Attachment 12 – Air Quality Response, SLR

Blackwattle Bay

Response to Submissions

June 2022

NSW GOVERNMENT

17 May 2022

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Infrastructure NSW
Level 27, 201 Kent St
Sydney
NSW 2000

Attention: Mia Gouge

Dear Mia

Blackwattle Bay Precinct - Air Quality
Revised Precinct Plan and Responses to Submissions

As requested, this letter provides additional advice regarding air quality issues for the Blackwattle Bay (BWB) Precinct development in relation to the following:

1. A summary of SLR's responses to issues raised by submitters in relation to the Air Quality Assessment prepared by SLR in 2021 (SLR Reference: 610.17553-R05-v1.0) for the BWB Precinct
2. Advice on the revised BWB RtS Precinct Plan in relation to air quality issues/improvements associated with the proposed modifications to building forms and uses proposed at various floor levels.

If you require any further information, please don't hesitate to contact the undersigned.

Yours sincerely

ALI NAGHIZADEH
Principal - Air Quality

Checked/
Authorised by: K Lawrence

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1 Responses to Submissions

The following responses address the key issues raised in the submissions. Where necessary, detailed responses are provided to specific technical issues raised in tabular format at the end.

1.1 Residential development in the vicinity of the Western Distributer and other major roads and that there would be adverse amenity and health impacts for future residents

A number of submissions expressed concerns about the buildings' proximity to the Western Distributor and other major roads, and that there would be adverse amenity and health impacts for future residents.

A detailed air quality impact assessment, including an air dispersion modelling study of air emissions from the surrounding roads, has been performed to assess compliance with regulatory ambient air quality guidelines. This assessment identified some areas of the site and parts of the proposed building envelopes where there are potential non-compliances with guidelines. Further analysis and assessments should be undertaken during the detailed building design stage so that any potential impacts can be mitigated through ventilation system design (e.g. air intake locations), building layout, and the proposed uses on each level and area. It should be noted that this assessment used conservative assumptions and methods, and vehicle emission estimates were projected based on anticipated future traffic volumes. If practical, it is recommended that site-specific or precinct-wide air quality monitoring be undertaken to inform the assessment of cumulative impacts and ground truth predictive modelling for the existing site conditions.

In addition to the air quality impact assessment, a Human Health Risk Assessment (HHRA) was prepared by SLR to investigate the risk to human health from potential exposure to pollutants. The population health endpoint assessment undertaken in the HHRA showed that for both long-term and short-term exposure, the altered exposure circumstances of the proposed development are predicted to provide an average net health benefit. This means that *on average*, lower population exposures to $PM_{2.5}$, PM_{10}, and NO_2 were anticipated to occur within the totality of the Study Area relative to other residences and commercial properties south, southeast, and north of the Study Area, due to the proposed apartments predominantly being located at elevated locations away from the main sources.

1.2 Poor air quality in work places impacting if people want to work there

Commercial spaces within the project can be expected to be exposed to similar air quality to many other commercial buildings within the Sydney CBD. As they are not required to have natural ventilation, an appropriately designed mechanical ventilation system (with air intakes located in areas of the building such as the roof top, where ambient air pollutant levels are predicted by the AQIA to comply with regulatory guidelines) will also be used to provide appropriate indoor air quality for the working environments within these spaces.

1.3 Increased traffic and worsening changes in air quality in the future

Ambient air quality in Australian cities has generally improved over recent decades, despite increases in vehicle numbers, due to improvements in vehicle engine performance and cleaner fuels. These improvements can be expected to continue as older vehicles in the fleet (including freight and heavy vehicles) are progressively replaced.

Further to this, the NSW EPA has a number of initiatives and strategies in place to address particle pollution and improve air quality that will continue to drive improvements in air quality in Sydney. Some major relevant initiatives include:

