pollution, as:
- Emissions can often be short term - for example, when gusts of wind blow dust into homes or distribute odours. This can make it difficult for Inner West community members to collect sufficient evidence of such occurrences.
- Often multiple complaints to the EPA must be made before action is taken. This is a source of particular frustration for the community.
- The EPA needs to be able to increase the number of its compliance inspections and general site visits and improve its responsiveness to community complaints. Current approaches and processes are demonstrably not meeting the Inner West community's expectations.
- Compliance efforts need to be streamlined and made more transparent. The following are examples:
 - EPA licences and local council planning permits often contain similar requirements for site management, but often neither body takes responsibility for ensuring conformity. This anomaly needs to be resolved: responsibility should be assigned to one authority only.
 - EPA, council and/or WorkSafe actions to ensure that companies comply with their legal obligations are not always made known to the community.

Odour

- Odour has substantial impacts on amenity and lifestyle and seems to be a particular challenge for the Inner West community to report and the EPA and industry to act on effectively. In the CRG's view, odour-causing facilities are not doing enough to control their emissions. EPA action to resolve this ongoing problem of non-compliance with both licence conditions and community expectations is essential.
- Some manufacturers in the Inner West are managing odour from their operations well through use of technologies such as dual biofilters. Other are not and continue to adversely affect the lives of communities in the Inner West.

Landfills

- The community is concerned that landfills are not taking due care to prevent emissions, including dust and odour. It is evident to the CRG that the operators' compliance with planning permit conditions and EPA licence requirements is not being effectively policed by the relevant authorities.
- Despite landfill operators being required to fill to an agreed 'contour plan', in practice these sites are being overfilled, further increasing the risk of dust and odours for surrounding communities.
- One landfill site is very close to many residences.
- Landfills can be associated with industries that generate substantial pollution, such as rock crushing.



Dust from a crushing plant at Altona North

Unsealed roads, driveways and industrial sites

- Unsealed roads, driveways and industrial sites are a major source of dust emissions in the Inner West.
- A variety of conventional processes are used for managing dust; examples are spraying sites with water, sealing areas subject to high levels of vehicle movement and using wheel-washing facilities to avoid spreading of caked-on dirt. Some of these approaches are being adopted, but without proper oversight this often leads to indirect impacts where mud is transported from the industrial areas on vehicle wheels, dries out and is then distributed as dust.
- Although efforts have been made to seal the heavily used Jones and Buntings Roads in Brooklyn, this has not been done completely and unsealed areas, such as road verges, remain.

'I've also experienced a large problem with dust. My trees, car, house is constantly covered in it. My window sills are covered.'

Alexandra, Hobsons Bay



Jones Road, Brooklyn - post-sealing and still creating major dust emissions

Shipping container storage sites and container parks

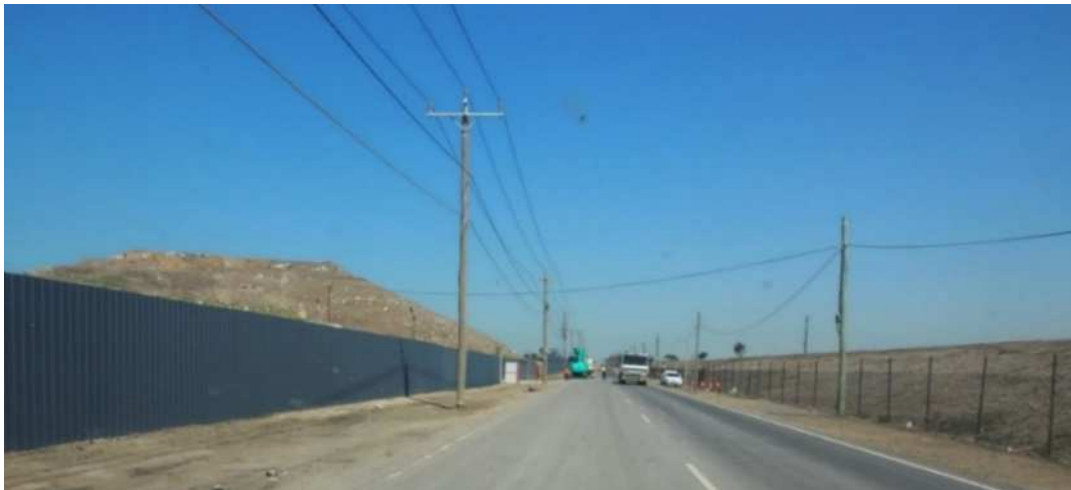
- Shipping container storage sites - where the containers are deposited, sorted and 'stored' before being sent to their final destination - appear to be proliferating in and around the Inner West. The Port of Melbourne's proximity is the main contributory factor.
- About 70 per cent of containers are stored outside the Port of Melbourne, which results in large numbers of empty containers being moved to and from the port and stored temporarily in container parks until needed to top up ships just before their departure.
- On 4 July 2017 The Age reported that more than 10,000 such containers were moving around the Inner West every day, almost half of them being empty. In January 2017, 92,000 containers were exported from the Port of Melbourne, 40 per cent of them being empty.
- Many of the containers are on otherwise unused and/or unsealed land, with heavy vehicles and general site activities creating substantial amounts of dust. It appears neither the EPA nor local councils require such areas to be sealed or at least managed more effectively to reduce dust.
- Access between the Port of Melbourne and most of the container parks is possible only via residential areas, and this problem will persist even after the West Gate Tunnel is completed. Provision of government incentives for at least some of the parks to relocate to sites accessible via freeways and arterial roads from the port will be needed to overcome the problem. Another option could be the former Footscray Market site (see Chapter 4).



Dust from a container park site

Stockpiling

Stockpiling of materials occurs on many sites in Inner West industrial zones. The stockpiles often appear to be poorly maintained, with large amounts of wind-blown dust and other potentially hazardous materials escaping from them. The CRG is concerned that the composition of these materials is not known. The risk they pose for community health is thus unclear.



Materials stockpiles in Brooklyn (1)



Materials stockpiles in Brooklyn (2)

'For 30 years, residents in Altona North have been subjected to dust emanating from a land fill site and unsealed container park sites near the residential area. Repeated requests to Local Government and EPA Victoria to stop the dust have not resulted in any reduction of the impacts of this insidious problem in Altona North.

A friend in Chambers Road, Altona North, was forced to sell their property and move away from the area whilst I was forced to seal all my ventilation vents and windows in my home to reduce the amount of dust entering my premises.

The Altona North community are looking to the State Government through the Inner West Air Quality Study to finally resolve this and the many other issues identified in the report in the interests of the health and safety of the Inner West community.'

Hobsons Bay Resident

Industrial chemical sites

Some sites are particularly problematic. It appears that EPA licences allow some sites to legally emit excessive quantities of air pollutants; this situation should be urgently reviewed. For example, ExxonMobil's Altona refinery emits:

- approximately 400 kilograms of ceramic catalyst dust is emitted from the refinery each day, which is within its licence limit of 1,000 grams per minute (equivalent to 1.5 tonnes a day).⁸ The CRG understands this dust possibly contains heavy metals.
- in 2018 the refinery released about 2,680 tonnes of sulphur dioxide, also within its licence limit of over 6,000 tonnes a year.

Recommendations

Priority recommendations are shown in bold.

That the Victorian Government:

Brooklyn	6.1	Fast tracks implementation of the Brooklyn Evolution Strategy 2016 long term framework plan, providing the necessary support for local government, community and industry to achieve the Strategy's aims. [Priority]	Medium-term
Resourcing	6.2	Provides appropriate resourcing to the EPA to enable it to use its strengthened tools and powers in line with the previous recommendation. [Priority]	Medium-term
Dust	6.3	Identifies and eliminates sources of dust emissions. [Priority] Actions could include: <ul style="list-style-type: none"> - ensuring any industrial and commercial sites with significant vehicular traffic, such as container parks, be sealed - identifying and sealing roads and verges - the use of wheel wash facilities for heavy vehicles - require that all crushing operations be enclosed to contain all dust 	Short-term
Implementing regulation	6.4	Requires that EPA prioritises its strengthened statutory tools and powers to ensure Inner West industrial premises comply with their air pollution management obligations Actions could include: <ul style="list-style-type: none"> - implementing a risk-based approach, focusing on premises creating greater air pollution, dust and/or odour risks to human and environmental health and amenity - commencing with such premises in the Brooklyn Industrial Estate and other major Inner West air pollution emitters, ensuring: <ul style="list-style-type: none"> o full compliance with all works approval, licence and other permit conditions, general duty obligations and compliance notice obligations, including for major organic compounds being emitted o instances of non-compliance are addressed within three months of their identification o appropriate industry guidance documentation and other information / advice provided o air pollution monitoring and reporting requirements are introduced to enable EPA to assess levels of emissions and compliance with any licence limits o appropriate and regular inspection and/or independent 	Short-term

auditing of compliance is undertaken

- o communities and local governments are supported to effectively comment on draft new or amended works approvals, licences or other permissions, including through provision of adequate technical expertise and increasing formal referrals to local governments
 - o dust and odour emissions are treated at source and contained within site boundaries
 - o undeveloped and/or unoccupied industrial sites are appropriately secured and maintained to prevent emissions
- identifying where it is appropriate to use other new statutory powers (e.g. requiring development of Better Environment Plans) to eliminate emissions of air pollution, and implementing actions to ensure their effective use

Land use change	6.5	Moves existing industrial premises that create substantial air pollution, including dust and/or odour, out of the Inner West to areas where their emissions will have minimal or no impact on local communities. Crushing plants, demolition and materials handling facilities, and materials stockpiles should be prioritised	Long-term
Landfills	6.6	Reduces the major risks landfills pose to local air quality Actions should include: <ul style="list-style-type: none">- not allowing landfills to rise above natural surrounding ground levels and being filled beyond permitted capacity- identifying appropriate means to rapidly fill Altona North landfill with clean fill- monitor and enforce landfill environmental management requirements	Long-term
Container parks	6.7	Assesses the feasibility of transforming the former wholesale fruit and vegetable market on Footscray Road into a container park, to reduce the proliferation of such parks in the Inner West and associated haulage of containers to and from them	Short-term

Notes

¹ Department of Environment, Land, Water & Planning (2018) Clean Air for All Victorians – Victoria's Air Quality Statement, State Government of Victoria <https://www.environment.vic.gov.au/__data/assets/pdf_file/0025/125719/Clean-Air-Statement.pdf>

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⁴ Victorian Auditor-General's Office (2018) *Improving Victoria's Air Quality March 2018 Independent audit report to Parliament* <<https://www.audit.vic.gov.au/sites/default/files/2018-03/20180308-Improving-Air-Quality.pdf>>

⁵ Smith, Rohan (2018). 'Residents still struggling three weeks after West Footscray factory fire'. *News.com.au* 20 September <<https://www.news.com.au/lifestyle/health/health-problems/residents-still-struggling-three-weeks-after-west-footscray-factory-fire/news-story/3be92223f7f5df87e7d523207ddae1fb>>

⁶ On the Nose Community Group Inc (2001) 'Update your nature strip Tree free West' Yarraville Residents (newsletter) October Issue 1 <http://www.brooklynip.com.au/wp-content/uploads/2011/10/YOTN_News-Issue-1_EPA-Cargill-Project.pdf>

⁷ EPA 'EPA actions on air quality in Brooklyn' (webpage) <<https://ref.epa.vic.gov.au/our-work/current-issues/odour-and-air-quality/brooklyn-industrial-precinct/epa-actions-on-air-quality-in-brooklyn>>

⁸ Department of the Environment and Energy (2019) National Pollutant Inventory 2017-18 Commonwealth of Australia <<http://www.npi.gov.au/npi-data/latest-data>>

7 Planning

Recognition of the serious health effects of poor air quality must take preference in planning regulations, particularly around sensitive use facilities and residential areas.

In Victoria, the connection between planning and air pollution in both the legislative and public domain is rarely recognised, acknowledged or acted on. There are a number of reasons for this. It is assumed that our air quality in Australia has always been considered to be 'good'.¹ However, as noted elsewhere in this Report, exceedances of air pollution objectives occur regularly in the Inner West, shown by air monitoring results². Objectives are put in place to protect the population from pollution.

It is clear from previous chapters that it is critical to protect Inner West communities from exposure to dangerous levels of air pollution. Current and proposed developments in the Inner West are likely to expose residents and workers to elevated levels of air pollution.

For example, air quality monitoring carried out by the EPA in 2013³ in Francis Street, Yarraville, revealed that the then State Environment Protection Policy annual objectives for PM₁₀ and the annual advisory standard for PM_{2.5}, were both exceeded. Residential and commercial development has continued to occur with little or no regard for the consequences of the poor air quality along this corridor.

The Victorian planning system currently has limited ability to effectively control air quality. Air quality management requirements are difficult to effectively apply through planning permits and conditions and the planning system is biased towards economic outcomes. When air quality compliance issues arise, they have historically been difficult to enforce through planning permit compliance processes, with the onus being on councils to prove that there have been breaches.

According to the National Environment Protection Council Review in 2011, exposures below the current air quality standards represent a statistically significant and measurable health risk to the Australian population. Its findings indicated that the majority of current standards are not meeting the requirements for the protection of human health.

The review provided recommendations in relation to the standards for three pollutants: ozone (O₃), nitrogen dioxide (NO₂) and sulphur dioxide (SO₂). Any new evidence around the health effects of these air pollutants had to be included in the review.

In 2018, seven years after the findings and recommendations, jurisdictional Environment Ministers signalled their intention to vary the Ambient Air Quality National Environment Protection Measures (NEPM) for O₃, NO₂ and SO₂, based on the latest scientific understanding of the health risks arising from these pollutants.



Truck traffic in Yarraville

A State Planning Scheme amendment, similar to the Brisbane City Plan,⁴ is required to address the risks and consequent health inequities around residential and commercial development on major transport corridors in the Inner West. Such an amendment will demonstrate Victorian Government leadership in providing a safer environment for all who reside in our region, including those most vulnerable to poor air quality, such as the sick, elderly, hospital patients, and those in childcare, schools and aged care facilities.

Planning and Environment Act 1987

The primary governing instrument of planning in Victoria is the *Planning and Environment Act 1987*⁵ (the Act). The Act's purpose is to establish a framework for planning the use, development and protection of land in Victoria in the present and long-term interests of all Victorians.

The Act's objectives include:

- to provide for the fair, orderly, economic and sustainable use and development of land
- to secure a pleasant, efficient and safe working, living and recreational environment for all Victorians and visitors
- to conserve and enhance those buildings, areas or other places which are of scientific, aesthetic, architectural or historical interest, or otherwise of special cultural value.

The Act:

- requires each municipality to prepare a planning scheme
- sets out requirements and processes for amendments to a planning scheme
- specifies processes for assessing planning applications and making decisions
- sets out processes for VCAT reviews of disputes associated with planning decisions.



Qenos site (less than 200 metres from houses)



Altona North Landfill (220 metres from houses)

Victoria Planning Provisions

The Act provides for the Victoria Planning Provisions (VPPs), which is a template document of standard provisions from which all local planning schemes are derived.

The Planning Scheme

The Act provides for a single instrument of planning control for each municipality - the planning scheme. This sets out the way land may be used or developed.

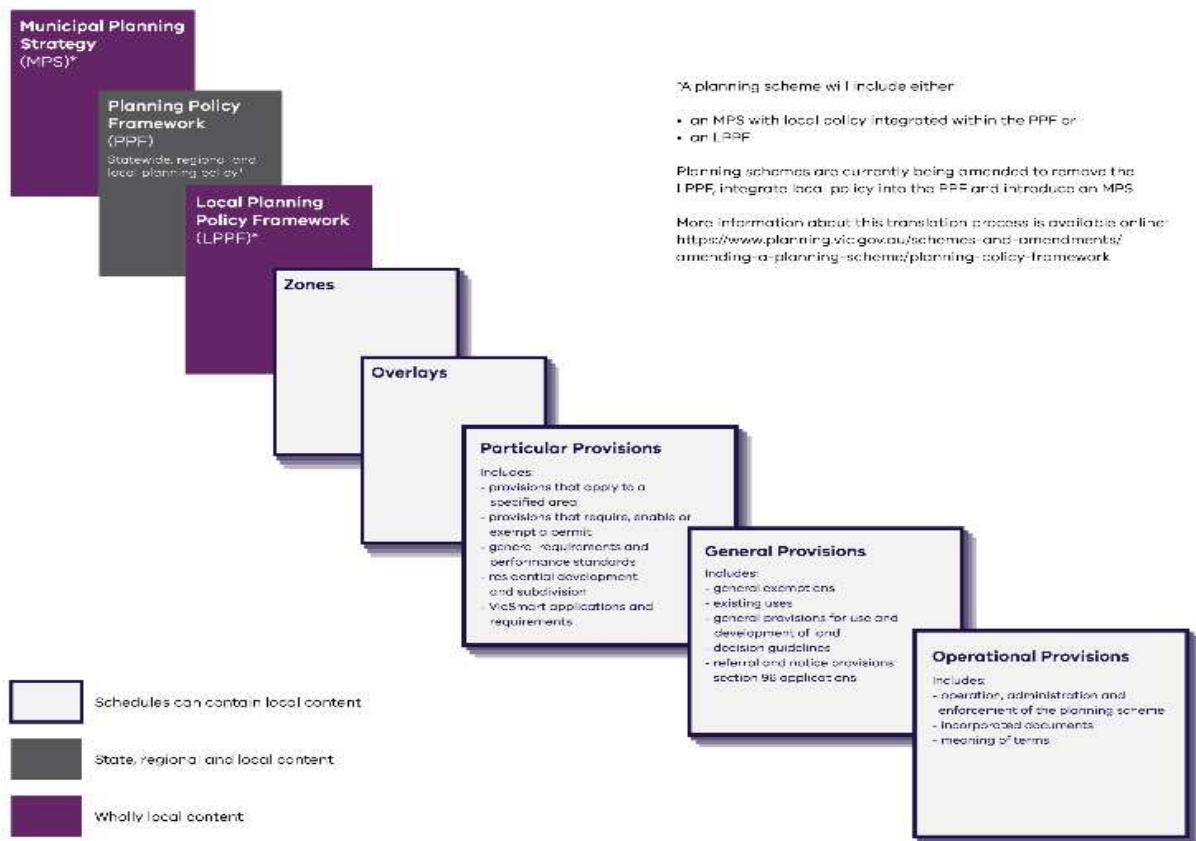
The planning scheme:

- is a legal document, prepared and approved under the Act
- contains state and local planning policies, zones and overlays, and other provisions that affect how land can be used and developed.

The Act allows each municipality to tailor its own planning scheme to its local requirements (to a point). This includes setting local policies for land use and development within that municipality. However, local policy cannot conflict with the State or regional policies contained within the VPPs.

Figure 7.1 – Planning Scheme Structure

Every planning scheme must include each part of the **Victoria Planning Provisions** in the same order (see diagram).



Source: DELWP

Examples of local policy relating to air quality for Inner West municipalities+

Maribyrnong Planning Scheme:

21.09

10/11/2016
C108

TRANSPORT

The City of Maribyrnong is traversed by several important east-west metropolitan road and rail transport routes. The state and national freight transport routes to the Port of Melbourne are of state significance and their operational requirements must be protected.

