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Dear Belinda

**Beaches Link and Gore Hill Freeway Connection (SSI 8862)  
Advice on Environmental Impact Statement (EIS)**

I am writing to you in reply to your invitation to the NSW Environment Protection Authority (EPA) to provide comment on the Environmental Impact Statement (EIS) for the above project.

The EPA understands the project involves the construction and operation of a 5.6 kilometre twin mainline tunnel motorway connection between the Gore Hill Freeway at Artarmon and Warringah Freeway at Cammeray and the Burnt Creek Bridge Deviation at Balgowlah and Wakehurst Parkway at Bantry Bay. The project includes a crossing beneath Middle Harbour between Northbridge and Seaforth, and associated surface access ramps.

The EPA has reviewed relevant EIS documents including:

- *Environment Impact Statement*, prepared by Jacobs, dated 4 December 2020 (EIS main report)
- *Appendix G: Beaches Link and Gore Hill Freeway Connection, Technical Working Paper: Noise and Vibration*, prepared by Renzo Tonin and Associates, dated December 2020 (TWPNV)
- *Appendix H: Beaches Link and Gore Hill Freeway Connection, Technical Working Paper: Air Quality*, prepared by ERM dated December 2020 (TWPAQ)
- *Appendix M: Beaches Link and Gore Hill Freeway Connection, Technical Working Paper: Contamination*, prepared by Jacobs dated December 2020 (TWPC)
- *Appendix N: Beaches Link and Gore Hill Freeway Connection, Technical Working Paper: Groundwater*, prepared by Jacobs, dated December 2020 (TWPGW)
- *Appendix O: Beaches Link and Gore Hill Freeway Connection, Technical Working Paper: Surface Water Quality and Hydrology*, prepared by Jacobs, dated December 2020 (TWPSWQH)
- *Appendix P: Beaches Link and Gore Hill Freeway Connection, Technical Working Paper: Hydrodynamic and Dredge Plume Modelling*, prepared by Royal Haskoning DHV, dated December 2020 (TWPHDPM)

Based on the information provided, the proposal will require an environment protection licence (EPL) under Schedule 1 of the *Protection of the Environment Operations Act 1997* (the POEO Act).

The EPA offers comments on noise and vibration, surface water quality, hydrogeology, contamination, air quality impacts and waste at **Appendix A**. Suggested conditions of approval are also provided for surface water quality, hydrogeology, contamination and waste.

Should you require clarification of any of the above please contact Anna Timbrell, Senior Planning Officer on 9274 6345 or email [anna.timbrell@epa.nsw.gov.au](mailto:anna.timbrell@epa.nsw.gov.au) or Aleksandra Young, Unit Head on 9995 6083 or [aleksandra.young@epa.nsw.gov.au](mailto:aleksandra.young@epa.nsw.gov.au).

Yours sincerely

A handwritten signature in blue ink, appearing to read 'Jacinta Hanemann', with a stylized, cursive script.

**Jacinta Hanemann**  
**Acting Director**  
**Regulatory Operations Metropolitan South**

## APPENDIX A

### 1. Noise and Vibration

The EPA considers that the TWPNV has provided an extensive, detailed and generally comprehensive assessment of this large scale and complex project. The construction stages of the project will result in predicted, and sometimes significant, noise and vibration impacts over an extended period of multiple years at a large number of receivers.

**A key challenge for this project will be to maintain a high degree of community engagement during the construction stage of the project and provide opportunities for the community to influence certain aspects, such as mitigation, respite periods, etc.** A project of this scale and level of impact must effectively engage with the community to successfully co-exist within the community.