- Leading the *Clean Air for NSW* strategy - the NSW Government's 10-year plan to improve air quality across the state includes initiatives relating to industry, transport vehicles, household emissions, monitoring and forecasting air quality and climate policy co-benefit actions.
- Administering the *Interagency Taskforce on Air Quality in NSW* that develops cross-government recommendations and actions to improve air quality standards, and coordinates communication of government actions to manage significant air quality issues in NSW.
- Managing the *Diesel and Marine Emissions Management Strategy* that sets out measures to reduce emissions from non-road diesel equipment, such as construction and mining equipment, locomotives and shipping.
- *Managing particles and improving air quality in NSW* - a strategy to reduce particle pollution from sources such as coal mines, non-road diesel machinery, shipping and wood smoke.
- Managing and updating the Air Emissions Inventory for the Greater Metropolitan Region (GMR) in NSW, which informs the community about emissions and their sources for hundreds of different air pollutants in the GMR.
- Coordinating or contributing to various air quality studies to add to evidence and improve knowledge related to air quality and its impacts, for use in future planning decisions and to inform policy development.
- Managing the load-based licensing scheme and pollution reduction programs to support industries in reducing emissions.
- Coordinating the *Interim NO_X Policy for Cogeneration in Sydney and the Illawarra* that sets out a policy framework for managing emissions of ground-level ozone and nitrogen dioxide from gas-fired cogeneration and trigeneration facilities.

1.4 Sensitive receivers need to be considered if Hymix continues to operate

One submission stated that if Hymix continues to operate as currently permitted, the lower floors of buildings located closest to the Hymix facility should be commercial/retail use and residential receivers should be located on higher floors.

As noted in the submission, particulate emissions from Hymix were addressed in the air quality assessment and associated air dispersion modelling study. SLR also recommends that ambient air quality monitoring be performed in the vicinity of the Hymix site to confirm that it is at levels compliant with the *Approved Methods for Modelling and Assessment of Air quality in NSW* and would not have potential to have adverse air quality impacts.

1.5 Dust and air emissions from construction

A number of submissions expressed concerns about dust and other air emissions from increased traffic congestion etc during the construction phase.

As outlined in the AQIA, there is potential for off-site dust impacts during construction, which will be managed through best practice dust suppression techniques. This includes watering during dry, windy conditions, covering loads entering/leaving the site, speed limits on site, wind breaks and air quality monitoring. These management measures are widely used and well understood in the construction industry, and it is expected that off-site impacts will be able to be effectively managed.

1.6 Dust and air emissions from increased traffic after completion

Once construction is complete, any increase in road traffic emissions associated with the project is expected to be minimal compared to the existing surrounding road network. The site is well served by public transport options and the Project will provide residential options for CBD workers who would otherwise be commuting into the city from outside the area. The provision of housing near workplaces is a key tool in reducing vehicle use and improving air quality in suburban and urban areas.

1.7 Air quality assessment methodology

One community submission raised a number of technical concerns regarding the methodology used for the air quality assessment. The issues raised, and SLR's responses, are provided in **Table 1**.

1.8 CoS requested that *Development Near Rail Corridors and Busy Roads Interim Guidelines* be addressed

The CoS submission notes that the NSW Government's document *Development Near Rail Corridors and Busy Roads Interim Guidelines* provides the following strategic planning advice:

> *As part of taking a strategic planning approach, noise and air quality issues should be considered at the strategic level to avoid or minimise the need to address them at the site-specific stage. For example, site selection and consideration of site layout and urban form can assist in reducing adverse health impacts from motor vehicle emissions. Similarly considering traffic noise issues upfront at the site selection and design stage is essential for residential, hospitals, childcare centres, schools, places of worship and other sensitive development.*

CoS states that this advice is not referenced or discussed in any of the relevant documentation of the study.

Section 4.3 of the AQIA refers to the *Development Near Rail Corridors and Busy Roads Interim Guidelines* and reproduces relevant text relating to air quality issues and air quality design considerations. The preparation of an AQIA for the precinct is a direct outcome of the identified need to address potential air quality impacts for future residential and other sensitive receptors within the development.

As an example, Section 11 of the Air Quality Assessment recommended that no sensitive receptors be located within a 20 m radius of the major roads. This 20 m radius includes both horizontal and vertical components of the separation distance between the road and the sensitive use. Hence the AQIA provided recommendations on the building levels that are suitable for sensitive use and those that should be reserved for commercial use etc. based on the results of a detailed air dispersion modelling study.

The Revised Precinct Plan now contemplates residential uses on the private land owner sites within 20 m of the Western Distributer. The detailed design of these buildings will need to address the Interim Guidelines and Apartment Design Guide provisions to determine if any further mitigation measures are required so that residential uses can be accommodated within these areas. As suggested above, site-specific air quality monitoring may be useful to inform the design process.