Close proximity to the Port also results in significant adverse impacts upon the community by heavy truck traffic. Activity centres such as Footscray Central Activities District (CAD) and Yarraville are detrimentally impacted by heavy truck movements through and around the centres. Residential areas are also impacted by traffic congestion, air and noise pollution, and road safety issues. The ability of the city to deliver population and economic growth will be severely limited if efforts are not made to manage the impacts of heavy trucks across the municipality.

The forecast increase in the Port's container trade, coupled with the future residential and industrial growth within the western region, will increase the amount of road and rail passenger and freight travelling through the city. Major redevelopment of strategic sites including the Maribyrnong Defence Site (MDS), Highpoint Principal Activity Centre (PAC) and the Footscray CAD, will place further pressure on the local transport network. Significant improvements are needed to the transport network to ensure the region's growth is sustainable.

In an effort to address some of these issues, State Government Department's such as VicRoads and the Department of Transport have identified the need for significant new transport infrastructure to improve east-west connections and reduce the impact of freight traffic on the municipality. Potential initiatives include:

Brimbank Planning Scheme:

21.09-2

25/08/2016
C177

Environmental Impacts of Industrial Uses

Sustainable land practices and environmental management has not been a feature of industrial activity in Brimbank. This has resulted in on and off-site amenity impacts including odour, dust, pollutants, noise emissions and contamination.

Best-practice community safety and environmental standards should be a feature of future industrial development, to mitigate any off-site environmental impacts and provide appropriate threshold distances from nearby sensitive uses.

Objective 1

To ensure industrial activity minimises environmental risks on-site and to nearby sensitive uses.

Strategies

- 1.1 Encourage industry to adopt best-practice community safety and environmental standards regarding matters such as noise, odour and dust emissions, stormwater quality and contamination.
- 1.2 Industrial activities with potential for on and/or off-site amenity impacts should provide an appropriate threshold distance or implement appropriate on site mitigation measures from nearby sensitive uses.
- 1.3 Require the precautionary principle to be applied when deciding on appropriate mitigation measures to consider future implications to health and/or the environment.
- 1.4 Within the Brooklyn Industrial and Commercial Precinct, require as appropriate:
 - A dust management plan that includes real time dust monitoring and response for land uses with high truck movements, dust generating activities and/or sites with areas that are unsealed.
 - The location of stockpiles, the storage of materials and areas for the processing of recycled materials accord with best practice.
 - Trafficable areas on sites to be appropriately sealed.
 - New developments and additions to existing development to implement best practice technologies to minimise off site amenity impacts.

Hobsons Bay Planning Scheme:

Clause 21.08 – Economic Development:

Objective 2

To achieve high quality amenity outcomes to industrial land throughout the municipality.

Strategies

- Encourage high quality urban design and architecture in industrial areas.
- Improve the amenity, appearance, safety and environmental performance of industrial areas.
- Protect the amenity of people living and working in Hobsons Bay from the effects of noise, air, water and land pollution.

Objective 3

To promote and encourage best practice philosophy by industry.

Strategies

- Ensure that new industrial development meets high standards of site development, emission control, landscaping and motor vehicle parking and movement management.
- Encourage existing industries to reduce their discharge of pollutants to improve air and water quality.
- Consider the impact of relevant industries on air and groundwater quality in the assessment of planning applications.
- Work with the Environment Protection Authority and the agencies responsible for the *Dangerous Goods Act* and the *Occupational Health and Safety Act* to ensure that industries do not threaten the health and safety of employees and residents or damage the local environment.
- Encourage industry to develop a water reuse program.
- Encourage industry that will investigate and implement, where possible, the potential benefits of cleaner production and energy efficient design.

Victorian planning system is zone based

Victoria operates on a zone-based planning system. Uses are categorised as either 'as of right' (Section 1), 'permit required' (Section 2) or 'prohibited' (Section 3). If a use is in Section 1 in a zone and does not need a planning permit, the responsible authority is unable to include any use-related conditions on such a permit. This precludes placing controls on matters which could help reduce air pollution such as operating hours, requirements for dust control, a construction management plan, requirements to seal trafficable areas and so forth. If pollution does occur (e.g. dust emissions that affect other properties), the responsible authority would have to use other legislation or seek the assistance of the EPA to try to address the issue.

In certain instances, the use is categorised as Section 1 as long as it meets certain conditions. An example is in the Industrial 1 Zone where the use of the land for industry or storage does not require a permit, as long as it meets the following:

- must not adversely affect the amenity of the neighbourhood, including through the:
 - transport of materials, goods or commodities to or from the land
 - appearance of any stored goods or materials
 - emission of noise, artificial light, vibration, odour, fumes, smoke, vapour, steam, soot, ash, dust, wastewater, waste products, grit or oil

If there is a dispute between the land owner/occupant and the responsible authority in relation to whether the use may (or does) adversely affect the amenity of the neighbourhood, then a declaration would be required from VCAT to resolve this, costing time and money for all parties involved.

Brimbank City Council successfully tested this situation at VCAT in 2018 for a site in the industrial area of Sunshine:

According to the National Environment Protection Council Review in 2011, exposures below the current air quality standards represent a statistically significant and measurable health risk to the Australian population. Its findings indicated that the majority of current standards are not meeting the requirements for the protection of human health.

The review provided recommendations in relation to the standards for three pollutants: ozone (O₃), nitrogen dioxide (NO₂) and sulphur dioxide (SO₂). Any new evidence around the health effects of these air pollutants had to be included in the review.

In 2018, seven years after the findings and recommendations, jurisdictional Environment Ministers signalled their intention to vary the Ambient Air Quality National Environment Protection Measures (NEPM) for O₃, NO₂ and SO₂, based on the latest scientific understanding of the health risks arising from these pollutants.

A site in First Avenue, Sunshine, was being used and had been partly developed for storage without any planning or building permits. Brimbank City Council took compliance action against the occupant of the site which resulted in them subsequently lodging a planning application. Council assessed the application and determined to refuse it on a number of grounds. The applicant sought VCAT review of this decision.

At a Practice Day hearing, Council's lawyers argued that the use of the land required a planning permit because there was evidence that the use was having an impact on the area's amenity through its appearance (primarily due to the outdoor storage of goods) and due to mud being tracked onto the roads by trucks entering and leaving the unsealed site.

VCAT agreed with Council stating:

'Unlike a number of other industrial uses on nearby land it is intended that a considerable amount of materials and goods will be stored externally on the subject site. I therefore conclude, in the context of this site, that one or all of the conditions in section 1 may not be met. There is some potential from the use to adversely affect the amenity of the neighbourhood and as such I consider a permit is required for the use and notice should be given.'

Existing Use Rights

Existing use rights enable a landowner to keep undertaking activities, given certain conditions are met, even if these impact health or amenity in local communities, making it difficult to address and manage sources of pollution. They are part of the VPPs and are established in relation to use of land under a planning scheme if any of the following apply:

- the use was lawfully carried out immediately before the approval date of the planning scheme
- a permit for the use had been granted immediately before the approval date of the planning scheme and the use commences before the permit expires

- a permit for the use has been granted under Clause 63.08* and the use commences before the permit expires
- proof of continuous use for 15 years is established under Clause 63.11† of the planning scheme
- the use is a lawful continuation by a utility service provider or other private body of a use previously carried on by a Minister, government department or public authority, even where the continuation of the use is no longer for a public purpose.

The Brooklyn area demonstrates the impact of existing use right provisions. Many sites within it were issued with planning permits over 25 years ago or have never been issued with one. However, as the use has continued in excess of 15 years they are considered to have 'existing use rights'.

Such uses do not necessarily meet today's community expectations around pollution and amenity impacts. Where a planning permit was issued more than 25 years ago, it usually contained only limited conditions which were vague and cannot be used to improve onsite practices that will help reduce amenity impacts. Effectively, these businesses can continue to operate in an outdated manner. This results in off-site impacts as long as the same use continues on the site. This is a key reason why it is likely that Brooklyn consistently records the worst monitored air quality in metropolitan Melbourne.

Key Issues - Air quality and health

There is a lack of understanding of the consequences of poor air quality among the planning and development communities. Particulate matter, ozone, carbon dioxide, nitrogen dioxide, sulphur dioxide, carbon monoxide, volatile organic compounds (VOCs) and other toxins from motor vehicle exhaust and smoke haze from bushfires, logging coupe burns and controlled hazard reduction fires, all contribute to air pollution in our cities.

However, emissions from the diesel fleet that traverses the Inner West in the form of trucks, trains and cars has the capacity to affect the health of thousands of our residents, especially the more vulnerable.

In 2012, the World Health Organisation⁶ upgraded the cancer risk from diesel exhaust from 'probably carcinogenic to humans' to 'carcinogenic to humans'.

The largest international study on vehicle air pollution and health research, carried out by the US-based Health Effects Institute, looked at 700 worldwide health-pollution studies and found, that while there were some gaps in research on traffic-related pollution, there was a clear health risk for those living near arterial roads or highways. The study found that traffic pollution within a 500-metre radius of a major thoroughfare was likely to exacerbate asthma in children, trigger new asthma cases across all ages, impair lung function in adults, and could cause cardiovascular illness and death.⁷ Other studies have demonstrated that an acute inflammatory response takes place in the airways and peripheral blood of humans after short-term exposure to high levels of particulate matter and a consistent increased risk for cardiovascular events occurring after both short and long-term exposure to particulate matter air pollution from diesel exhaust.⁸

A comprehensive global review published recently found that air pollution may be damaging every organ in the body.⁹

* 'Alternate use - If land is used for a use ... for which an existing use right is established, a permit may be granted to use the land for an alternative use which does not comply with this scheme. The responsible authority must be satisfied that the use of the land for the alternative use will be less detrimental to the amenity of the locality.' Full text is available at: <https://planning-schemes.delwp.vic.gov.au/schemes/vpps/63_08.pdf>

† 'Proof of continuous use - If, in relation to an application or proceeding under the Act or this scheme ... the extent of any existing use right for a period in excess of 15 years is in question, it is sufficient proof ... if the use has been carried out continuously for 15 years prior to the date of the application or proceeding. An existing use right may be established under this clause even if the use did not comply with the scheme immediately prior to or during the 15 year period, unless either: ... the use has been held to be unlawful [or] ... the responsible authority has clearly and unambiguously given a written direction for the use to cease by reason of its non-compliance with the scheme.' Full text is available at: <https://planning-schemes.delwp.vic.gov.au/schemes/vpps/63_11.pdf>

The latest research on PM₁ indicates hidden dangers posed by diesel emissions from both cars and trucks. A Californian children's health study, found that children growing up within half a kilometre of a busy road suffer a significant loss in lung capacity.¹⁰ There are currently no regulatory standards anywhere for PM₁.



Truck traffic in Spotswood

A study by researchers from the Cincinnati Children's Hospital Medical Center and the University of Cincinnati found that children exposed to high amounts of air pollution were more likely to end up in hospital emergency rooms for mental health problems, including anxiety, depression, bipolar disorder, suicidality, personality disorders and schizophrenia.¹¹ It adds to growing evidence that dirty air is linked to worsening depression, anxiety and other mental health issues in children and teenagers.

Chapter 2 provides further detailed information on the risks air pollution poses to human health.

Development on major transport corridors

Clearly, a major shortcoming of planning controls is their failure to address vehicle traffic corridors, the proximity of sensitive land uses and the increase in diesel vehicles on our roads.

Some jurisdictions in other states have identified the concerns and enacted amendments to their planning schemes to restrict the impact and included separation distances for sensitive use facilities in their planning schemes. For example, Brisbane City Council¹² have a requirement for:

- the preparation of an air quality impact report
- the air quality, odour and health risk assessment methodologies to be used to assess the potential air quality impacts of development
- the achievement of air quality (planning) criteria, odour criteria and health risk assessment criteria

Note - The scope of this planning scheme policy is for ambient (outdoor) air quality at sensitive uses and sensitive zones. It does not apply to indoor air quality or to workplace health and safety.



Truck traffic in Footscray

The State of California¹³ has introduced bans on public schools being situated within 150 metres of busy transport corridors.

The Los Angeles County Department of Public Health recommends that a buffer of at least 500 feet should be maintained between the development of new schools, housing or other sensitive land uses and freeways¹⁴, and that consideration should be given to extending this minimum buffer zone based on site-specific conditions, given the fact that unsafe traffic emissions may be present at greater distances. An update in March 2019¹⁵ stated that new schools, housing or other sensitive land uses built between 500 and 1500 feet of a freeway should adhere to current best practice mitigation measures to reduce exposure to air pollution. Such practices may include:

- use of regularly maintained air filtration to enhance heating, ventilation and air conditioning systems
- orientation of site buildings and placement of outdoor facilities designed for moderate to vigorous physical activity as far from the emission source as possible.

According to *Victoria in Future 2019*¹⁶ the combined population of Hobsons Bay, Brimbank and Maribyrnong is anticipated to increase to approximately 513,000 by 2036 - a 35 per cent increase on the current population. To accommodate the influx of residents, a higher density of development will need to occur due to the lack of available vacant developable land. This is already occurring in areas around Maribyrnong, such as Edgewater, the Josephs Road precinct, Kinnears and Bradmill. This will in turn increase demand for schools, childcare centres, aged care facilities and community centres.

The location of sensitive-use facilities close to major road corridors is already creating difficulties for planning departments. VCAT recently decided to allow a childcare centre to be built on the corner of Williamstown Road and Francis Street in Yarraville, despite Maribyrnong Council's objections, due to concerns about the health impacts on vulnerable children. This decision highlights the barriers the planning system can pose to reducing health risks.¹⁷

VicRoads, which was a referral authority for this application, noted that levels of noise and air pollution on Francis Street were high compared to most other arterial roads in Victoria and requested that Council have regard to the State Planning Policy Framework and in particular Clause 15.01 – Urban Environment:

“Ensure the development contributes to the quality of living and working environments and responds to the site and its context with regard to noise and air quality given the significant arterial road carries 20,000 vehicles per day including approximately 5,000 heavy vehicles per day.”

In their determination of this application, VCAT failed to recognise any issue with air quality at what is possibly one of the most polluted intersections in Melbourne.

As space for further development becomes limited and truck movements triple, this will continue to have implications for planning decisions and the health of residents. We have more freeways traversing our cities bringing more cars and trucks on our roads, which has a tendency to wipe out any air quality improvements brought about by improved emission standards. The EPA acknowledge this in their *Future Air Quality in Victoria* report, stating that levels of ozone and particulate matter are expected to increase in the future.¹⁸

Some councils' land use planning instruments may include locational criteria to ensure that sensitive uses are not situated in areas that could present health or safety risks to children and, at the same time, do not 'unreasonably affect residents with respect to noise, loss of privacy, traffic generation and on street parking'.¹⁹

The government has clearly failed to understand the gravity of the situation that has unfolded in some parts of the 'most livable city in the world'.

Breathable air, particularly for the most vulnerable in our community, must not be relegated to an 'economic privilege'. It must be a basic human right.

Polycentric Cities

The area's location, between the rapidly growing outer western and south-western suburbs and Geelong, and the CBD, means it experiences heavy commuter traffic. This involves growing numbers of vehicles, including diesel-fuelled trucks, travelling to, from and through the Inner West daily, including along many residential streets.

A 2014 study²⁰ looked at the effects of shifting from a monocentric private car oriented city to promoting polycentric cities. Travel time and travel distances continues to increase in monocentric cities, increasing congestion, air pollution, noise, accidents and greenhouse gas emissions. The inner western suburbs bear the brunt of the increased traffic travelling to the city centre.

The study concluded that there were significant benefits related to reduced travel distances, reduced demand on public transport use and increased walking activity. Employment decentralisation and creating activity centres in outer suburban suburbs was the key to improving the lives on people living on the path of commuters from the outer suburbs. Melbourne was one of the cities where the research was conducted, along with Riyadh in Saudi Arabia.

Plan Melbourne 2017-2050

Melbourne's population is projected to grow from 4.5 million to almost 8 million by 2051.

In response to this growth, the Victorian Government has adopted *Plan Melbourne*²¹, a metropolitan planning strategy that defines the future shape of the city over the next 35 years. Integrating long-term land use, infrastructure and transport planning, it sets out the strategy for supporting jobs and growth, while building on Melbourne's legacy of distinctiveness, liveability and sustainability. Plan Melbourne is a formal planning document to guide planners, councils, developers and the VCAT. It is structured around:

- 9 Principles – to guide policies and actions
- 7 Outcomes – to state the ambitions of the plan
- 32 Directions – to outline how the Outcomes will be achieved
- 90 Policies – to detail how Directions will be turned into actions

A number of outcomes relate to planning initiatives that will improve air quality outcomes in the Inner West.

The CRG strongly supports the following initiatives and actions that will improve air quality and seeks that they be prioritised by Government in the Plan.

These are listed in the CRG’s priority order:

Outcome 6: Melbourne is a sustainable and resilient city

To become more sustainable and resilient Melbourne will reduce greenhouse gas emissions to net zero emissions by 2050. Urban areas will be designed to encourage more active modes of transport and be less car dependent. Air quality and noise impacts should be a fundamental consideration in the design and assessment of all new developments.

Direction 6.6 Improve air quality and reduce impact of excessive noise

Policy 6.6.1 Reduce air pollution emissions and minimise exposure to air pollution and excessive noise

As urban renewal progresses, more people could be exposed to air and noise pollution in mixed-use areas, along major roads, at intersections, in popular entertainment areas and near industrial areas. In addition, predicted higher temperatures and more frequent bushfires and dust storms will add to the pressures on air quality.

The location of sensitive uses—such as childcare centres, schools, residential areas, aged-care facilities, hospitals and community facilities—require careful consideration and technical guidance early in the development application process.

Appropriate planning measures, building standards and urban design play a key role in minimising urban noise and air pollution and safeguarding community health and amenity.

Transport-oriented development and walkable neighbourhoods will assist in encouraging a mode shift away from cars and reducing vehicle emissions. Land-use interface issues and buffer distances between emission sources and sensitive uses must also be managed to mitigate exposure to air and noise pollution.

Outcome 3: Melbourne has an integrated transport system that connects people to jobs and services and goods to market

Direction 3.4 Improve freight efficiency and increase capacity of gateways while protecting urban amenity

Policy 3.4.2 Increase the volume of freight carried on rail

Interstate terminals enable freight to be transferred easily from rail to road or road to rail, using the most efficient mode for different parts of the freight journey. The government will continue to work with the private sector to encourage initiation of interstate system services, including confirmation of preferred terminal sites, rail network connections and access, an efficient and reliable port interface, and the provision of adequate land zoned to allow high-volume freight customers to locate adjacent to interstate terminals.