Additional comments are outlined below:

1. A qualitative assessment of waterborne activities has been conducted in Section 4.2.6. While the TWPNV notes that there are no guidelines for the assessment of noise from vessel movements in NSW, the predicted noise levels from vessel movements at surrounding sensitive receivers should be included, to assist in quantifying their potential impacts on the community. **The EPA considers that with up to 19 barge and boat movements per day, 48 additional movements associated with cofferdam construction, and the potential for some movements at night, there is potential for noise impacts on surrounding receivers. The EPA recommends further details be provided on mitigation and management measures to minimise these impacts.**
2. The EPA notes that the operational road noise assessment (Table 3-2) (Section 7.2.1) has assumed quieter pavement surfaces – such as open grade asphalt or similar – for all sections of the Gore Hill Freeway and Burnt Bridge Creek deviation affected by the project. If quieter pavements are not adopted for these sections as a result of the detailed design process, then additional alternative measures will be required to achieve acceptable mitigation outcomes.
3. The EPA notes that the project is proposing to apply the standard construction hours recommended in *the Interim Construction Noise Guideline* (EPA, 2009) (ICNG). The use of construction shoulder periods with associated noise management levels should be treated with caution as the traffic noise (being the dominant source) may not be present in the same manner as when the noise monitoring was completed – particularly with road closures, diversions and other impacts to traffic flow.
4. Construction and operational noise mitigation must focus on community engagement where engineering and administrative noise controls cannot reduce noise levels.
5. Should blasting be proposed for the project, additional blasting assessments are required to be carried out to demonstrate that blast impacts are able to comply with the relevant guidelines. The proponent must identify any impacts and address these using all feasible and reasonable mitigation and management measures.
6. Section 5.17 of the TWPNV has adopted vibration and airblast overpressure limits for blasting which are higher than those in the *Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration* (ANZEC, 1990) guidelines. Whilst the EPA understands that blasting for construction may be suited to higher limits, this must be appropriately justified. **Adequate justification is required if the proponent wishes to adopt alternative blasting limits from those in the ANZEC (1990) guideline, for reasons other than expediting the works.**

7. Table 5-3 of the TWPNV states that blasts would be limited to one single detonation in any one day per receiver group, unless otherwise agreed by the NSW EPA. **The EPA requests further clarification on how a 'receiver group' is defined, and how this blast schedule will be managed so that individual receivers in adjacent groups will not be impacted by successive blasts in any one day.**

Note the following are considered typographical errors:

8. Table 3-2 of the TWPNV states that the Out-of-Hours Work (Evening) time window on Monday to Friday is 7 pm to 10 pm. This may be a typographical error and the EPA recommends that future references be amended to refer to a 6 pm to 10 pm time window in accordance with *the Interim Construction Noise Guideline* (EPA, 2009).
9. Section 3.2 of the TWPNV states that "The ICNG refers to the NPfl...", The EPA recommends future references are amended to read "The ICNG refers to the Industrial Noise Policy (INP)...".

## **2. Surface Water**

The Beaches Link project would impact two catchment areas:

- Sydney Harbour and Parramatta River: the dredging works and wastewater discharges would occur to waterways within this catchment
- Northern Beaches Lagoon: stormwater and wastewater discharges at the eastern end of the Project footprint would be to waterways within this catchment.

### Dredging Works

Based on the information provided in the TWPC, the EPA considers the potential residual water pollution risks associated with the dredging works can be managed through conditions of approval.

**The EPA recommends the following condition of approval:**

*Prior to commencement of dredging, the applicant must prepare a **Dredging Trigger Action Response Protocol (TARP)** setting out management criteria and mitigation measures for managing water pollution risks associated with dredging, including identifying the relevant monitoring sites, frequency and analytes. The TARP must be prepared in consultation with the EPA.*

### Wastewater Discharges

Wastewater from tunnelling activities would be directed to five wastewater treatment plants – four discharging to the local streams (Willoughby Creek, Flat Rock Creek and Burnt Bridge Creek) via the stormwater system and one discharging to a drainage channel flowing to the Wakehurst Golf Course dam for onsite reuse.

These proposed discharges are unlikely to pose a risk to the receiving waterways given the default guideline values for toxicants (i.e. 95% and 99% species protection level) will be met through dispersion and dilution within a short distance of the discharge points (also noting that discharge concentrations would typically be lower than the limits if the criteria were adopted as 100 percentile discharge limits).