1.9 CoS strongly recommends that the privately owned sites to the north and next to elevated roadway remain suitable for only non-residential uses

The CoS submission recommends that the Precinct Plan be redesigned to ensure protection for people's health and wellbeing from the impacts of noise and air pollution by the placement of apartment buildings away from the noise sources. The CoS submission states that at a minimum, the City requires the reference scheme to provide evidence that what is proposed is approvable under the relevant controls, such as the NSW Government's own Apartment Design Guide, specifically:

- *The assessment demonstrates that the full height of every building facing the Anzac Bridge approach is unable to permit natural ventilation at night to apartments because the noise levels will be too great.*
- *The built form analysis locates habitable rooms including bedrooms facing the bridge approach. The City strongly recommends that the privately owned sites to the north and next to elevated roadway remain suitable for only non-residential uses*

SLR notes that the first bullet point above relates to noise, and is not addressed in this response.

The air quality assessment and HHRA identified locations within the proposed building envelopes that were considered to be unsuitable for residential use to inform the design process. Not all building facades at the northern end of the precinct in the vicinity of the highway were identified as being adversely being impacted, with no significant exceedances predicted above the 8th floor height. Some exceedances were predicted below this level, where additional mitigation (such as mechanical ventilation) may be required.

It is recommended that the modelling be revised and updated during the detailed design stage to assess the impact on air quality at the proposed residential and commercial areas. The HHRA may also need to be updated based on the revised model outputs. If the modelling predicts significant exceedances at proposed residential locations, additional mitigation measures could be adopted. These can include:

- Reducing the number of apartments facing the Western Distributer by designing building cores to the east; or
- Provision of mechanical ventilation for apartments facing the Western Distributer with fixed glazing to the east and operable windows to non-impacted facades.

1.10 EPA submission

The EPA submission raised several matters but only one relating to air quality, which was that the following further matters should be considered in developing the Blackwattle Bay Design Code to provide air quality benefits:

- Setting buildings back from busy roads and ensuring that utility rooms, rather than living rooms and bedrooms face busy roads,
- Apartments near busy roads should be built with private open space facing away from busy roads, so to provide amenity and relief and separation from air and noise pollution,
- Microclimates should be understood to help support the sustainable design of buildings that capitalises on natural ventilation and minimises the risk of canyoning,
- Measures such as those in the Development near rail corridors and busy roads – interim guideline should be integrated into the Code,
- Exemplar approaches such as those in the design tool box for the Parramatta Road Corridor Urban Transformation Strategy should be incorporated,

- Commitment to fully implementing the protections for children that are provided in the Child Care Planning Guideline as it appears the proposed mixed use settings include activities such as childcare services.
- Low shrubs and hedges reduce air pollution and should be considered along roads (for example, under trees) to help protect pedestrians from vehicle pollution and reduce air pollution entering buildings.
- Provisions for active transport solutions.

SLR agrees that the items listed above should be considered in development of the BWB Design Code.

1.11 Poulos submission noted that the predicted wind field patterns in the Study Area were not compared to wind data from nearby meteorological stations

The air quality assessment presents 9 am and 3 pm wind roses from the BoM Observatory Hill weather station, located 2 km northeast of the Project in Figure 8 of the report. The wind roses showed a strong diurnal pattern, with winds from the west quadrant dominating during the morning and winds from the east quadrant dominating in the afternoon. Winds were also stronger in the afternoon than during the morning.

However, as noted in Section 3.2.4 of the report, "Considering the topographical features of the land between the Study Area and Sydney Observatory Hill AWS… …the actual winds experienced at the Study Area may be different to those recorded by the BoM AWS. Therefore, meteorological modelling was carried out in order to predict site-representative wind conditions for the Study Area".

The wind roses presented in Figure 22 of the assessment report for the modelled meteorological data also showed significant westerly wind conditions, particularly in winter, however in spring and summer (and to a lesser extent, autumn), winds predominantly blew from the northeast rather than from the east. The frequency of calm conditions was also predicted to be lower than that reported at 9am and 3 pm at Observatory Hill. It needs to be remembered however that any direct comparison between the Observatory Hill roses in Figure 8 and the modelling data in Figure 22 is limited due to the differing time periods used to compile the files (9am/3pm readings only for the observed data, and all hours/seasonal for the modelled data). In addition, as noted in the report:

- The wind conditions predicted by the modelling at other areas within the modelling domain may vary from the wind roses presented in Figure 22.
- The GRAMM and GRAL model will further refine the CALMET predictions, as the GRAL internal flow fields module takes into account the effect buildings and solid structures may have on the flow fields.