Policy 3.4.3 **Avoid negative impacts of freight movements on urban amenity**

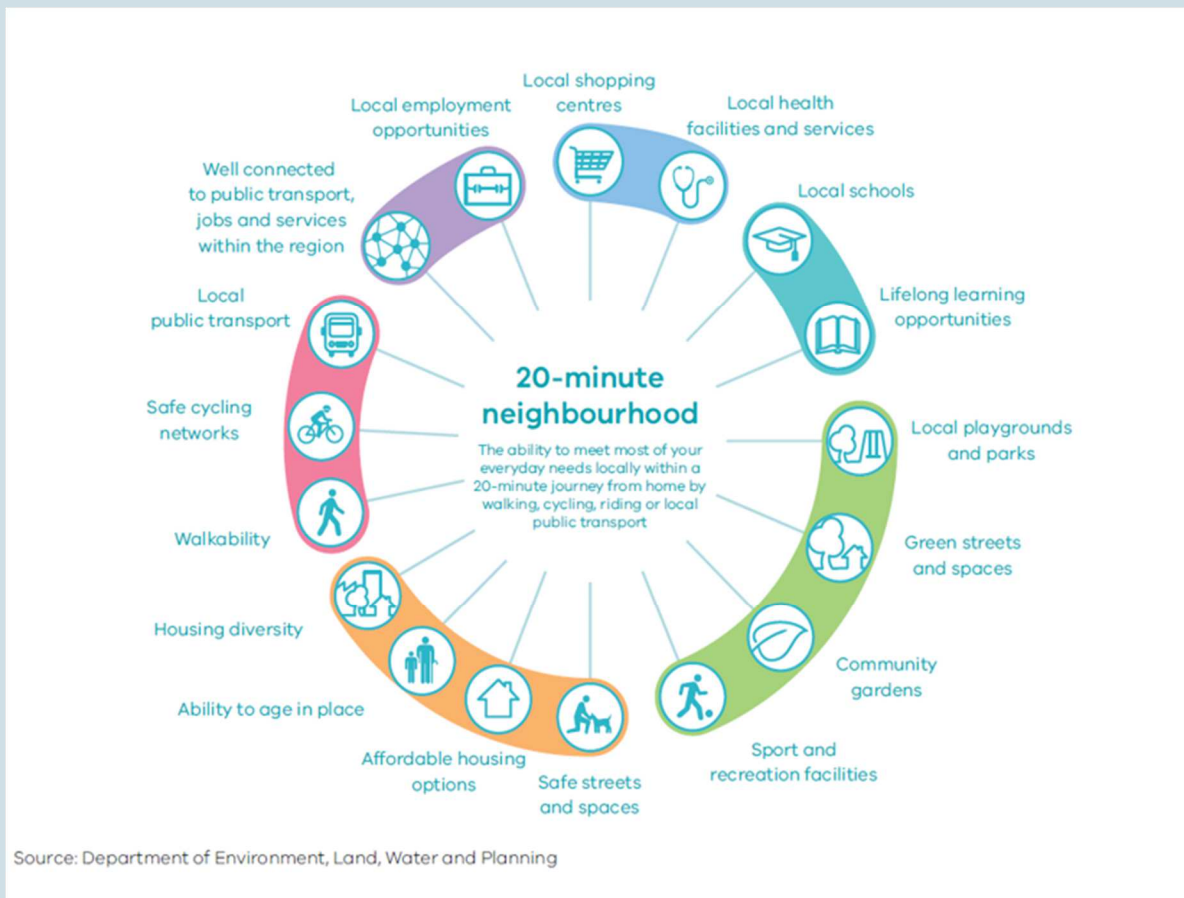
The government will continue to work with industry to identify and prioritise key routes for protection and investment on the Principal Freight Network. A more consistent and informed approach to land-use planning in freight precincts and corridors—such as protecting buffer zones—is required to protect residents from unacceptable amenity impacts.

Outcome 5: **Melbourne is a city of inclusive, vibrant and healthy neighbourhoods**

Direction 5.1 **Create a city of 20-minute neighbourhoods**

The 20-minute neighbourhood is all about ‘living locally’—giving people the ability to meet most of their everyday needs within a 20-minute walk, cycle or local public transport trip of their home. If 20-minute neighbourhoods existed across Melbourne, it could reduce travel by nine million passenger kilometres and cut Melbourne’s daily greenhouse gas emissions by more than 370,000 tonnes.

A 20-minute neighbourhood can create a more cohesive and inclusive community with a vibrant local economy—reducing social exclusion, improving health and wellbeing, promoting a sense of place, reducing travel costs and traffic congestion, and reducing carbon emissions across the city as a whole.



Policy 5.1.1	Create mixed-use neighbourhoods at varying densities
Policy 5.1.2	Support a network of vibrant neighbourhood activity centres
Outcome 1:	Melbourne is a productive city that attracts investment, supports innovation and creates jobs
Direction 1.1.	Create a city structure that strengthens Melbourne’s competitiveness for jobs and investments
Policy 1.1.3	Facilitate the development of national employment and innovation clusters

National employment and innovation clusters will be a focus for knowledge-based employment and crucial for maximising access to high-productivity jobs for the middle and outer suburbs and growth areas. Together with key industrial precincts, transport gateways, health and education precincts and metropolitan activity centres, these locations will attract investment and stimulate employment.

The national employment and innovation clusters are focused on knowledge-based businesses that locate close to each other for knowledge and resource sharing. The clusters are distributed throughout Melbourne and along high-capacity transport networks to provide greater access to high-productivity jobs.

Of the seven clusters identified across Melbourne, the two clusters most likely to improve air quality outcomes for the Inner West by creating jobs close to where people live are Sunshine and Wyndham.

Findings

Planning

- It is clear to the CRG that there are many and varied planning policies in relation to air quality issues, but local policies are there to simply guide decision making at a local level, and a much broader approach is required in order to achieve improvements in air quality in the Inner West.
- Additionally, whilst local policies in planning schemes are considered in the decision making on permit applications, they are but one component of the consideration and need to be balanced amongst all of the other considerations that a planner must make in their assessment. In this regard, important policies such as those that could assist to improve (or at least provide some control over) air quality are not given any priority or elevated status.

Adverse Amenity

- Instead of matters relating to amenity being open to interpretation and argument, the CRG believes that it should be clear that if there are any potential health or amenity impacts created by an industrial use, regardless of how minor, they should require a planning permit so that there can be some controls placed around them. Decisions regarding amenity matters should not be left to the discretion of a council planner as this can potentially result in disputes with an applicant, or referral to VCAT to seek a determination.

Existing Use Rights

- Existing use rights can create significant issues for both councils and residents due to the lack of control that they allow over sites that enjoy them.
- The CRG believes that there should be changes to the Act and the VPPs to remove existing use rights for sites that are clearly having a detrimental impact on the area. Similar to the impending changes to the Environment Protection Act, the CRG also believes that there should be the ability for responsible authorities to review the conditions on outdated planning permits for use and update them to reflect current technological advancements, standards and expectations.

Development on Major Transport Corridors

- Most local government authorities have not enacted amendments to their planning schemes to address air pollution, and some actually encourage facilities, such as childcare centres, to be located adjacent to main roads. However, there is no consistency between councils and often no scientific basis for the programmed distances.
- An amendment to the Planning Policy Framework to include separation distances will remove all uncertainty for developers and give clear indications for the location of all future sensitive-use facilities in the region.
- An air quality map of the region's road network would identify the heavily polluted transport corridors and assist planning departments to determine acceptable distances of proposed sensitive use facilities from transport corridors.

Polycentric Cities

- The results of a study carried out in Melbourne indicated that if key activity centres were planned and developed in the outer suburbs, then significant benefits could be achieved with reduced car trip distances. Use of public transport was also reduced, and walking was promoted.

Plan Melbourne 2017 – 2050

- Plan Melbourne is an important strategic plan for Melbourne over the coming decades aimed at supporting Melbourne's liveability and sustainability. It identifies and outlines a set of actions and policies aimed to enhance air quality outcomes for Melbourne in the future. The CRG urges Victorian Government to prioritise implementation of these actions.

Recommendations

Priority recommendations are shown in bold.

That the Victorian Government:

Planning Policy Framework	7.1	<p>Amends the Planning Policy Framework to support development of consistent and appropriate local planning policies to improve environmental and amenity outcomes to better protect the community from transport, commercial and industrial induced air pollution.</p> <p>Actions could include:</p> <ul style="list-style-type: none"> - ensuring that sensitive-use facilities, such as childcare centres, schools, aged care facilities and hospitals, are located at specified distances from existing air polluting industries and major transport corridors, including air, road and rail. The specified distance from transport corridors will be determined by scientific evidence related to vehicle numbers, pollution levels, type of vehicle (truck/car/diesel train), with the specified distance incorporated into the local planning policies of Councils in the Inner West - supporting Planning Schemes in the Inner West requiring planning permits for the establishment of all shipping container storage and handling sites, and review and strengthen the decision guidelines (VPP 53.07-1) to reduce on and off-site emissions and reduce the proximity to sensitive use facilities including residential zones - supporting development of consistent and appropriate local planning policies in the Inner West to improve environmental and amenity outcomes that include Best Practice Industrial/Commercial Land Use Guidelines and landscaping requirements for industrial and commercial sites. 	Medium-term
Planning Policy Framework	7.2	<p>Reviews and amends the planning framework, including the <i>Planning and Environment Act</i>, to strengthen enforcement powers and penalties for breaches of Planning Permit conditions relating to offsite emissions, including air pollution and that any fines and penalties arising from breaches of the Act be directed to local environmental improvements.</p>	Medium-term
'As of right' provisions	7.3	<p>Reviews and amends 'as of right' provisions to stop existing land uses creating excessive air pollution, with a particular focus on premises that do not meet current setback/buffer/siting planning requirements.</p> <p>This could be done by:</p> <ul style="list-style-type: none"> - providing subsidies or incentives to operators/land owners to support change of use or updating existing facilities or practices to bring them up to current planning system requirements, or negotiating early departure from the sites 	Medium-term
Air quality monitoring and reporting	7.4	<p>Requires industries that emit a high level of air pollutants to establish ongoing air quality monitoring and reporting as mandatory planning approval requirements.</p>	Medium-term

Plan Melbourne	7.5	<p>Prioritises actions in <i>Plan Melbourne 2017-2050</i> that will assist to enhance air quality outcomes, particularly:</p> <ul style="list-style-type: none"> • Direction 6.6 - Improve air quality and reduce impact of excessive noise • Direction 3.4 - Improve freight efficiency and increase capacity of gateways while protecting urban amenity • Direction 5.1 - Create a city of 20-minute neighbourhoods • Direction 1.1 - Create a city structure that strengthens Melbourne's competitiveness for jobs and investments including • Policy 1.1.3 - Facilitate the development of national employment and innovation clusters 	Long-term
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Notes

¹ Australian Government (2015) *National Clean Air Agreement* <<https://www.environment.gov.au/protection/air-quality/publications/national-clean-air-agreement>>

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¹¹ <https://www.ncbi.nlm.nih.gov/pubmed/31553231>

¹² <http://eplan.brisbane.qld.gov.au/CP/AirQualityPSP>

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¹⁴ Health Effects Institute (2010) *Traffic-Related Air Pollution: A Critical Review of the Literature on Emissions, Exposure, and Health Effects Special Report* <http://publichealth.lacounty.gov/eh/docs/AQinFreeways.pdf>

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¹⁹ University of Technology Centre for Local Government (2013) *Best Practice Guideline for the Planning and Development of Child Care Facilities* https://docs.education.gov.au/system/files/doc/other/uts-clg-final-report_0.pdf

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²¹ Victorian Government (2020) Plan Melbourne (website) <https://www.planmelbourne.vic.gov.au/home>

8 Next steps

It is vital that the findings and recommendations expressed in this report are considered by the Victorian Government and action in response begins immediately.

The CRG awaits the government's careful consideration of the findings and recommendations and its formal public response to them. A comprehensive action plan detailing what will be done and when should be prepared in order to give effect to the response.

The CRG expects that the government will provide regular, public reports on progress against its commitments in this regard. Provision of such information is crucial so that the community can be kept informed of progress being made to reduce hazardous air pollution in the Inner West.

The CRG expects that the Victorian Government will:

- release a response to this report to the CRG and broader community within six months, articulating whether it supports each recommendation and, if not, the reasons why
- release an action plan shortly thereafter articulating what it will specifically do to respond to this report's recommendations, including timelines and responsible agencies
- retain an Inner West Air Quality Community Reference Group to work with it on delivering and monitoring the effectiveness of actions, and identify further opportunities to drive down air emissions
- release annual progress updates, demonstrating what has been done to address each action committed in the Action Plan, and the impacts these are having on Inner West air pollution levels

This report should be shared at Government level with other states and territories, and the Commonwealth. The Victorian Government should recommend that other jurisdictional governments consider its findings and recommendations to inform their own policy, program and regulatory reforms to tackle air pollution in similar highly polluted communities.

Appendix A Terms of reference

Context

The inner west of Melbourne is impacted by air quality issues due to a range of pollution sources, including dust, transport, industry and shipping.

The Inner West Air Quality Community Reference Group gives community the opportunity to provide input into future improvements for air quality in Melbourne's inner west.

Establishment

Membership of the Inner West Air Quality Community Reference Group will be recruited as follows:

- by invitation by Department of Environment, Land, Water and Planning; and
- through an expression of interest process.

Membership will be selected to reflect the diversity of the Brimbank, Hobsons Bay and Maribyrnong community.

The membership of the Community Reference Group will be capped at fifteen (15) to allow for quality discussion to occur and for all members to be heard.

Scope

The scope of the Inner West Air Quality Community Reference Group extends to any air quality issues across the Brimbank, Hobsons Bay and Maribyrnong local government areas, recognising work occurring through other processes. This includes those issues associated with transport projects such as the West Gate Tunnel project.

Role of the Inner West Air Quality Community Reference Group

The role of the Inner West Air Quality Community Reference Group will be to:

- Investigate the current air quality issues and concerns across the Brimbank, Hobsons Bay and Maribyrnong local government areas, including current transport initiatives such as the West Gate Tunnel project.
- Provide advice and recommendations for government consideration including feasibility and relative importance of any actions to address air quality issues in the inner west, including in relation to tunnel filtration for the West Gate Tunnel project.
- Ensure the findings of the Inner West Air Quality Community Reference Group are communicated to the communities of the inner west of Melbourne.

Role of individual members

The role of individual members of the Inner West Air Quality Community Reference Group will include:

- Attending regular meetings as required and actively participating in the group's work.
- Representing their local community/organisation and other diverse groups.
- Being respectful, open and honest during meeting discussions.
- Complying with the Code of Conduct (see Attachment 1 to these Terms of Reference).

Membership

The membership of the Inner West Air Quality Community Reference Group was determined following the recruitment process outlined above:

Adam Fletcher	Community member representative
Alexandra Damasoliotis	Community member representative
Bert Boere	Community member representative
Chris Dunlevy	Don't Destroy Millers Road representative
Christine Harris	Spotswood and South Kingsville Residents Group representative
Clare Sheppard	Community member representative
Geoffrey Mitchelmore OAM	Community member representative
Ian Butterworth	Hobsons Bay City Council representative
Keith Loveridge	Maribyrnong City Council representative
Kristen Gilbert	Brimbank City Council representative
Louise Keramaris	Community member representative
Narelle Wilson	Maribyrnong Truck Action Group representative
Valerie Dripps	Community member representative

Chair

The Inner West Air Quality Community Reference Group is chaired by Patsy Toop OAM. The role of chair is independent of the Victorian Government.

Secretariat

The Department of Environment, Land, Water and Planning will provide the secretariat services for the Inner West Air Quality Community Reference Group.

Additional supporting staff

The Environment Protection Authority will provide expert health and air quality support for the Inner West Air Quality Community Reference Group. By agreement of the group, additional expert or support staff can be provided as necessary and if funding allows.

Agenda items

All agenda items will be forwarded to the secretariat by close of business ten (10) working days prior to the next scheduled meeting.

The agenda, with attached meeting papers, will be distributed at least five (5) working days prior to the next scheduled meeting.

Minutes and meeting papers

The minutes of each Inner West Air Quality Community Reference Group meeting will be prepared by the secretariat.

Full copies of the draft minutes, including attachments, will be provided to all Inner West Air Quality Community Reference Group members for endorsement no later than five (5) working days following each meeting.

The minutes will be published on the DELWP website no later than ten (10) working days following each meeting for public viewing.

Frequency of meetings

The Inner West Air Quality Community Reference Group will meet approximately every six (6) weeks.

Proxies to meetings

Members of the Inner West Air Quality Community Reference Group who were invited to represent a local organisation will nominate a proxy to attend a meeting if the member is unable to attend. The proxy may participate in discussion as well as have voting powers in line with the organisation they are representing.

Members of the Inner West Air Quality Community Reference Group who were invited as a community representative rather than a representative of an organisation may nominate an observer to attend a meeting if they are unable to attend. While the observer may take notes to report back to the member, the observer will not have any voting powers. If the member wishes to raise any specific points at the meeting, they must provide these in writing to the Chair ahead of the meeting and the chair will convey this input to the CRG.

The Chair should be informed of the substitution at least five (5) working days prior to the scheduled nominated meeting where practicable, noting that this may not be possible in all situations.

Quorum requirements

A quorum will be eight (8) out of up to fifteen (15) members.

Term and review period

The Inner West Air Quality Community Reference Group's term will be from 10 December 2018 to 31 March 2020.

The group will undergo a formal mid-term review after six (6) months of operation to:

- Consider the future role and operation of the group.
- Consider if more than one (1) year is required to achieve the role of the group.

Funding

The Inner West Air Quality Community Reference Group will have access to approximately \$60,000 budget. This budget is intended to be used for research purposes and for the creation of the end-of-term report.

Remuneration

Attendance at the Inner West Air Quality Community Reference Group meetings will not be remunerated. Refreshments will be provided at each meeting.

Child care

Provision of child care services will be available to those members who are otherwise unable to attend a meeting of the Inner West Air Quality Community Reference Group.

Any member requiring child care services will need to contact the Secretariat.

Decision-making processes

Decisions made by the Inner West Air Quality Community Reference Group will be determined by a two-thirds majority decision process (i.e. at least two-thirds of members in attendance at a meeting are in agreement regarding a decision).

Reporting

The Inner West Air Quality Community Reference Group will provide a public report to Minister for Roads and Minister for Energy, Environment and Climate Change by the end of its term on 31 March 2020.

The report will provide recommendations to the Victorian Government on action needed to address air quality issues based on the group's findings on the feasibility of approaches and relative importance and impact of issues.

Amendment

These terms of reference can be amended by agreement of Minister for Roads and Minister for Energy, Environment and Climate Change.

Attachment 1: Code of Conduct

As a representative of the Inner West Air Quality Community Reference Group, I agree to:

- Attend regular Inner West Air Quality Community Reference Group meetings and provide apologies in advance where attendance is not possible.
- Represent the views of my organisation, interest group or community.
- Participate in the Inner West Air Quality Community Reference Group in a constructive way.
- Ensure discussion remains within the scope identified in the Terms of Reference.
- If discussed outside of the Inner West Air Quality Community Reference Group, the content and tone of meetings must be fairly represented.
- Respect the ideas and beliefs of all members and provide an atmosphere where all members feel comfortable to participate.
- Notify the Chair of any potential conflict of interest that may arise during my participation in the Inner West Air Quality Community Reference Group.
- Not disseminate confidential information that is discussed at the Inner West Air Quality Community Reference Group meetings as advised by the Chair, such as issues of a sensitive commercial or conceptual nature.
- Seek prior written approval from the Chair, in consultation with the Victorian Government, before making any media or social media comment on behalf of the Inner West Air Quality Community Reference Group.

I understand that where a member disregards the Code of Conduct, as agreed by the Inner West Air Quality Community Reference Group member, the Chair may ask them to step down and/or their organisation may be requested to nominate a replacement.

Appendix B Expert presentations

Presenter	Title	Organisation	Topic
25 February 2019			
Dr Andrea Hinwood	Executive Director – Applied Science & Chief Environmental Scientist	EPA Victoria	Current state of knowledge on air pollution
18 March 2019			
Clare Walter	Researcher	Lung Health Research Centre	Diesel and heavy vehicles Health impacts of diesel particulates
Greg Cain	Industry Services Manager	Victorian Transport Association	Transport industry and the work of the Victorian Transport Association in the Inner West
Malcolm Brown	Manager	Complete Vehicles Volvo Australia	Heavy vehicle engines and emissions
29 April 2019			
Dr Cathy Wilkinson	CEO	EPA Victoria	EPA role and future Role of the Environment Protection Authority <i>Environment Protection Amendment Act 2018</i> The EPA's shift to a more prevention-oriented model that seeks to prevent pollution before it occurs
Dan Hunt	Regional Manager	EPA Victoria	Pollution reports the EPA has received from the Inner West in 2018 and 2019 EPA inspection and investigation activities in the Inner West The Brooklyn Dust Action Plan, Resource Recovery Audit Taskforce, West Footscray/Tottenham fire recovery, compliance priorities for 2019–20.
Tim Eaton	Executive Director	EPA Victoria	The EPA's approach to infrastructure, including the West Gate Tunnel project The EPA's involvement with the environment effects statement for the West Gate Tunnel project.

13 May 2019**Victorian Air Quality Strategy**

Kyle Garland Team Leader,
Air Quality Department of
Environment,
Land, Water
and Planning

Katherine Evans Senior Policy
Officer Department of
Environment,
Land, Water
and Planning

24 June 2019**West Gate Tunnel filtration**

Dr Lyn Denison Principle
Consultant Environmental
Resource
Management

Discussed the types of tunnel filtration and workings. Modelling used for the West Gate Tunnel project's environment effects statement

Significance of any reduction in air pollution, including diesel exhaust, from a health perspective

Actions to help reduce air pollution impacts

Dr Paul Torre Senior Applied
Scientist EPA Victoria

Tim Faragher Executive
Director
Regulatory
Standards,
Assessments &
Permissioning EPA Victoria

Dr Bruce Dawson Principle
Environmental
Consultant Golder
Associates

Associate
Professor Lou
Irving Respiratory
Physician Peter
MacCallum
Cancer Centre

15 July 2019**Dust**

Michael Beale Occupational
Hygienist envirosapHe

What dust is in the context of air quality, including its composition and health risks

Major sources of, and appropriate mitigation methods for, different types of dust emissions

The regulatory environment covering dust management in the Inner West

International standards on dust and whether there are 'safe levels' of exposure

Dr Paul Torre Senior Applied EPA Victoria
Scientist

Jeremy Settle Regional EPA Victoria
Manager
Metropolitan
Area

26 August 2019

Industry in the Inner West

Jim Demetriou Air and Odour AOC Specialist
Compliance Consulting
Specialist

Monitoring and reporting of air pollutants emitted by industry in the Inner West

Air pollution and monitoring legislation and standards that apply to industry

Impact of air pollution from industry (including shipping and port operations) on the health of the community living in the Inner West

Gavin Fisher Air Quality EPA Victoria
(EPA) Scientist

Stephen Lansdell Regional EPA Victoria
Manager, Western
Metropolitan

16 September 2019

Planning framework

Steven Cox Manager, Department of
Planning Environment,
Services (West) Land Water and
Planning

Victoria's planning framework

Local and Victorian government responsibilities within the planning system

Key and emerging planning policies and guidance related to air quality

Victoria's environment effects statement process

Role of Victorian Civil and Administrative Tribunal

The role of the EPA as an advisory and referral authority

Existing use rights

Kristen Gilbert Manager City Brimbank City
Planning Council

Ruth Davies Principal EPA Victoria
Planner and Subject Matter
Expert

David Partner HWL Ebsworth
Vorchheimer Lawyers

Appendix C Media release – Inner West to have their say on air quality

Media Release

The Hon Lily D'Ambrosio MP
Minister for Energy, Environment and Climate Change
Minister for Suburban Development



Thursday, 26 July, 2018

THE INNER WEST TO HAVE THEIR SAY ON AIR QUALITY

The Andrews Labor Government is giving locals the opportunity to provide input into future improvements for air quality in the inner west.

The Minister for Energy, Environment and Climate Change Lily D'Ambrosio and Minister for Roads Luke Donnellan today announced the Inner West Air Quality Community Reference Group.

The Reference Group will investigate air quality across the inner west and explore sources of pollution to find the best solutions for managing air quality and emissions in the inner west.

The Inner West Air Quality Community Reference Group will include representatives from key community groups, residents and representatives from Hobson's Bay, Brimbank and Maribyrnong Councils.

This announcement builds on the Labor Government's extension of air quality monitoring for 10 years and its involvement of the local community in decisions concerning air quality and the West Gate Tunnel Project.

The Group will examine air quality monitoring regimes with full access to the available data from the new air quality monitoring program, which was established by the West Gate Tunnel project.

Construction is underway on the West Gate Tunnel, which will take more than 9,000 trucks per day off residential streets in the inner west, build additional noise walls, create new open spaces and complete Federation Trail.

The Group's work will also contribute to the Labor Government's *Victorian Air Quality Strategy*, which will set out clear, sustainable and cost-effective approaches to monitor and manage air quality over the next decade.

For more information on the Inner West Air Quality Community Reference Group visit:
environment.vic.gov.au/sustainability/inner-west-air-quality-reference-group

Quotes attributable to Minister for Energy, Environment and Climate Change Lily D'Ambrosio

"Local communities in Melbourne's west have excellent ideas on how to improve air quality, we are giving the inner west community a chance to have their voices heard."

Quotes attributable to Minister for Roads Luke Donnellan

"We have listened to the community every step of the way and we will keep doing this to find the best solution for the inner west."

Quotes attributable to Member for Williamstown Wade Noonan

"I have campaigned for initiatives to create cleaner air in the inner west and I'm pleased the establishment of this group will help further improve air quality in our region."

Media contact: Pat Hutchens 0436 344 218 | pat.hutchens@minstaff.vic.gov.au

Appendix D Analysis of West Gate Tunnel Project air monitoring data

Analysis of West Gate Tunnel Project air monitoring data



Environment
Protection
Authority Victoria

Report to Inner West Air Quality Community Reference Group

EPA has reviewed pre-operation air pollution monitoring data from the West Gate Tunnel Project (WGTP) in the Inner West of Melbourne and specific EPA monitoring stations, from 2016 to 2019. The highest impacts were measured for particulate matter (PM_{2.5} and PM₁₀) and the results were variable across the monitoring stations, being dependent on the generation of local air pollution sources and prevailing weather conditions.

PM_{2.5} and PM₁₀ concentrations at WGTP stations were compared with EPA stations located in and away from the Inner West region. In 2019, PM_{2.5} concentrations were higher than preceding years. Overall, PM₁₀ levels were higher at the stations located in the Inner West. Stations located in Brooklyn showed very high PM₁₀ levels, most likely due to dust from local industrial and commercial activities; from heavy traffic-related road emissions or from being located within a construction site.

Introduction

The West Gate Tunnel Project (WGTP) is undertaking air monitoring at six stations to measure and understand air pollution concentrations in locations where there is a risk that air quality might be affected by tunnel construction and/or operation. On request from the [Inner West Air Quality Community Reference Group](#) (CRG), EPA has reviewed the WGTP air monitoring data collected between July 2016 and December 2019 during part of the project's construction phase. EPA also operates air monitoring stations in the area, at Footscray and Brooklyn.

The WGTP and EPA stations measure major air pollutants including:

- particulate matter (PM_{2.5} and PM₁₀)
- carbon monoxide (CO) and
- nitrogen dioxide (NO₂).

These pollutants are common in urban areas of Melbourne and other Australian cities. The major sources of these pollutants in the local Footscray, Yarraville and Spotswood areas are emissions: from motor vehicles, shipping, diesel trains, industrial/commercial activities and domestic activities (e.g. smoke from wood heating).

This report presents the findings of EPA's review. It covers air pollution concentrations measured at the six WGTP monitoring stations operating during different periods located in Brooklyn, Spotswood and Yarraville. It outlines the average and peak concentrations of particulate matter (PM_{2.5} and PM₁₀), carbon monoxide (CO) and nitrogen dioxide (NO₂) and how they compare in relation to:

- each WGTP monitoring station
- general background levels in some other Melbourne locations (from select stations in EPA's monitoring network)
- state air quality objectives.

Monitoring will continue for at least five years following the tunnel's opening, allowing for ongoing assessment of changes to air quality in the local area associated with the WGTP.

Monitoring stations

The WGTP established six monitoring stations around the project zone to assess air quality. The objective of the monitoring is to gain an understanding of the air pollution levels before and during the tunnel operation. The locations of each WGTP air monitoring station and EPA air quality monitoring stations in the Inner West are shown in Figure 1. WGTP monitoring stations are listed in Table 1 and designated as WGTP station 1 to WGTP station 6.

Donald McLean Reserve (WGTP station 5), Francis Street (WGTP station 2), Primula Avenue (WGTP station 4) and Millers Road (WGTP station 6) are located near highly trafficked major roads that carry a relatively high proportion of heavy commercial vehicles compared to other major roads in Melbourne. These WGTP stations are classified as roadside sites and typically represent the highest air pollution impacts from road emission sources. Yarraville Gardens (WGTP station 1) is in an area away from a major road and is more representative of general background air quality in the area (Figure 1). Woods Street (WGTP station 3) is also designated as a roadside station however EPA considers the station as more representative of the general air quality given it is not located alongside a major road, and located in a parkland approximately 40 metres from an elevated major road. The station is within a typical residential area that features a low vehicle traffic suburban street.

EPA's network air monitoring station at West Footscray (identified as 'Footscray') represents general background air quality in the Inner West. EPA's Brooklyn monitoring site is generally representative of local air pollution impacts in the Brooklyn area, including local industrial and commercial activities (Figure 1). EPA's network monitoring station at Alphington is classified as generally representative of background air quality in the Inner North East of Melbourne. EPA's central business district (CBD) station is located near a major road and is classified as generally-representative of air pollution levels near roads in the CBD. EPA also used these stations to compare the data collected by the WGTP monitoring stations.

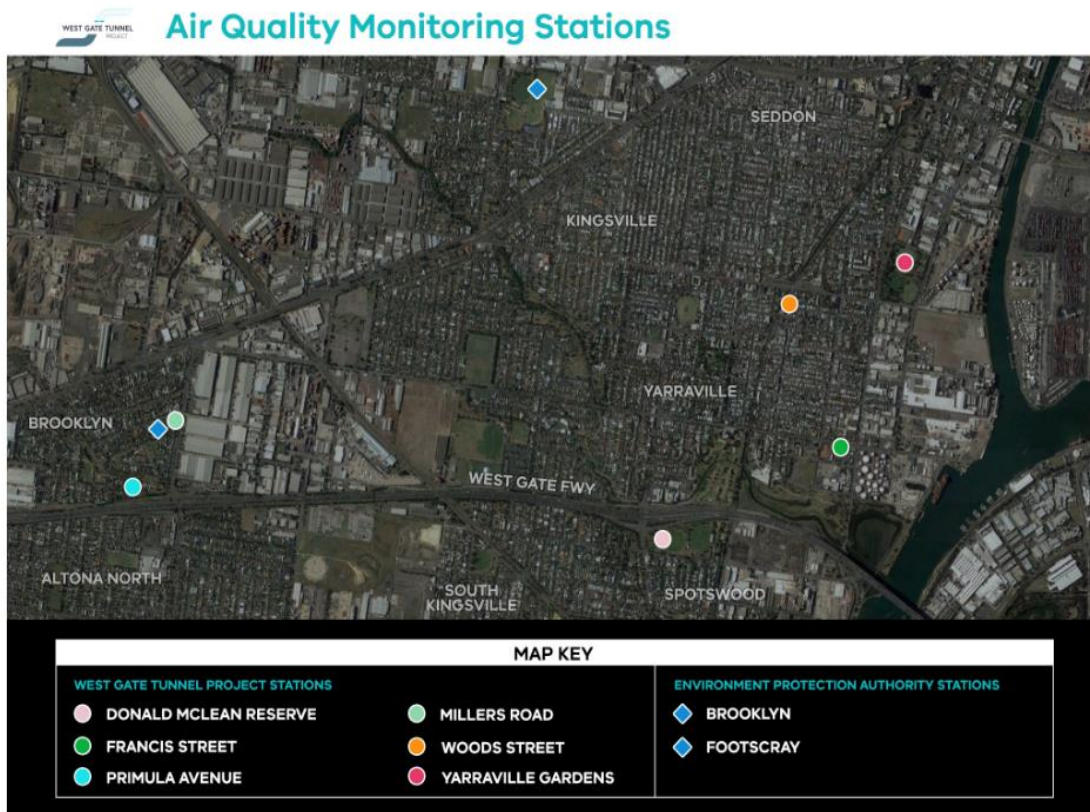


Figure 1: Location of WGTP stations and EPA (Brooklyn and Footscray) air monitoring stations (see Table 1 for further information)

Air pollutants measured

EPA's review examined the air pollutants listed in Table 1.

Table 1: Air pollutants measured at each monitoring station

Monitoring station	Air pollutant			
<i>Yarraville Gardens (WGTP station 1)</i>	PM _{2.5}	PM ₁₀		
<i>Francis Street (WGTP station 2)</i>	PM _{2.5}	PM ₁₀		
<i>Woods Street (Railway Reserve) (WGTP station 3)</i>	PM _{2.5}	PM ₁₀		
<i>Primula Avenue (WGTP station 4)</i>	PM _{2.5}	PM ₁₀	NO ₂	CO
<i>Donald McLean Reserve (WGTP station 5)</i>	PM _{2.5}	PM ₁₀		
<i>Millers Road (WGTP station 6)</i>	PM _{2.5}	PM ₁₀		
<i>EPA network station Footscray</i>	PM _{2.5}	PM ₁₀	NO ₂	CO
<i>*EPA network station Brooklyn</i>		PM ₁₀		
<i>EPA network station Alphington</i>	PM _{2.5}	PM ₁₀	NO ₂	CO
<i>EPA network station Melbourne CBD (CBD)</i>	PM _{2.5}			

*The PM_{2.5} reported at the Brooklyn station is not used for comparison in this review as the method to determine it is indirect (derived from 'visibility' measurements). This method is not comparable to that at other stations.

Air quality objectives used for assessing air pollution concentrations

The Victorian State Environment Protection Policy (Ambient Air Quality) (SEPP (AAQ)) outlines the air quality objectives for Victoria. It adopts the requirements of the National Environment Protection Measure for Ambient Air Quality. Table 2 shows the SEPP (AAQ) objectives for particulate matter (PM_{2.5} and PM₁₀), NO₂ and CO.

Table 2: State Environment Protection Policy Objectives

Pollutant	SEPP (AAQ) Objectives	
	Averaging period	Maximum concentration
PM _{2.5}	Daily	25 µg/m ³
	Annual	8 µg/m ³
PM ₁₀	Daily	50 µg/m ³
	Annual	20 µg/m ³
NO ₂	Hourly	120 ppb
	Annual	30 ppb
CO	8-hour	9 ppm

ppb = part per billion ppm = part per million µg/m³ = micrograms per cubic metre

The SEPP(AAQ) sets out the maximum concentration for a given pollutant.

Review Findings

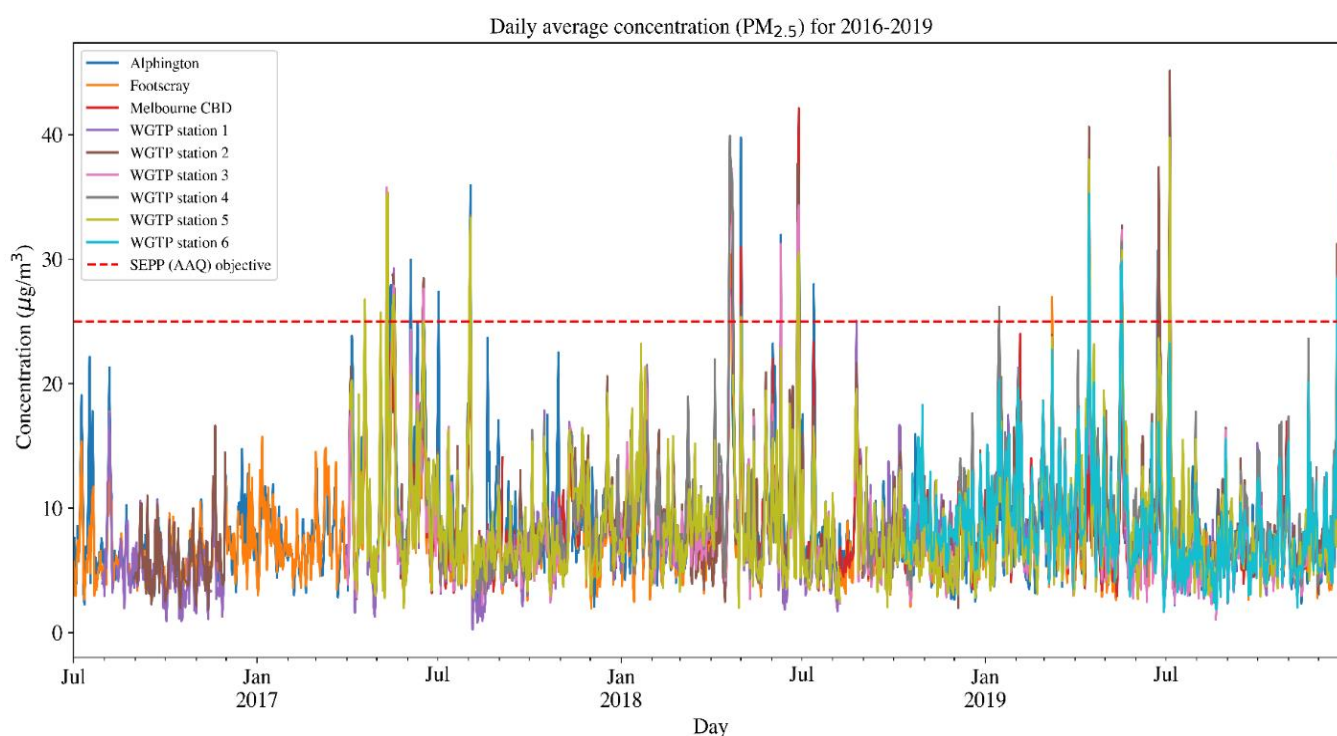
PM_{2.5} levels

The **daily averaged PM_{2.5} concentrations** are shown in Figure 2.

The concentrations measured at each monitoring station is dependent on the prevailing weather and the generation of local pollution sources during that specific year. Concentrations measured at both WGTP and EPA stations generally indicate a trend of peak levels occurring at multiple stations during autumn and winter. Higher concentrations of air pollution during autumn and winter in Melbourne are typically due to calm meteorological conditions, resulting in a build-up of local urban air pollutants. The higher PM_{2.5} levels measured in December 2019 are attributed to smoke impacts across Melbourne associated with bushfires adding to the local levels.