Detailed validation of the GRAMM and/or CALMET data, by extracting the predicted wind data at an observation site, is not possible as there are no BoM stations with high resolution data within the modelling domain suitable for validation purposes.

SLR notes that the CALMET modelling has been done in accordance with the relevant NSW EPA guidelines and GRAMM modelling was done in general accordance with *Optimisation of the application of GRAL Model in the Australian context*. In our experience, GRAMM typically underpredicts wind speeds which usually leads to conservative model predictions.

1.12 Poulos submission stated that the 3D visualisation for the model results for the lower levels of BLD02 (Figures 26, 27, 28 and 29) are out of line for those for adjacent buildings and with the tabular results for BLD02

SLR has reviewed the tabulated results for BLD 02 against the 3D visualisation plots and the data is concluded to be consistent. It is acknowledged that BLD 02 is predicted by the model to be impacted more on different facades than the adjacent buildings, with lower impacts on the façade facing the highway and areas of increased impacts on the façade facing the harbour compared to the buildings on either side. The is expected to be a result on variations in the wind fields around the buildings, the shift in the alignment of the roads near BLD 02 relative to the predominant wind directions, slight changes in setback from the Western Distributor, and increased distance from Pyrmont Bridge Road compared to BLD 03 and BLD 04.

Table 1 AQIA Methodology Issues Raised

Issue Raised	Response
The air quality assessment performed by SLR is lacking in any actual measured data of existing air quality in Blackwattle Bay. The proponent has had four years to install an air quality monitoring station and obtain actual data on the existing levels of air pollutants. With no existing data, there is no opportunity provided to assess the validity of the claimed predicted air quality.	Any air quality assessment methodology has benefits and limitations. The method used to perform the Blackwattle Bay AQIA aligns with current best practice and incorporated a number of conservative assumptions to ensure that impacts were not underpredicted. Given the nature of the proposed development, and the need to assess impacts at various heights above ground level, a baseline monitoring program was not deemed to be required as it would have limitations in providing the information required to assist in the project design. Given this, regional background air quality monitoring data was utilised in combination with a detailed air dispersion modelling study for the adjacent road network. The AQIA used background monitoring data based on measurements at Rozelle and added on the incremental impacts predicted by the modelling due to emissions from the Western Distributor and other local roads to provide an assessment of total cumulative impacts. The modelling is able to provide an estimate of worst case predicted impacts from the traffic emissions at various heights above ground and taking into account wind flows around the proposed buildings that currently do not exist on the site. On-site monitoring of air quality at ground level, while useful, is not able to provide the amount of information on the spatial distribution of air pollutants in, around and above the site once constructed. In addition, If the assessment had used baseline air quality data recorded on site, then adding on the incremental impacts from the modelled roads would have resulted in 'double counting' of impacts from these roads, depending on their proximity to the on-site monitoring station. The modelling has also been performed based on conservative assumptions regarding future traffic numbers and engine emission factors, which could not be addressed by monitoring the existing air quality.

Issue Raised	Response
The NEPM AAQ for NO_2 is now 80 ppb for 1 hour and 15 ppb for 1 year. The claim by SLR to use the old standards is rejected as the life expectancy of the proposed residential towers is well beyond 2040. Again, SLR is out of step with the particulate criteria for $PM_{2.5}$. The assessment report should be updated to the standards that are applicable over the life of the buildings.	At the time of preparing the AQIA, the Variation to the Ambient Air NEPM was proposed but not in force. It was updated on 15 April 2021, after the AQIA content had been finalised. It is also noted that the new standards for NO_2 are different to those presented in the draft variation, hence even if the draft values had been used, they would not have been in line with those finally adopted. In addition, at the time of finalising the report, no guidance could be obtained from NSW EPA as to when or if the Approved methods would be updated to be brought into line with the NEPM, hence the AQIA was based on the current guidelines set out by NSW OEH in the *Approved Methods for Modelling and Assessment of Air Pollutants*, which also does not require any consideration of the future $PM_{2.5}$ (from 2025) standard included in the Ambient Air NEPM. In January 2022, SLR was advised that the Approved Methods is currently being reviewed and will be updated to be consistent with the current Ambient Air NEPM. It is not known if this will include/address the future standards from 2025 for $PM_{2.5}$ and SO_2 contained in the Ambient Air NEPM, or how the reduced criteria will be implemented in NSW. For example, the NEPM standards are designed for the assessment of regional air quality at neighbourhood monitoring stations, not at peak stations near industrial sites or beside roads etc. In addition, as part of adopting the new NEPM criteria, NSW EPA will need to implement policies and strategies that enable the State to achieve these lower standards at relevant neighbourhood monitoring stations, e.g. by introducing increased controls on emissions from major sources, of which traffic emissions is one. As a result, background regional levels (and impacts from the adjacent road network) should reduce in future years as these policies are implemented *(refer to response 629d for further information on some of the policies the NSW EPA has in place)*. The air quality assessment recommended that the modelling be updated once the design of the buildings has been refined and confirmed. As part of this update, changes to relevant air quality criteria would be addressed, along with a review of more recent air quality data, as appropriate.