The concentrations measured at each monitoring station are dependent on the prevailing weather and the generation of local pollution sources during that specific year. Concentrations measured at both WGTP and EPA stations generally indicate a trend of peak levels occurring at multiple stations during autumn and winter. Higher concentrations of air pollution during autumn and winter in Melbourne are typically due to calm meteorological conditions, resulting in a build-up of local urban air pollutants during this period. The higher PM_{2.5} levels measured in December 2019 are attributed to smoke impacts across Melbourne associated with bushfires adding to the local levels.

Figure 2: Daily averaged PM_{2.5} concentrations measured from July 2016 to December 2019 for all stations



operating compared to SEPP (AAQ) objective of 25 µg/m³

The PM_{2.5} annual average¹ and maximum daily concentrations for all stations in comparison to the related PM_{2.5} SEPP (AAQ) objectives are shown in the Appendix (Figures 6 to 13). The number of days on which the daily concentrations exceeded the PM_{2.5} SEPP (AAQ) objective are shown in the Appendix (Figures 14 to 16).

2016

During July to December 2016 average PM_{2.5} concentrations at Alphington (6.8 µg/m³) and Footscray (6.3 µg/m³) were higher than WGTP station 1 (5.2µg/m³) and WGTP station 2 (5.8g/m³) (Figure 6). Maximum 24 hour concentrations

¹ Average concentrations rather than annual averages are shown for 2016 as there is insufficient data to determine annual averages.

ranged from 16.6 $\mu\text{g}/\text{m}^3$ at WGT station 1 to 22.2 $\mu\text{g}/\text{m}^3$ at Alphington (Figure 10)²..

2017

Annual average concentrations ranged from 8.0 $\mu\text{g}/\text{m}^3$ at Footscray, 8.7 $\mu\text{g}/\text{m}^3$ at CBD and 9.3 $\mu\text{g}/\text{m}^3$ at Alphington with WGTP stations ranging between 8.8 $\mu\text{g}/\text{m}^3$ and 9.4 $\mu\text{g}/\text{m}^3$ (Figure 7). Alphington station recorded a maximum 24-hour concentration of 35.9 $\mu\text{g}/\text{m}^3$ with other stations ranging from 35.8 $\mu\text{g}/\text{m}^3$ at WGTP station 3 to 28.7 $\mu\text{g}/\text{m}^3$ at CBD (Figure 11). The number of days that exceeded the SEPP (AAQ) objective ranged between 3 and 8 days, with 8 days at Alphington and 3, 4, 6, 7 and 8 days at WGTP stations (Figure 14). Alphington station is located away from major roads and impacted by general urban pollution such as local traffic road emissions and domestic activities (e.g. wood heating). The variation in levels and impacts across the monitoring stations indicates how air pollution levels are dependent on local sources and prevailing weather conditions.

2018

In 2018, EPA's background stations (Alphington and CBD) recorded slightly higher maximum 24-hour concentrations than stations in the Inner West (Figure 12) and recorded annual average $\text{PM}_{2.5}$ levels that were either higher than or comparable to levels measured at Inner West stations (Figure 8). EPA stations ranged from 5, 7 and 8 days above SEPP (AAQ) objective compared with the range of 3, 7 and 8 days for WGTP stations (Figure 15).

2019

During 2019 the WGTP stations recorded higher annual average concentrations (Figure 9), maximum 24-hour concentrations (Figure 13) and number of days above the SEPP (AAQ) objective (Figure 16) relative to EPA background sites. The major contribution to the WGTP roadside stations is likely to be road emission sources (as expected). The non-roadside WGTP station 1 was impacted by a variety of sources.

PM₁₀ levels

EPA's Brooklyn station data was included for the analysis of PM_{10} data. The Brooklyn station provides an indication of local background pollution levels including impacts from local industrial sources in the Brooklyn Industrial Precinct. The EPA CBD site does not have PM_{10} air monitoring for comparison, so the data collected from the WGTP stations was compared with Alphington and Footscray.

PM_{10} levels measured at each monitoring station are dependent on the generation of local pollution sources and prevailing weather conditions transporting and dispersing the pollution in air during that specific year.

² On no day during July to December 2016 reporting period was the 24-hour $\text{PM}_{2.5}$ SEPP (AAQ) objective exceeded at any operating monitoring station. There is therefore no graph in the Appendix demonstrating this.

Figure 3 shows the variation of the daily average concentrations for all the sites in relation to the SEPP (AAQ) PM₁₀ objective of 50 µg/m³. Several days were measured above the SEPP (AAQ) PM₁₀ objective. The highest levels were recorded during December 2018 through February 2019 and the period during October to December 2019. The relatively higher PM₁₀ levels compared with PM_{2.5} levels during late spring and summer generally suggests the source to be raised dust. There are several days in December 2019 where bushfire smoke was a significant source contributing to high PM₁₀ readings, which also resulted in PM₁₀ levels higher than the 24-hour SEPP (AAQ) objective.

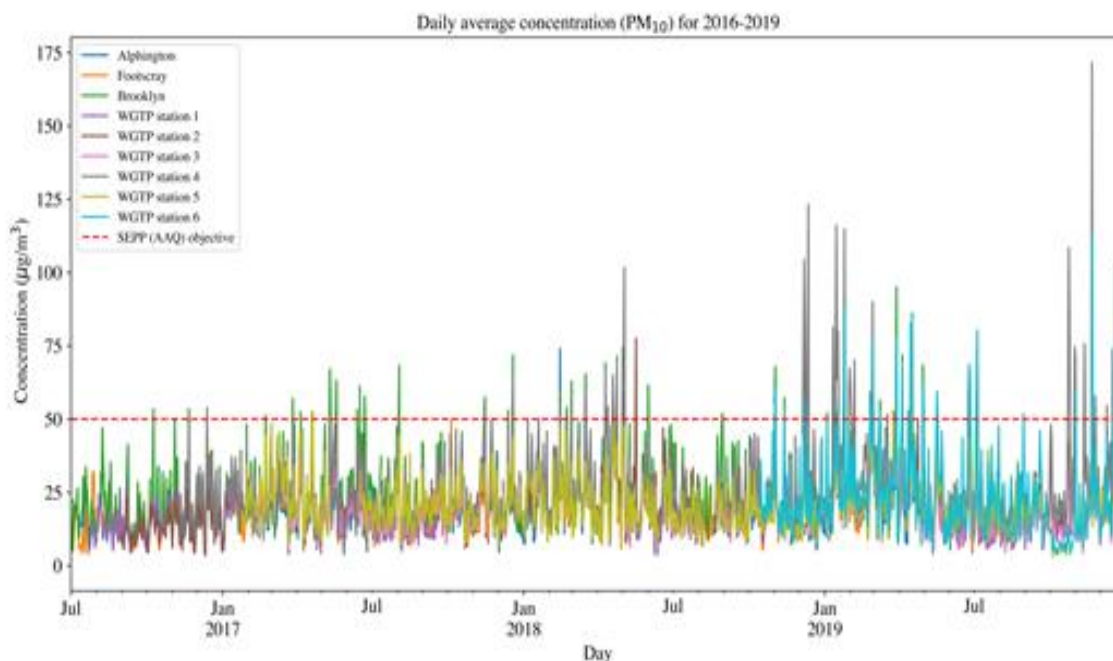


Figure 3: Daily averaged PM₁₀ concentrations measured from July 2016 to December 2019 for all WGTP and EPA stations operating compared to SEPP (AAQ) objective of 50 µg/m³

The PM₁₀ annual³ and maximum daily concentrations in comparison to the related PM₁₀ SEPP (AAQ) objective is shown in the Appendix (Figures 17 to 24). The number of days recorded exceeding the daily concentrations above the PM_{2.5} SEPP (AAQ) objective is shown in the Appendix (Figures 25 to 28).

2016

The highest average concentrations were measured at WGTP station 4 (23.4 µg/m³) with the lowest at Alphington (13.2 µg/m³) in 2016 (Figure 17). Maximum 24-hour average concentrations ranged from 29.9 µg/m³ at WGTP station 2 to 53.8 µg/m³ at Brooklyn (Figure 21). Brooklyn and WGTP station 4 were the only stations to record days that exceeded the 24-hour AAQ objective during the year (Figure 25).

2017

In 2017, the Brooklyn (71.7 µg/m³) and WGTP station 4 (65 µg/m³) stations measured the highest 24-hour concentrations (Figure 22). The annual PM₁₀ SEPP (AAQ) objective was exceeded at Brooklyn and the roadside WGTP stations 2, 4 and 5 (Figure 18). Exceedances of the 24-hour SEPP (AAQ) objective was recorded at four stations: one day at WGTP stations 2 and 5, six days at WGTP station 4 and 15 days at Brooklyn (Figure 26). The elevated PM₁₀ concentrations measured at the Brooklyn station are mostly due to local dust impacts generated by industrial and commercial activity in the Brooklyn Industrial Precinct. At sites close to heavily trafficked major roads where there is no other industry or major construction activity, the main source of the PM₁₀ levels measured is likely to be from road emissions – both exhaust and non-exhaust emissions.

³ Average concentrations rather than annual averages are shown for 2016 as there is insufficient data to determine annual averages.

2018

The highest concentrations of PM₁₀ were recorded at WGTP station 4 (123.2 µg/m³) and Brooklyn (99.2 µg/m³) (Figure 23). Days on which the 24-hour SEPP (AAQ) objective was exceeded ranged from none at WGTP station 5, one day at Footscray, WGTP station 1 and WGTP station 3, three days at Alphington, and six days at WGTP station 2. There were 16 days above the SEPP (AAQ) recorded at Brooklyn and 19 days at the WGTP station 4 (Figure 27). Annual concentrations exceeded the annual SEPP (AAQ) objective at three stations, WGTP station 4 measuring 26.8 µg/m³, Brooklyn measuring 24.2 µg/m³ and WGTP station 1 measuring 21.3 µg/m³ (Figure 19).

2019

In 2019, annual average PM₁₀ concentrations ranged from 29.9 µg/m³ at WGTP station 4, 26.6 µg/m³ at WGTP station 6 and 25.2 µg/m³ at Brooklyn compared with other WGTP stations varying from 19.4 µg/m³ to 23.5 µg/m³, Alphington measuring 18.6 µg/m³ and Footscray 20.5 µg/m³ (Figure 20). Very high 24 hour PM₁₀ concentrations were measured at Brooklyn, WGTP station 4 and WGTP station 6. Maximum 24-hour concentrations peaked at WGTP station 4 at 171.7 µg/m³, followed by Brooklyn at 140.9 µg/m³ and 116.2 µg/m³ at WGTP station 6, compared with 69.8 µg/m³ and 88.4 µg/m³ at Alphington and Footscray stations respectively (Figure 24). All stations recorded many days above the 24-hour SEPP (AAQ) objective, including 41 days at WGTP station 4, 30 at Brooklyn and 26 days at WGTP station 6 (Figure 28).

The WGTP station 6 recorded high concentrations and levels and may also be significantly impacted by both the Brooklyn Industrial Precinct and other dust and road traffic emissions given its proximity to a heavy trafficked road.

WGTP station 4 is in a WGTP construction site and surrounded by solid construction barriers (see Figure 33 aerial photo - November 2019). The high PM₁₀ levels relative to the PM_{2.5} levels indicate raised dust and given the location in the construction site it is highly likely the activities associated with construction works adjacent to the station are significantly contributing to the high PM₁₀ levels measured. The objective of WGTP station 4 is to provide baseline air monitoring data near the West Gate Freeway before and after the operation of the tunnel, to inform an understanding of the air pollution levels before and after tunnel operation. The levels measured at WGTP station 4 are currently representative of levels at the construction site and not of the typical baseline levels near the West Gate Freeway.

CO and NO₂ levels

Daily maximum 8-hourly average concentration of CO measured at WGTP station 4 and the two background EPA stations (Alphington and Footscray) compared to the CO SEPP (AAQ) objective are shown in Figure 4. The CO concentrations measured at all three sites were generally below the SEPP (AAQ) objective with WGTP station 4 recording higher CO concentrations than the EPA background sites. Unlike PM₁₀ levels, the construction activity does not appear to be significantly affecting the measured levels. Measured levels of CO are not markedly higher at this site in 2019 than in 2017 when there was limited construction activity nearby. The higher concentration at WGTP station 4 is likely to be due to motor vehicle emissions given its proximity to major heavy trafficked roads.

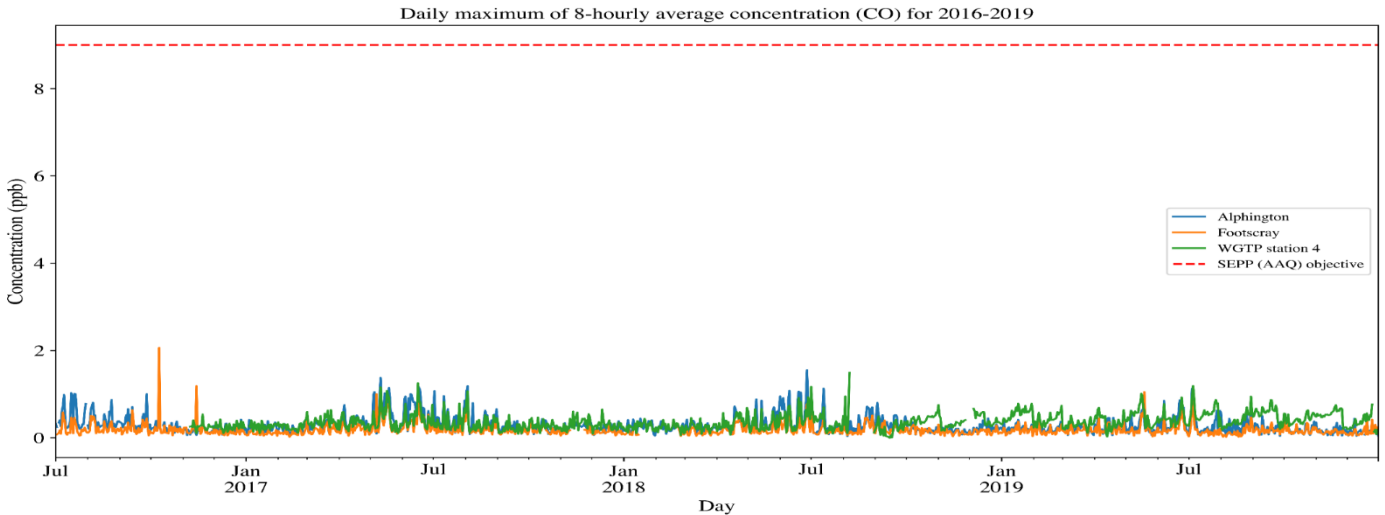
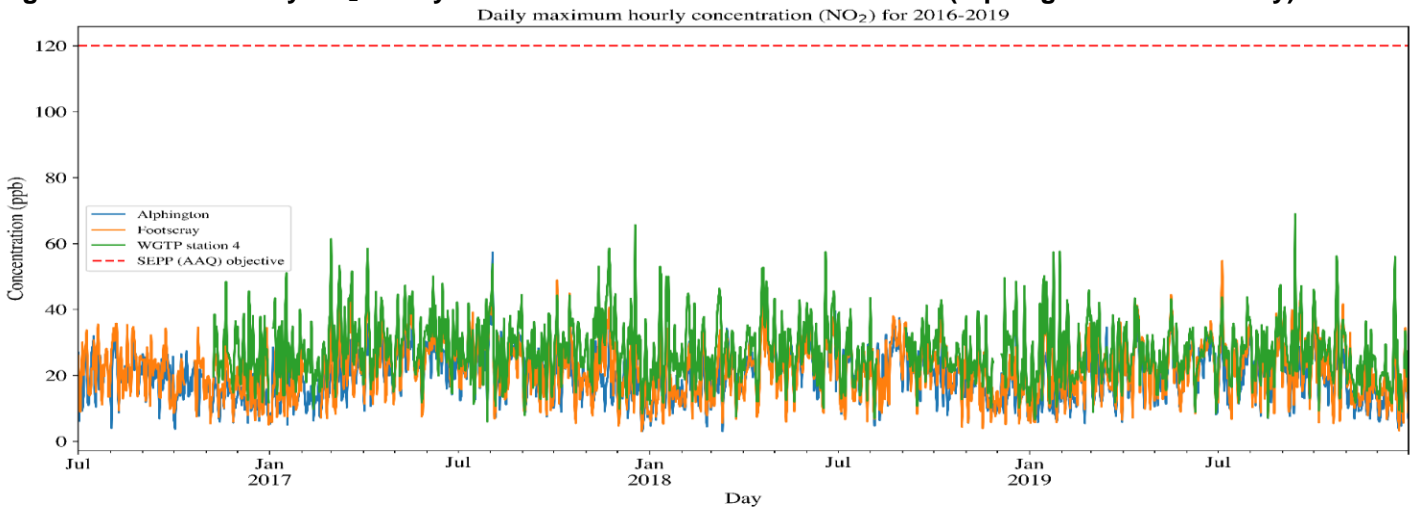


Figure 4: 8-hourly averaged CO concentrations measured at EPA sites (Alphington and Footscray) and WGTP station 4 (CO data available only from October 2016)

The NO₂ daily maximum one-hour levels measured at WGTP station 4 and the two background EPA stations (Alphington and Footscray) are compared to the NO₂ SEPP (AAQ) objective in Figure 5. The NO₂ concentrations measured at all three sites were below the SEPP (AAQ) objective with WGTP station 4 generally recording higher NO₂ concentrations than at EPA background sites. Like CO levels, the general trend of levels between limited construction activity in 2017 and high activity of construction 2019 is not significant; indicating that higher concentrations at the WGTP 4 station is likely to be due to motor vehicle emissions, given the proximity to major heavy-trafficked roads.

Figure 5 Maximum daily NO₂ hourly concentrations measured at EPA sites (Alphington and Footscray) and



WGTP station 4 (NO₂ data available only from October 2016)

All stations recorded levels below the annual SEPP (AAQ) objective for NO₂. The average NO₂ concentration measured in 2016 is shown in the Appendix (Figure 29) as are annual average concentrations measured during 2017 (Figure 30), 2018 (Figure 31) and 2019 (Figure 32).

Concluding Remarks

The highest impacts were measured for PM_{2.5} and PM₁₀, both recording elevated concentrations at WGTP stations and Brooklyn. Concentrations were variable across the monitoring stations and are dependent on the generation of local air pollution sources and prevailing weather conditions. The higher concentrations at WGTP stations and Brooklyn were measured during 2019 with 5 to 8 days exceeding the daily SEPP (AAQ) objective for PM_{2.5}. Stations located in Brooklyn during this year showed very high PM₁₀ levels with 26 to 30 days exceeding daily SEPP (AAQ) objective*. CO and NO₂ were all well below the SEPP (AAQ) objectives. Most of the contributing sources were from: local industrial and commercial activities, road-sources, and smoke from domestic sources (e.g. wood heating) and bushfires at specific times of the year. This data will be used as a baseline to continue monitoring for changes in air quality as part of the development and eventual operation of the WGTP and other local activities.

To better understand the sources of PM_{2.5} and their contribution to the levels of PM_{2.5} in inner Melbourne, EPA Victoria will undertake a 'PM_{2.5} speciation' and 'source identification' project during 2020 – 2021. This will involve collecting PM_{2.5} particles and analysing them to identify chemical composition and the major sources they come from.

* WGTP 4 station has been excluded because the levels measured is in a construction site rather than typical baseline levels at the location.

Appendix

Summary of PM_{2.5} data

The annual⁴, maximum concentrations in comparison to the related PM_{2.5} SEPP (AAQ) objective and number of days that recorded daily concentrations above the PM_{2.5} SEPP (AAQ) objective for each station for each year of the air monitoring undertaken from mid-2016 to 2019 (Figures 6 to 16).

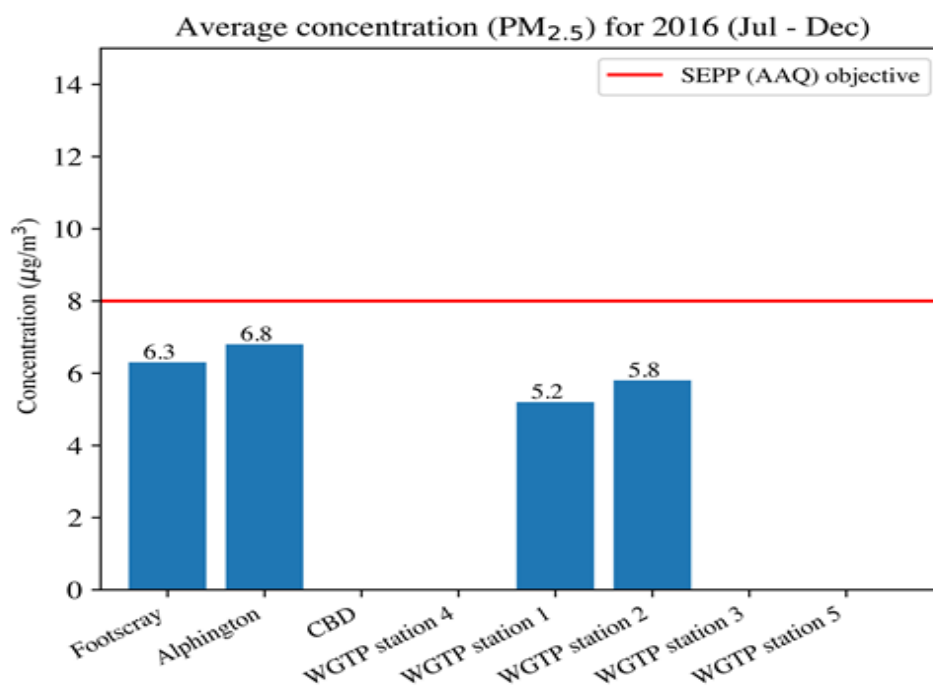


Figure 6: Average PM_{2.5} concentrations measured during 2016 at the WGTP and EPA stations operating

⁴ Average concentrations rather than annual averages are shown for 2016 as there is insufficient data to determine annual averages.

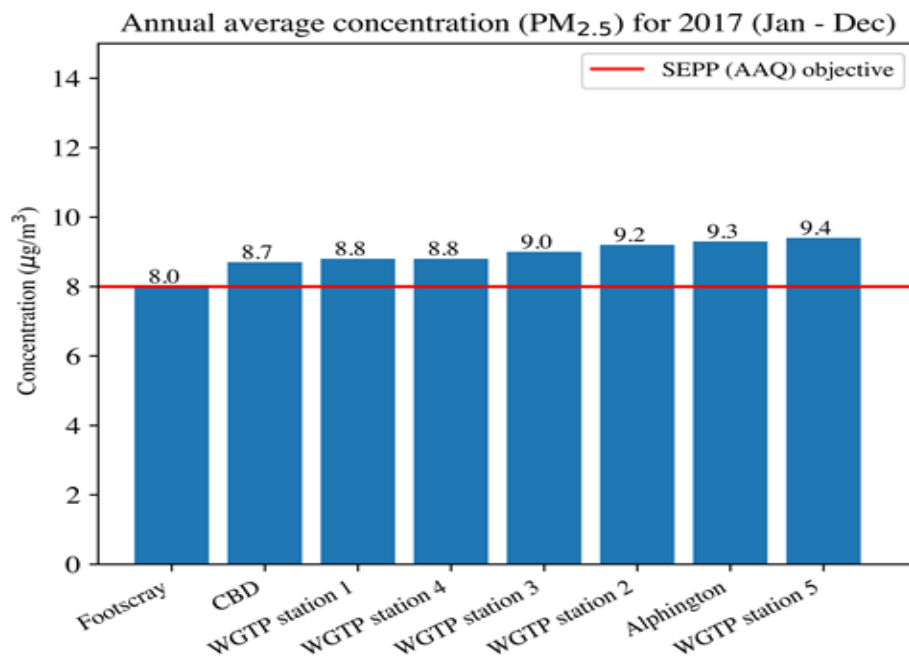


Figure 7: Annual PM_{2.5} concentrations during 2017 at the WGTP and EPA stations operating

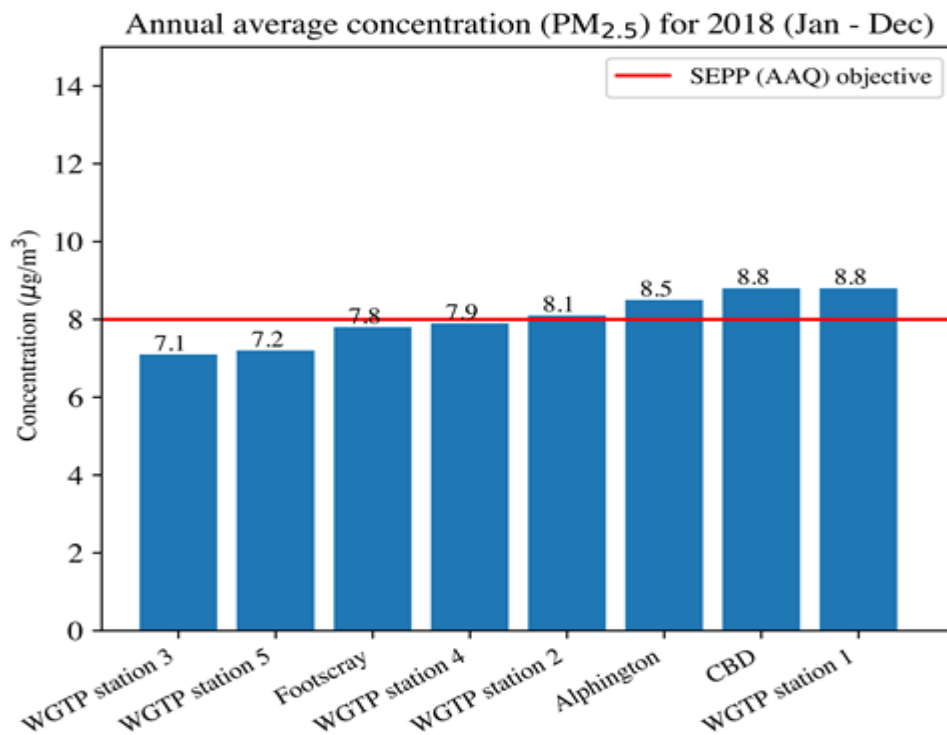


Figure 8: Annual average PM_{2.5} concentrations during 2018 at the WGTP and EPA stations operating

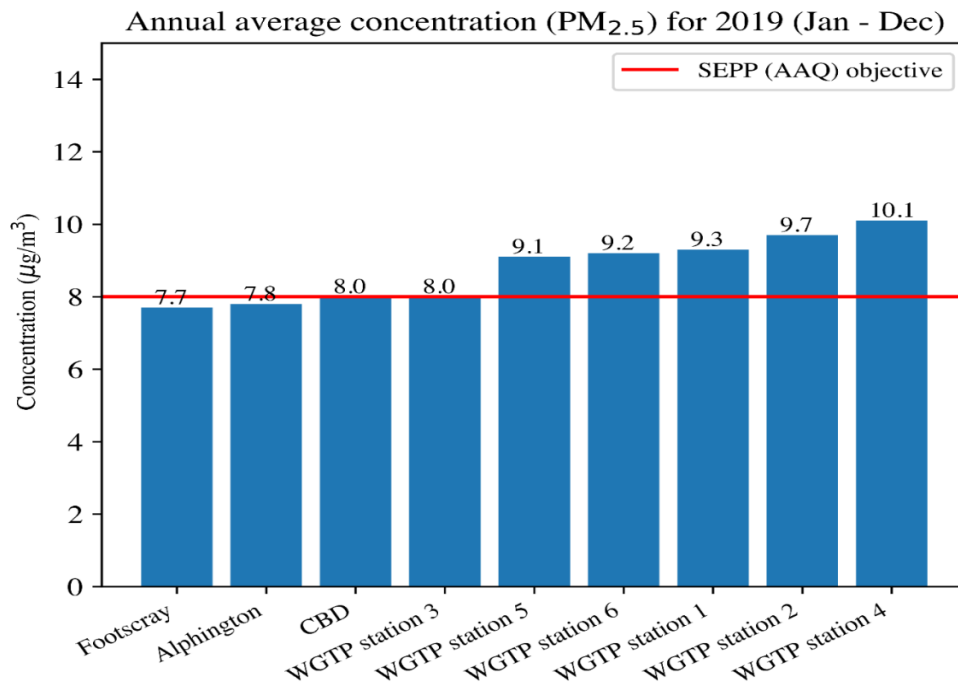


Figure 9: Annual average PM_{2.5} concentrations during 2019 at the WGTP and EPA stations operating

Figure 10: Maximum 24-hour PM_{2.5} during 2016 at the WGTP and EPA stations operating

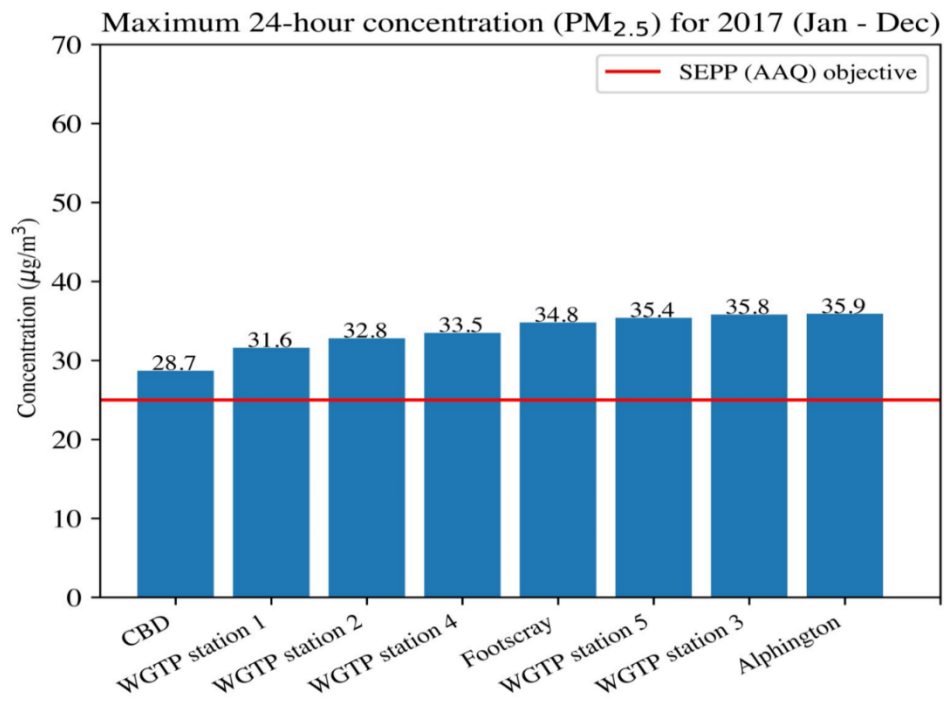


Figure 11: Maximum 24-hour PM_{2.5} during 2017 at the WGTP and EPA stations operating

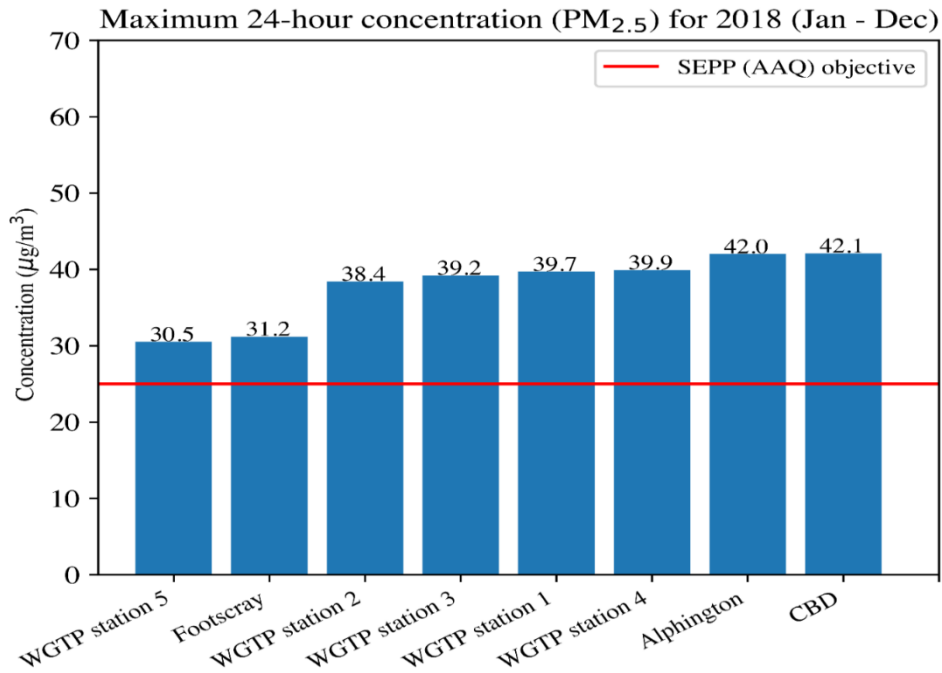


Figure 12: Maximum 24-hour PM_{2.5} during 2018 at WGTP and EPA stations operating

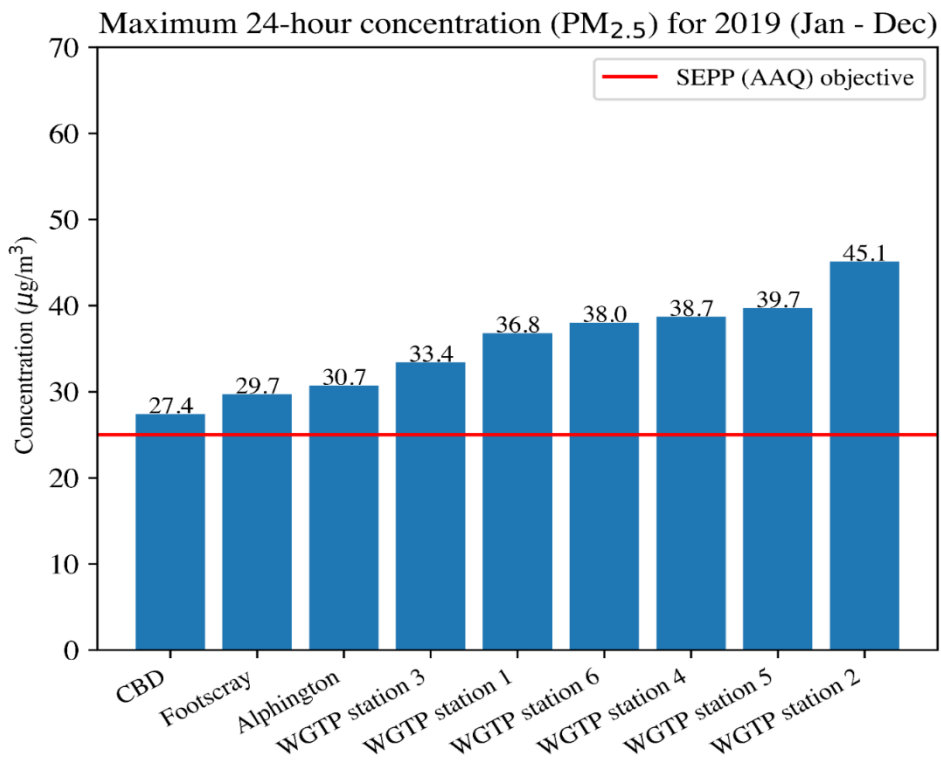


Figure 13: Maximum 24-hour PM_{2.5} during 2019 at WGTP and EPA stations operating

Figure 14: Number of days measured above 24-hour PM_{2.5} SEPP (AAQ) objective during 2017 at WGTP and EPA stations operating

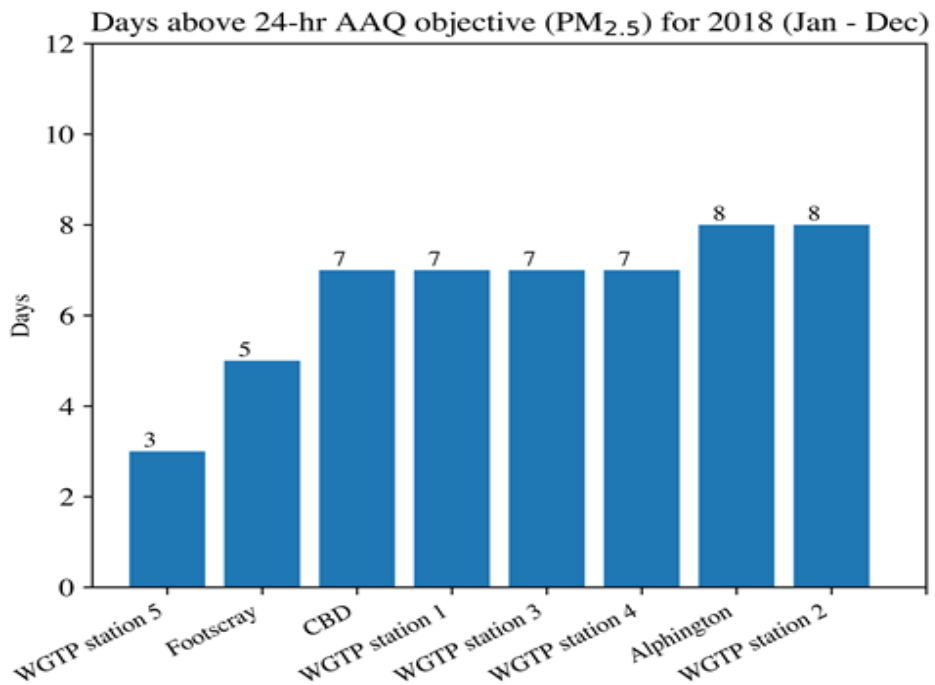


Figure 15: Number of days measured above 24-hour PM_{2.5} SEPP (AAQ) objective during 2018 at WGTP and EPA stations operating

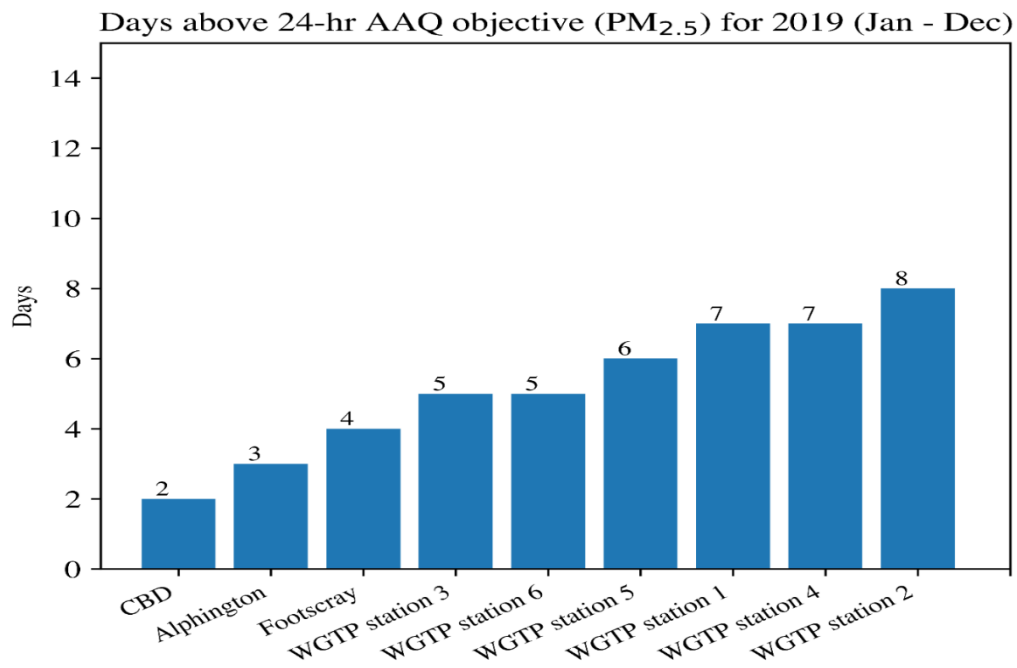


Figure 16: Number of days measured above 24-hour PM_{2.5} SEPP (AAQ) objective during 2019 at WGTP and EPA stations operating

Summary of PM₁₀ data

The annual⁵ and maximum concentrations in comparison to the related PM₁₀ SEPP (AAQ) objective and number of days on which daily concentrations above the PM₁₀ SEPP (AAQ) objective were recorded for each station for each year of the air monitoring undertaken from mid-2016 to 2019 (Figures 17 to 28).