Issue Raised	Response
• The model used by SLR is based on using "background" air quality data as being that from the Rozelle site. There is no critical analysis provided to support this arbitrary claim. • What effect will the Hansen concrete batching plant have on air quality at Blackwattle? • What effect will the multi-stacks from WestConnex and the Western Harbour Tunnel have on the air quality? No pollution controls are required on these stacks. The stacks are not subject to load-based licensing. No emission controls have been imposed on the operators of the stacks. Given the air movement patterns in the early morning period, the proposed Blackwattle towers will be downwind from the stacks and be subject to high levels of unregulated pollution. The Rozelle air monitoring station has no such air pollution stacks downwind of the site in the early morning period. • The Rozelle site has no shipping facilities located within a kilometre of the site. • There is no industrial factories near the Rozelle site as there is at Blackwattle. • It is reasonably likely that the claimed "background" air pollution levels at Blackwattle are seriously in error.	• In addition to the Rozelle AQMS data, the air quality impact assessment also reviewed publicly available air quality monitoring data from the White Bay Cruise Terminal (WBCT) AQMS, located approximately 1 km north of the project site. This review showed that the $PM_{2.5}$ and SO_2 concentrations recorded by the WBCT AQMS are similar to those recorded by the Rozelle AQMS on days when ships were not berthed at the WBCT. Given this, it was concluded that the incremental impact at this location from other marine vessels and industrial activities in the area is not significant, and the same can be expected for the proposed project site. The very localised impact of berthed vessels at the WBCT being measured by the WBCT AQMS is not considered to be representative of the emission sources surrounding the Study Area. • Air quality impacts from the Hanson CBP at Glebe Island is discussed under Issue #9. • A review of the Director General's Assessment Report for the Cross City Tunnel (DoP, 2002) shows that no adverse air quality impacts were predicted for the closest elevated receptors to the CCT stack at the time, the Millennium Towers, which is 200 m to the east-southeast. The closest tower proposed as part of the Project is 800 m to the west-northwest. Given the larger separation distance and lower frequency of winds that would blow emissions from the stack towards the Project Site, any impacts can be expected to be minimal and would be more than adequately addressed by the background dataset and conservative assumptions used in the assessment. This is reflected in current planning requirements that any development within 500 m of the CCT stack requires an assessment to ensure potential air quality impacts from the CCT plume of emissions are considered. The project does not trigger this requirement. Given that the stacks associated with WestConnex and the WHT Project are much further from the Study Area, no further consideration of impacts from these sources is considered to be warranted. • SLR considers that the background air quality data used in the assessment represent the best available data to characterise regional air quality levels, which have then been added to the predictions from the modelling of localised traffic and industrial emissions to provide conservative estimates of potential cumulative concentrations at the Project site.