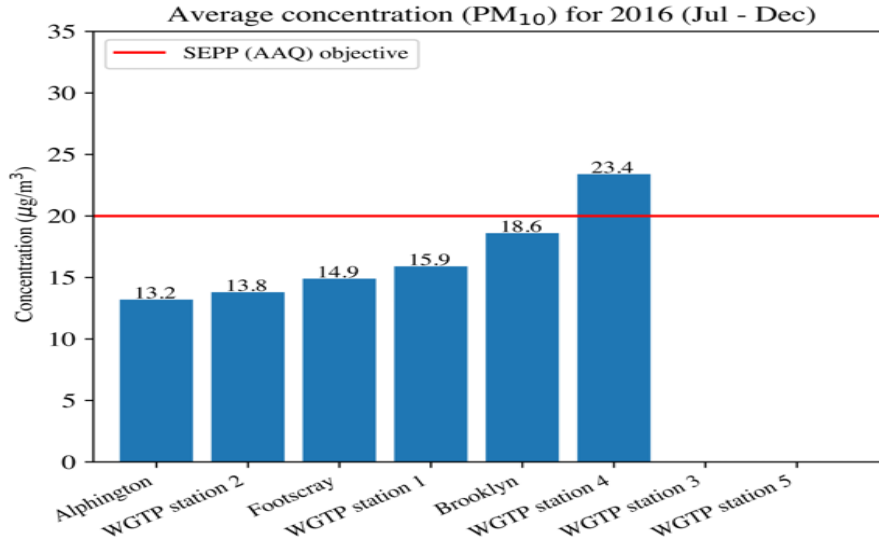


Figure 17: Average PM₁₀ concentrations measured during 2016 at the WGTP and EPA stations operating

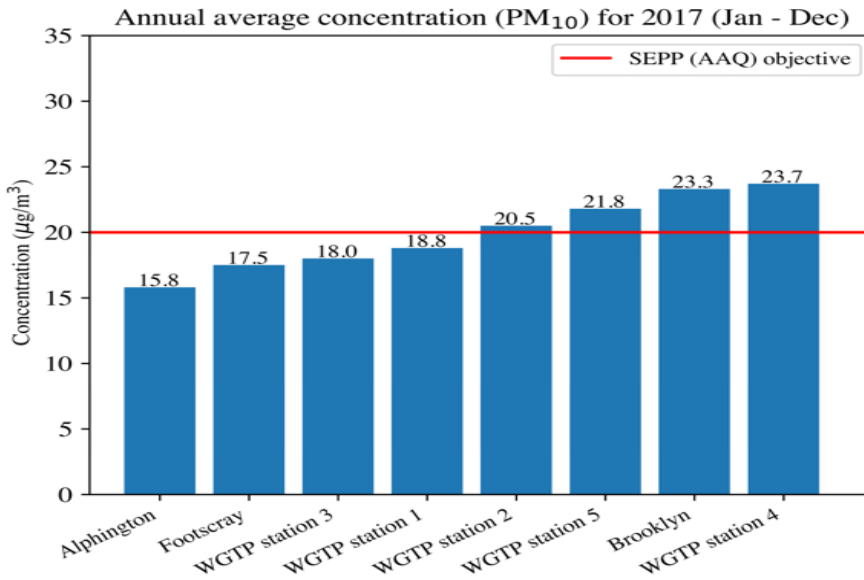


Figure 18: Annual average PM₁₀ concentrations measured during 2017 at the WGTP and EPA stations operating

⁵ Average concentrations rather than annual averages are shown for 2016 as there is insufficient data to determine annual averages.

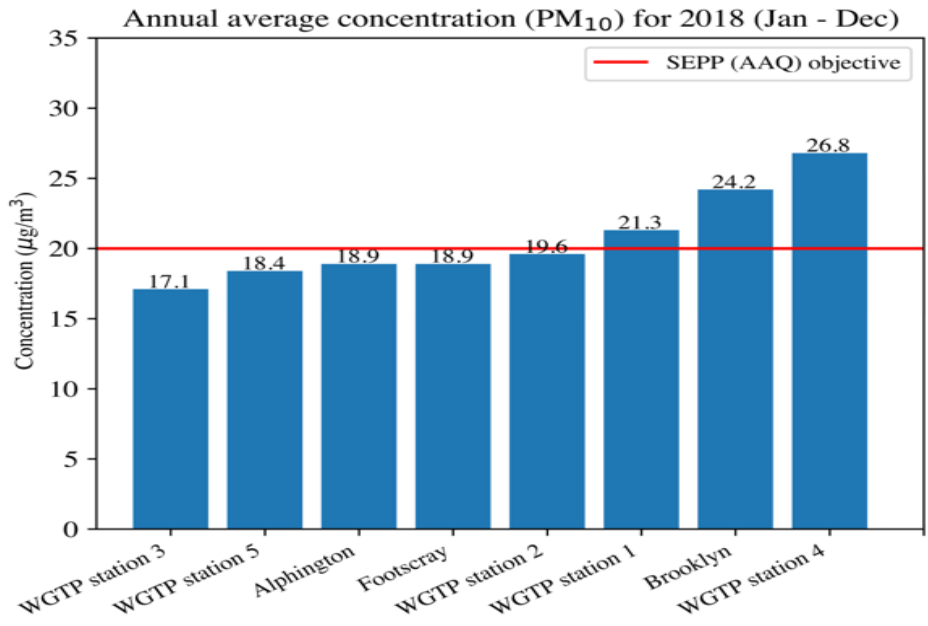


Figure 19: Annual average PM₁₀ concentrations measured during 2018 at the WGTP and EPA stations operating

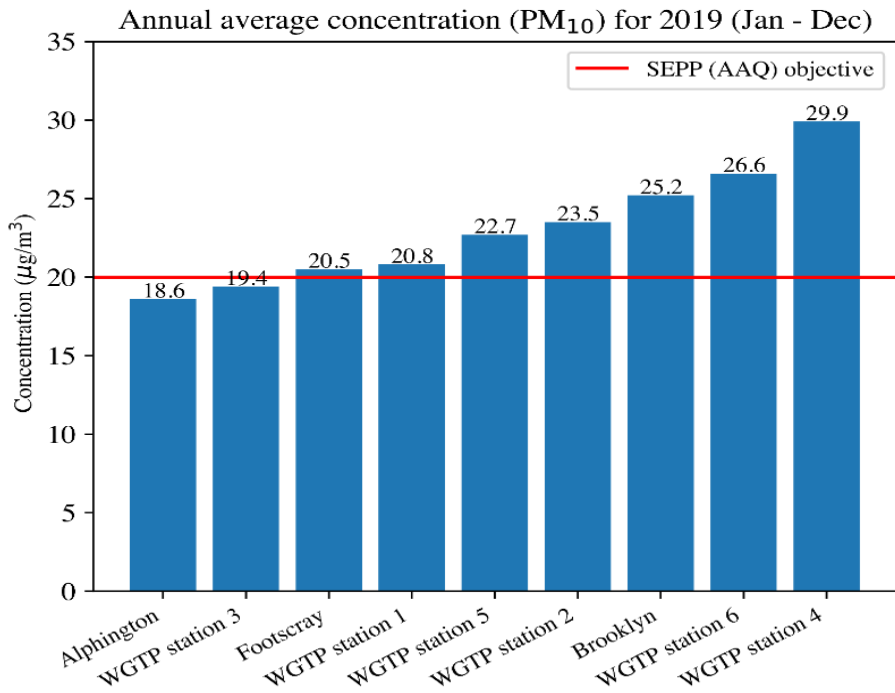


Figure 20: Annual average PM₁₀ concentrations measured during 2019 at the WGTP and EPA stations operating

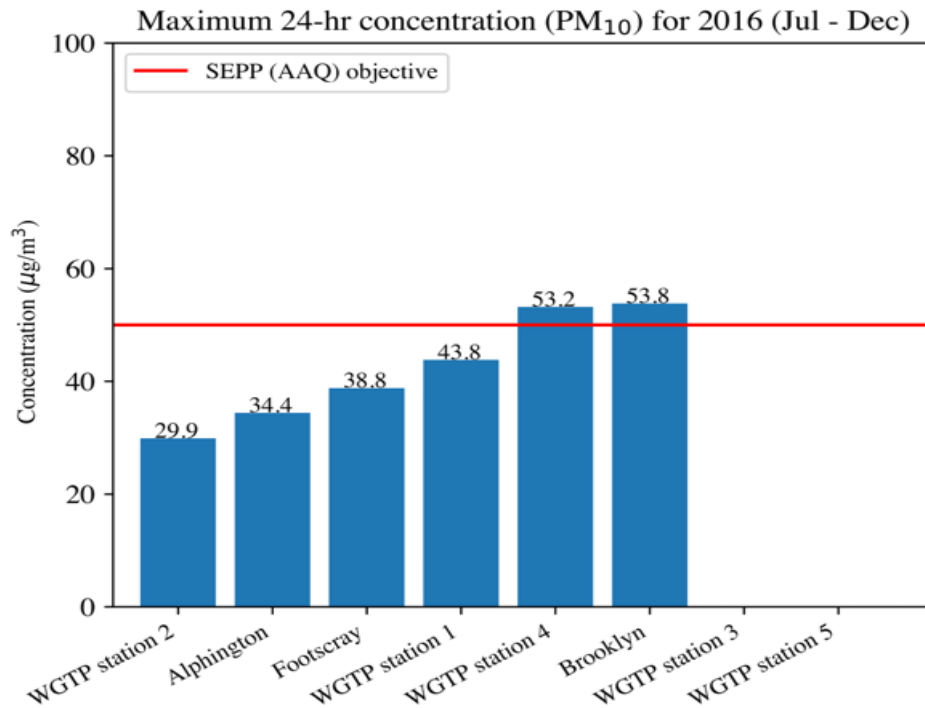


Figure 21: Maximum 24-hour PM₁₀ during 2016 at WGTP and EPA stations operating

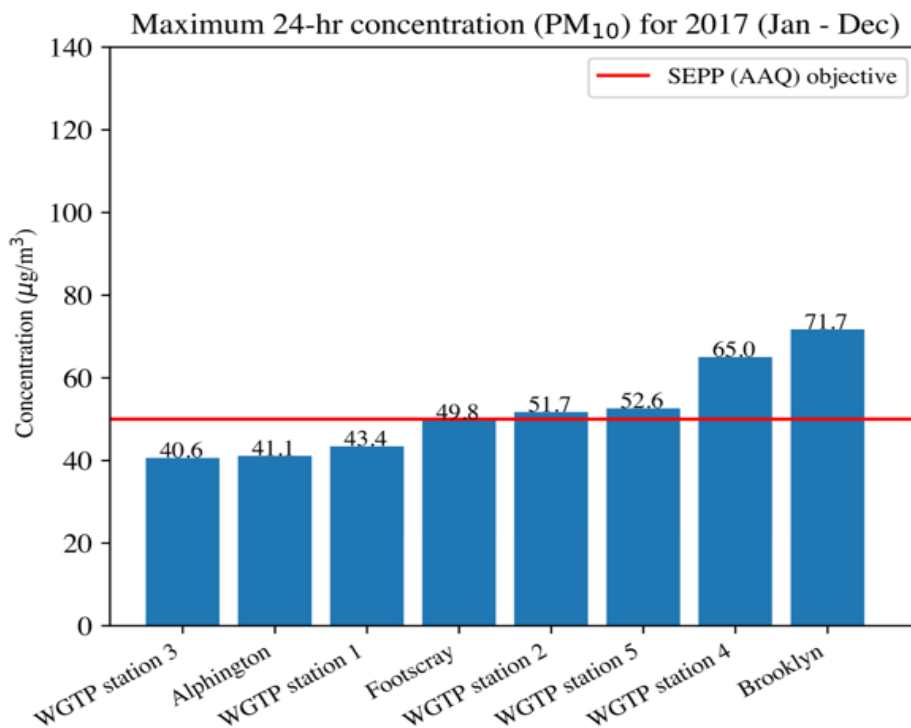


Figure 22: Maximum 24-hour PM₁₀ during 2017 at WGTP and EPA stations operating

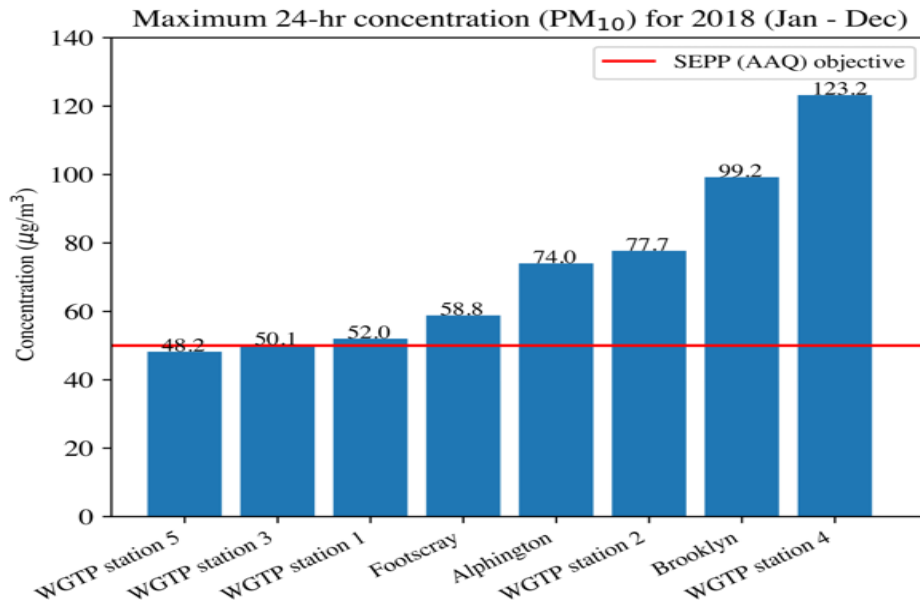


Figure 23: Maximum 24-hour PM₁₀ during 2018 at WGTP and EPA stations operating

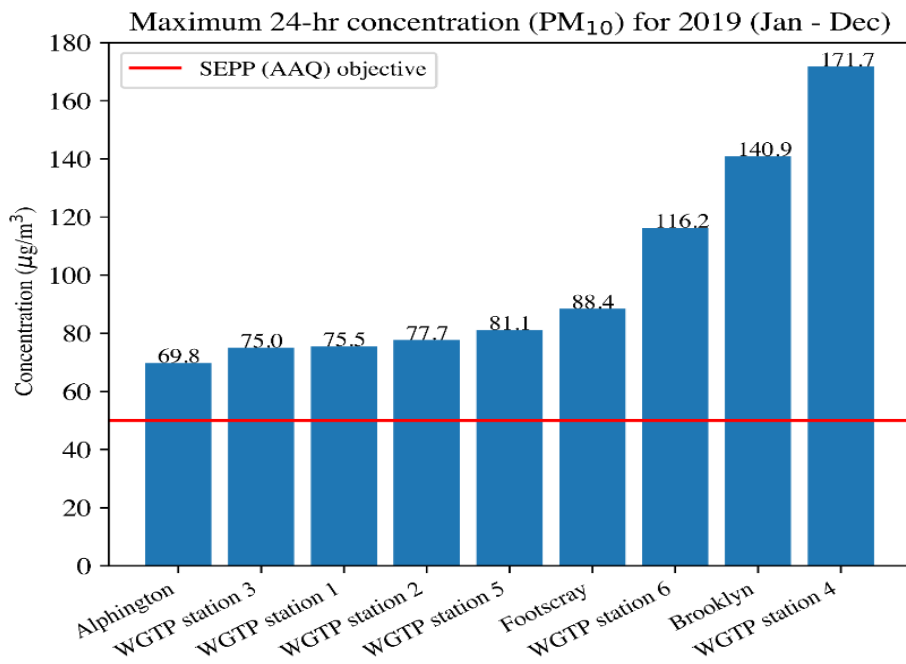


Figure 24: Maximum 24-hour PM₁₀ during 2019 at WGTP and EPA stations operating

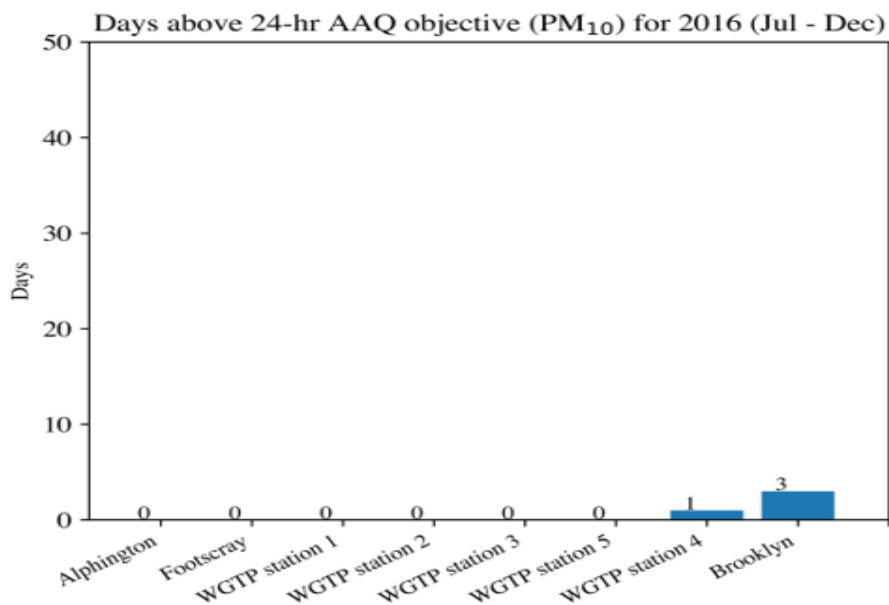


Figure 25: Number of days measured above 24-hour PM₁₀ SEPP (AAQ) objective during 2016 at WGTP and EPA stations operating