Issue Raised	Response
The proponent has not provided any assurance that the modelled air pollution levels will be achieved. What happens if the actual air pollution levels are 20% higher than predicted? Is there any actions the developer could take to reduce the levels of air pollution to those predicted? What happens to future residents in that case? There are no examples of action that has been taken where predicted air pollution levels in large scale residential developments have not been met. In the case of the Blackwattle project, as it is likely no air quality monitoring station will be established to confirm the model "predictions" there will be no action should non-compliance occur as non-compliance assessment methodology has not been proposed by the proponent. This is the reason that the claimed "background" air pollution levels must be subject to critical review	In January 2022, SLR was advised that the Approved Methods is currently being reviewed and will be updated to be consistent with the current Ambient Air NEPM. As part of adopting the new NEPM criteria, NSW EPA will need to implement policies and strategies that enable the State to achieve these lower standards by reducing emissions from major sources, of which traffic emissions is one. As a result, background regional levels (and impacts from the adjacent road network) should reduce in future years as these policies are implemented (refer to response 629d for further information on some of the policies the NSW EPA currently has in place). The assessment did not assume any improvement in regional background air quality into the future, which is considered to be a conservative approach. As stated under Issue #4, SLR considers that the background air quality data used in the assessment represent the best available data to characterise regional air quality levels and provide conservative estimates of potential cumulative concentrations. In relation to remedial action that can be taken in developments where poor air quality is being experienced, in mechanically ventilated buildings where air quality has been monitored and shown to not meet indoor air quality criteria, engineering solutions are available (and are implemented where required) to improve air quality, such as installing filtration systems on the intake air, increased ventilation rates, cleaning of ductwork, filter replacement etc. Land use change, with commercial uses replacing residential uses, also often occurs along major transport routes as traffic volumes increase. For the Project, this could possibly equate to changing the use on the various floor levels (ie. through a major refit) in the future – either changing from residential to commercial or commercial to residential, which could be driven by a variety of factors, including air quality issues.
The insistence of residential buildings being naturally ventilated is highly problematic given the proximity of the buildings to Anzac Bridge and extremely high levels of air and noise pollution. The insistence on natural ventilation will see health impacts compromised. If these towers are built for residential accommodation, then the health of residents must be protected based on current scientific evidence. Consideration of the principles of ecologically sustainable development (ESD) demands that health risks are addressed up front.	Air pollutant emissions from traffic on Anzac Bridge were considered in the air quality impact assessment and included in the air dispersion modelling study. In addition to the air quality impact assessment, a Human Health Risk Assessment (HHRA) was prepared by SLR to investigate the risk to human health from potential exposure to pollutants. The population health endpoint assessment undertaken in the HHRA showed that for both long-term and short-term exposure, the altered exposure circumstances of the proposed development are predicted to provide an average net health benefit. This means that on average lower population exposures to $PM_{2.5}$, PM_{10}, and NO_2 are anticipated to occur within the totality of the Study Area relative to other residences and commercial properties south, southeast, and north of the Study Area.

Issue Raised	Response
Only air pollution modelling is provided. The model does not include the stack emissions from the Rozelle Interchange and Western Harbour Tunnel. Both projects are approved and will be developed. Shipping emissions are not included.	The Rozelle Interchange ventilation system outlets are located approximately 1.5 km to the west of the Project Site. Any incremental impacts from this source will be negligible by the time the emissions disperse over that distance. The air quality impact assessment for that project predicted increases in $PM_{2.5}$ concentrations adjacent to Anzac Bridge in 2023 and 2033 compared to without the project, due to projected increases in traffic on this section of the road network. The modelling performed for this project included pollutant emissions from Anzac Bridge traffic based on projected 2033 vehicle numbers. The traffic projections provided to SLR for use in estimating road traffic emissions that were input into the modelling already factored in projected local traffic changes associated with Westconnex, Rozelle Interchange and the WHT Project. See comments above under Issue #4 regarding shipping emissions and the Rozelle Interchange and WHT stack emissions.
Claim page 27 "newer vehicles produce significantly less emissions than older vehicles" is not supported by the latest data which shows that newer vehicles are of greater weight and produce higher levels of air pollution. The ongoing failure of the Federal Government to introduce new motor vehicle emission standards makes any prediction of future emissions questionable.	Newer vehicles have improved fuel efficiency and emissions controls. There is currently discussion around the introduction of electric and hybrid vehicles being heavier and the potential for this to contribute to increased brake and tyre wear, and hence particulate emissions, however they still emit much lower (or no) emissions of gaseous combustion products, soot and VOCs. Older vehicles within the Australian vehicle fleet are also still being replaced by newer petrol-fuelled models which is contributing to lower emissions, as seen by the lower emission factors developed for assessments of impacts from the future Australian fleet. In their 2016 report "*The Ribbon Development – Refined Assessment of Level 29 Pool Area*", Pacific Environment estimated a 46% reduction in emissions due to the modernisation of the vehicle fleet between 2017 and 2030. On 25 February 2019, the Australian Government announced new measures to improve fuel quality standards to ensure access to the latest vehicles, savings for motorists from more fuel-efficient vehicles and health benefits to the community from cleaner air. The Government is currently undertaking a further review of the fuel quality standards to improve the quality of fuel supplied in Australia by 2024. This review seeks to create standards that are aligned with international standards.
The assessment has not included air pollution emissions from the recently approved development for Hansen Concrete at Glebe Island.	The air quality impact assessment for the Hanson CBP prepared by Pacific Environment (March 2018) also used background air quality data from Rozelle and included modelling of emissions from the proposed CBP, delivery trucks and ships berthed at the site. This assessment predicted ground level concentrations of NO_2, SO_2, $PM_{2.5}$, PM_{10} and deposited dust at a number of sensitive receptor locations in the surrounding area, including slightly north of the northern-most end of the Blackwattle Bay site and in the vicinity of proposed building BLD04. No exceedances of regulatory ambient air quality criteria were predicted for typical daily or peak daily operations at these receptor locations.