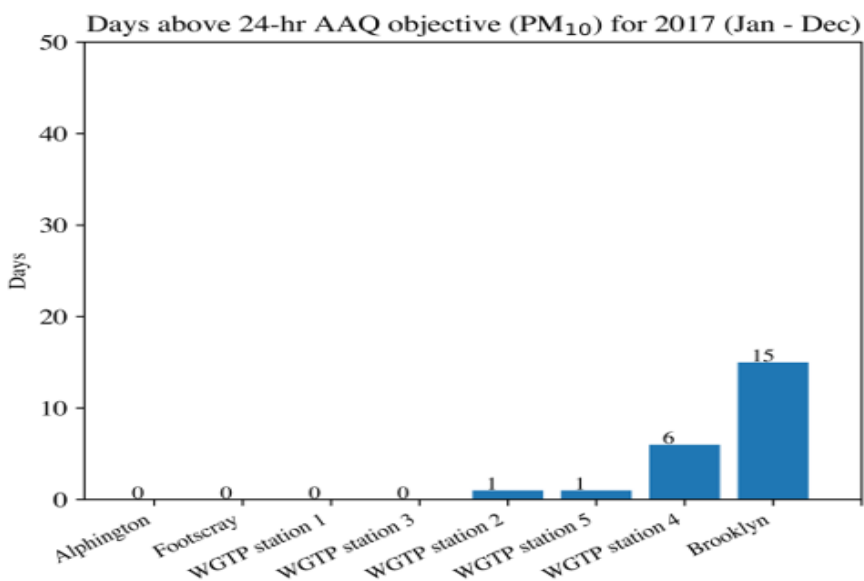


Figure 26: Number of days measured above 24-hour PM₁₀ SEPP (AAQ) objective during 2017 at WGTP and EPA stations operating

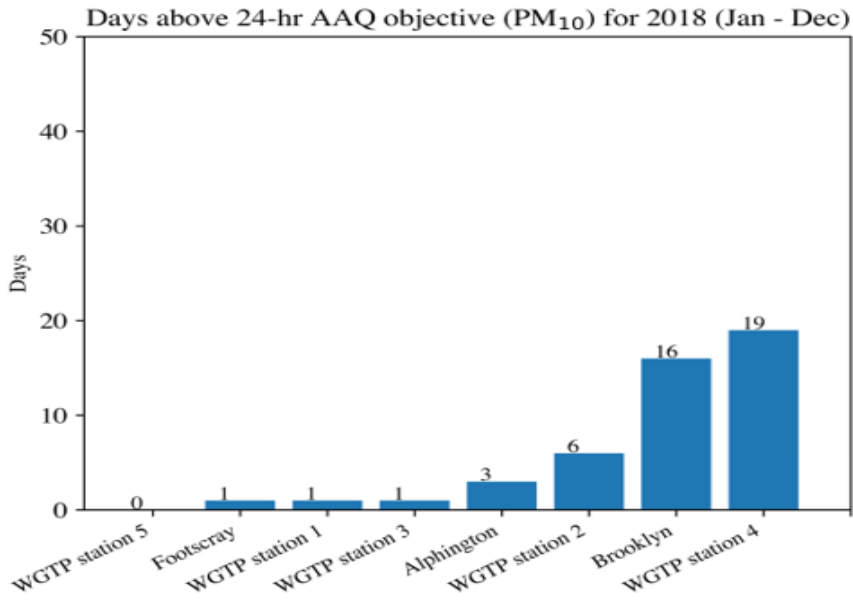


Figure 27: Number of days measured above 24-hour PM₁₀ SEPP (AAQ) objective during 2018 at WGTP and EPA stations operating

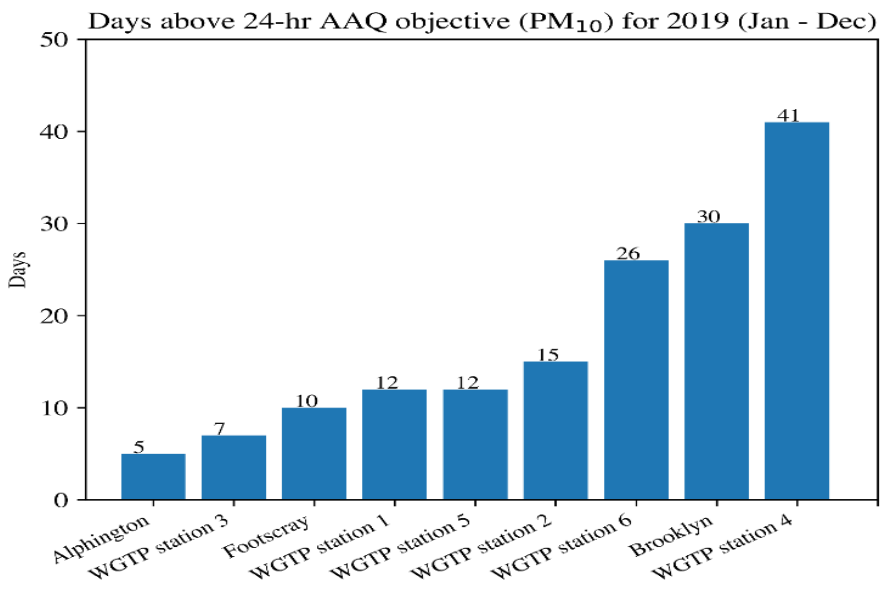


Figure 28: Number of days measured above 24-hour PM₁₀ SEPP (AAQ) objective during 2019 at WGTP and EPA stations operating

Summary of NO₂ data

The average NO₂ concentration measured in 2016 is shown in Figure 29 and annual average concentration measured during 2017 in Figure 30, 2018 in Figure 31 and 2019 in Figure 32.

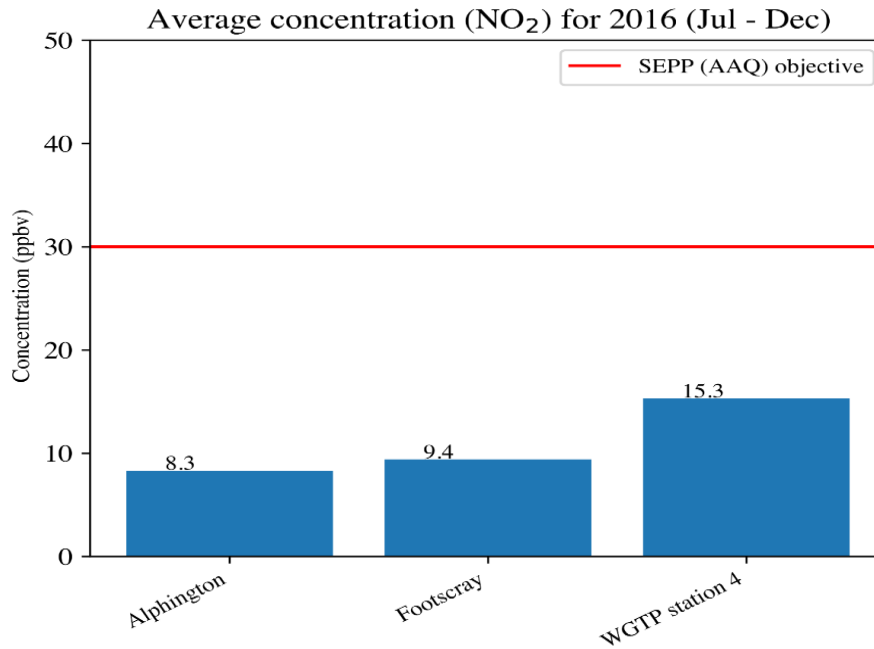


Figure 29: Average NO₂ concentrations measured during 2016 at WGTP and EPA stations

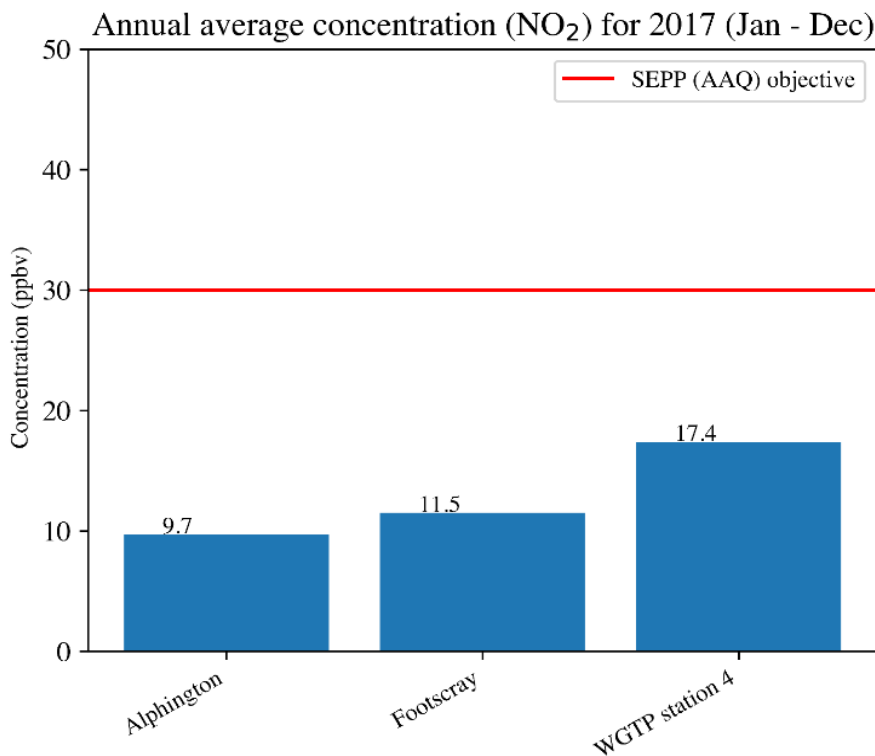


Figure 30: Annual Average NO₂ concentrations measured during 2017 at WGTP and EPA stations

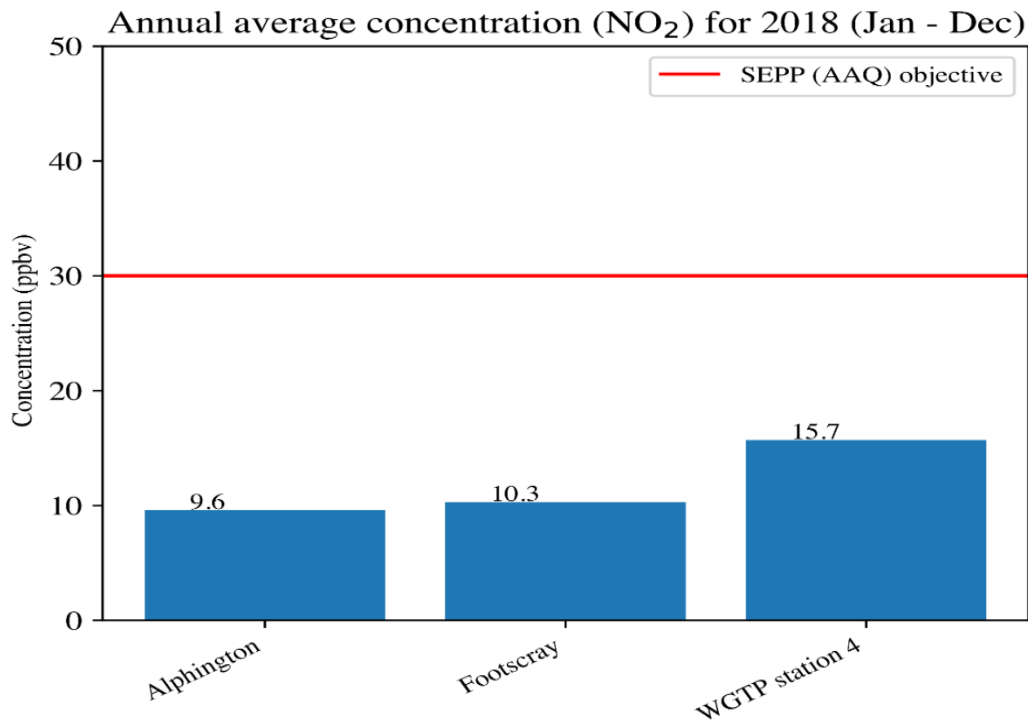


Figure 31: Annual Average NO₂ concentrations measured during 2018 at WGTP and EPA stations

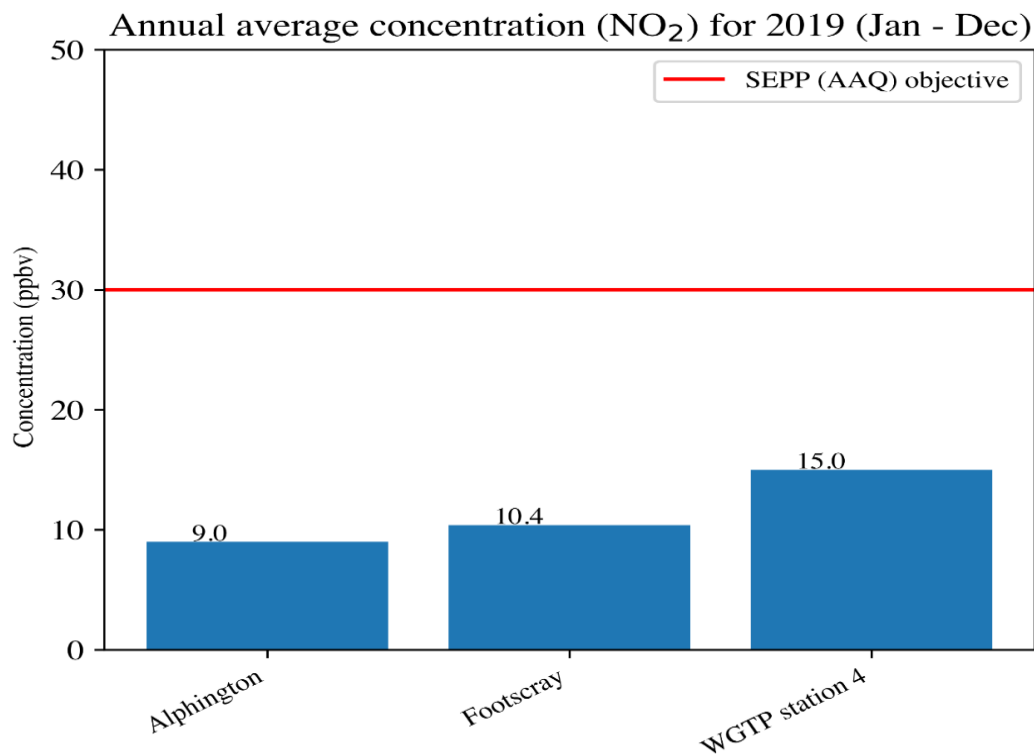


Figure 32: Annual Average NO₂ concentrations measured during 2019 at WGTP and EPA stations

Notes: Fence surrounding air monitoring station.

Date: Mon, 25 Nov 2019

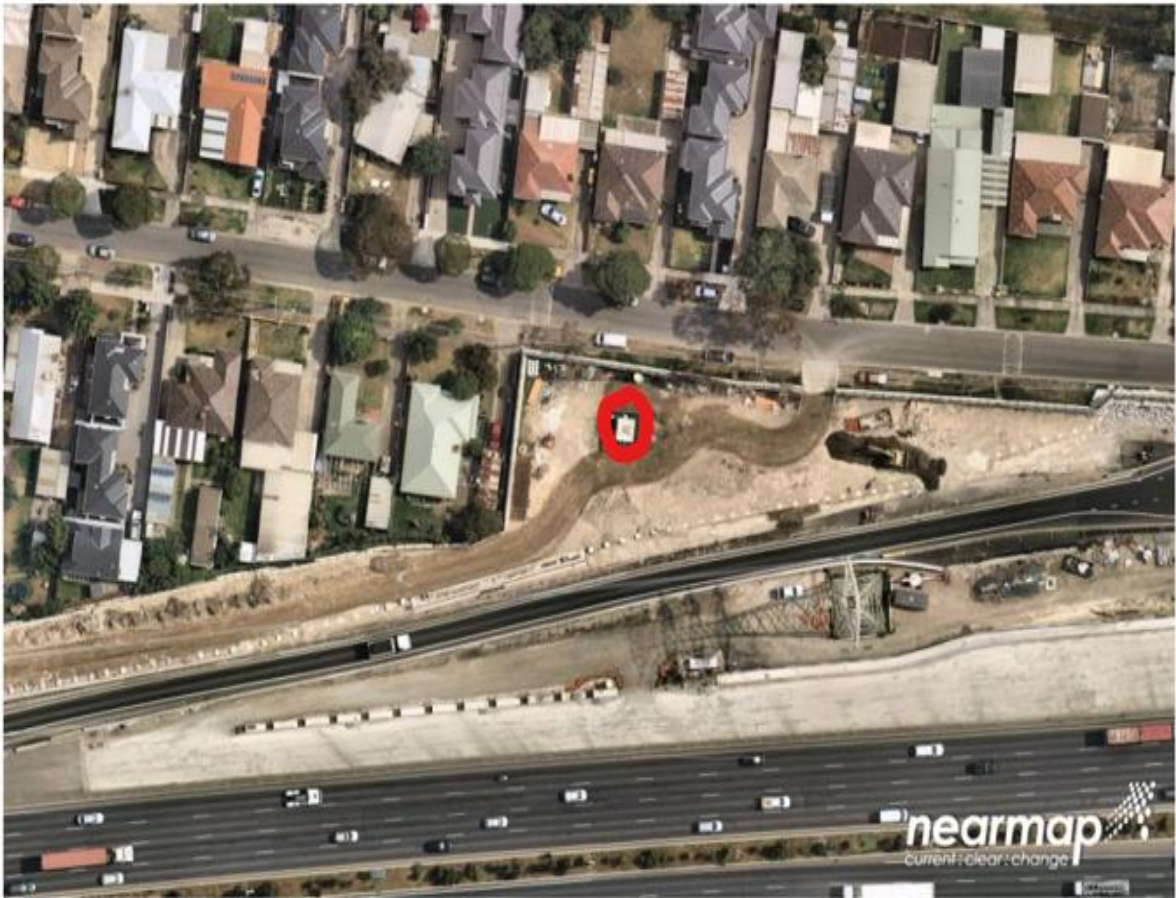


Figure 33: Aerial photo (nearmap-25 Nov 2019) of WGTP 4 station highlighted by the red circle.

Inner West Air Quality

COMMUNITY REFERENCE GROUP

MARCH 2020