Issue Raised	Response
The use of the Rozelle data as the source of existing background air quality at this site is not supported. The Rozelle site is approximately 250 m from Victoria Road. In contrast, this site is fronting the Anzac Bridge which is a six lane road that has reached capacity in peak hours. The only valid claim that could reasonably be made is that worst case high air pollution days at the Rozelle site would be similar to the air pollution levels at Blackwattle.	The AQIA used background monitoring data based on measurements at Rozelle and added on the incremental impacts predicted by the modelling as a result of emissions from the Western Highway and other local roads to provide an assessment of total cumulative impacts. Emissions from Anzac Bridge were included in the modelling. If the assessment had used baseline air quality data recorded on site, then adding on the incremental impacts from the modelled roads would have resulted in 'double counting' of impacts from the roads, depending on the proximity of the on-site monitoring station to those roads. The modelling study used time-series of hourly average pollutant concentrations predicted by GRAL for the discrete receptor locations, added to contemporaneous background time series data recorded at Rozelle for the same period as the meteorological data used in the modelling, to provide an assessment of potential cumulative impacts. The impact assessment then investigated the peak short-term impacts predicted across the building facades (as well as the annual averages), which for the high background days/hours, is in agreement with the submitter's comments as being a reasonable representation of worst-case background levels at the project site.
The proponent has not identified any issues arising from the location of outside air intakes for ventilation and air conditioning systems. What risks arise to building occupants caused by the use of polluted outside air? What air pollution criteria applies to pollutant concentrations in outside air intakes? Who is the regulator of “fit and proper purpose” in this application? The documents do not discuss and identify a regulatory approach to this issue. This issue must be incorporated into the planning requirements for the proposed rezoning	The AQIA recommends that where the use of mechanical ventilation is proposed, the air intakes should be sited as far as practicable from the major source of air pollution. The modelling results provide guidance for the ventilation system designers on the areas of the building predicted to comply with ambient air quality criteria so that proposed locations can be confirmed as being appropriate. The detailed design of the ventilation system and any associated filtration systems etc, as well as regulating compliance with Australian Standards for ventilation systems and indoor air quality guidelines etc are beyond the scope of the air quality assessment.

2 Air Quality Implications of the Revised BWB Precinct Plan

In response to the submissions received on the exhibited Precinct Plan, an amended public domain and built form framework has been developed for Blackwattle Bay, referred to as the Blackwattle Bay Response to Submissions (RtS) Precinct Master Plan. The amended RtS Precinct Plan was developed with review and input from the Project Review Panel and the Project Working Group, comprising Department of Planning and Environment, Government Architect NSW, Transport for NSW and City of Sydney members.

Key changes of relevance to the air quality assessment include:

- Proposed building footprints have been moved out of the City of Sydney land parcel adjacent to Bank Street near the intersection with Pyrmont Bridge Road. This locates some of them slightly farther away from the Western Distributor. There is no change to the distance from Pyrmont Bridge Road.
- Removal of Building 07 and reduction from 8 storeys to 6 storeys for Building 2B, Building 06, Building 5A and Building 5B. Building PL01-1 has also reduced in height to RL54.4m from RL65m.
- Further reductions to Building 5B and Building 03 podium to improve amenity of adjacent residential.
- Increase in height of Building PL02 tower from RL91.5 to RL100.4m
- Adjusted building footprints for Buildings 05A, 05B and 06, and repositioning and reduction of tower envelope for Building 02, now Building 2A.
- An increase in tower separations for Private Landowner sites to minimum 24 m above 8 storeys.

Overall, the private landowner buildings have the same distance from the Western Distributor in the amended RtS Precinct Plan as the exhibited Precinct Plan. For the buildings on the existing Sydney Fish Market site, there is no change in distance from the Western Distributor for Building 2A, a slight increase of approximately 2 m in the setback from the Western Distributor for Building 03, and a slightly larger increase in the setback for Building 04 (approximately 5-7m). The Celestino (PL02) massing is also slightly narrower than what was illustrated in the exhibited Precinct Plan, giving more space between their tower and the adjacent towers, which should improve dispersion of air pollutants in this area. However, the gap between Building 2A and Building 03 has narrowed.

There have also been changes in the proposed use on some floors of the buildings as illustrated by the changes in the orange (residential) and grey (commercial) colouring in **Figure 1**.

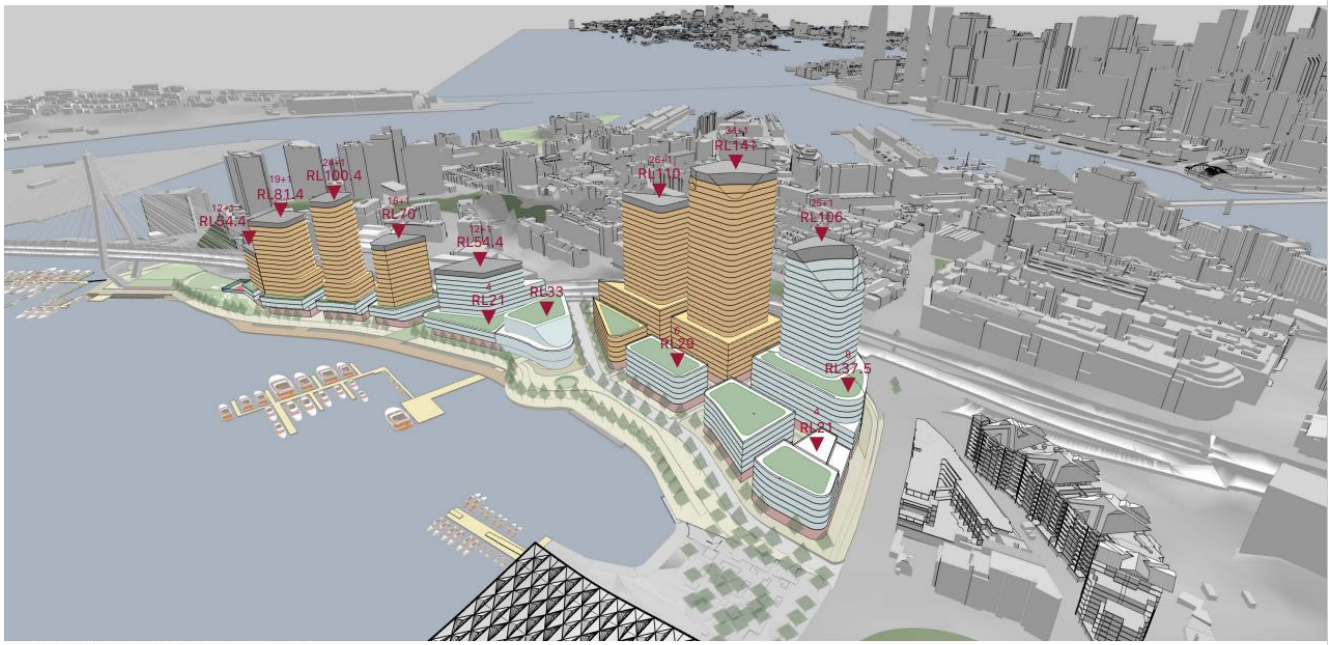
While the slight increases in setbacks from the Western Distributor and tower separations for Private Landowner sites should result in the predicted concentrations reducing in some areas, significant changes model predictions are not likely. However, as residential use in now proposed at lower levels in many of the budlings, it is recommended that the modelling be revised and updated during the detailed design stage to assess the impact on air quality at the proposed residential and commercial areas. The HHRA may also need to be updated based on the revised model outputs. If the modelling predicts significant exceedances at proposed residential locations, additional mitigation measures could be adopted. These can include:

- Reducing the number of apartments facing the Western Distributer by designing building cores to the east; or
- Provision of mechanical ventilation for apartments facing the Western Distributer with fixed glazing to the east and operable windows to non-impacted facades.

Figure 1 Comparison of Exhibited and RtS Precinct Plans

Exhibited Precinct Plan

11 April 2022 - Blackwattle Bay SSP - RtS Precinct Plan



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