**The EPA recommends the following condition of approval to set out the discharge quality requirements consistent with the EIS. (This condition is consistent with the condition of approval for the Western Harbour Tunnel project):**

*Unless an EPL is in force in respect to the CSSI and that licence specifies alternative criteria, discharges from construction wastewater treatment plants must not exceed:*

- (a) the Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2018 (ANZG, 2018) default guideline values for toxicants at the 90 per cent species protection level;*
- (b) for physical and chemical stressors, the guideline values set out in Tables 3.3.2 and 3.3.3 of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC/ARMCANZ, 2000); and*
- (c) for bioaccumulative and persistent toxicants, the ANZG (2018) guidelines values at a minimum of 95 per cent species protection level.*

*Where ANZG (2018) does not provide a default guideline value for a particular pollutant, the approaches set out by ANZG (2018) for deriving guideline values, using interim guideline values and/or using other lines of evidence such as scientific literature or international water quality guidelines, must be used to derive a guideline value.*

### Stormwater Discharges

The TWPSWQH states that sediment basins would be used during the construction stage, with the basin locations to be determined at the detailed design stage. Sediment basins would be sized consistent with *Managing Urban Stormwater, Soils and Construction* Vol. 1 (Landcom, 2004) and Vol. 2D *Main Road Construction* (DECC, 2008) for:

- 85<sup>th</sup> percentile, 5-day rainfall event for sensitive receiving environments (catchments that drain to Quarry Creek, Flat Rock Creek, Trefoil Creek, Manly Creek and Manly Dam).
- 80<sup>th</sup> percentile, 5-day rainfall event for all other standard receiving environments.

The proposed sediment basin sizing is consistent with the recommendations of DECC (2008) for activities with a duration of disturbance of one to three years. Where the duration of disturbance is greater than three years, DECC (2008) recommends sizing sediment basins for the 90<sup>th</sup> and 95<sup>th</sup> percentile 5-day rainfall events, for standard and sensitive receiving environments respectively. Noting that construction is expected to take five to six years, the applicant would need to ensure that each sediment basin is appropriately sized for the duration of catchment disturbance.

It is unclear whether controlled discharges of stormwater are proposed for the construction stage. However, the EIS states that if controlled sediment basin discharges are required, a water pollution impact assessment commensurate with the potential risk and consistent with the National Water Quality Guidelines would be prepared to inform licensing consistent with section 45 of the *Protection of the Environment Operations (POEO) Act 1997*.

**The EPA recommends the following conditions of approval to ensure that the potential water pollution risks would be appropriately assessed and managed:**

1. *Sediment basins must be designed, constructed and managed consistent with the practices and principles of Managing Urban Stormwater, Soils and Construction Vol. 1 (Landcom, 2004) and Vol. 2D Main Road Construction (DECC, 2008).*
2. *If construction stage stormwater discharges are proposed, a **Water Pollution Impact Assessment** commensurate with the potential risk and consistent with the national Water Quality Guidelines will be required to inform licensing consistent with section 45 of the Protection of Environment Operations Act 1997. The Assessment must at a minimum:*
  - (a) provide details of the discharge locations and receiving waterways;*
  - (b) characterise the expected discharge quality under typical and worst-case conditions for all pollutants present at levels that pose a risk of non-trivial harm to human health or the environment;*

- (c) *assess the potential impact of discharges on the environmental values of the receiving waterway, including typical through to worst-case scenarios, with reference to the relevant Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2018) for slightly to moderately disturbed ecosystems for standard receiving environments*
- (d) *demonstrate that all practical and reasonable measures to avoid discharges (e.g. stormwater reuse or transfers to the tunnel wastewater treatment plants) and minimise water pollution and protect human health and the environment from harm are investigated and implemented.*

#### Erosion and sediment control

There is potentially a risk of contamination of construction stormwater. The TWPC identifies several areas of moderate to high risk contaminated sites within the project footprint, with contaminants of concern including heavy metals, hydrocarbons, pesticides and volatile organic compounds. The TWPC states that further detailed investigations are required to quantify the environmental risks prior to construction.

The TWPC highlights that construction stage erosion and sediment controls would be consistent with Landcom (2004) and DECC (2008). However, the measures recommended by Landcom (2004) and DECC (2008) are designed to manage uncontaminated sediment and may not be appropriate for managing potential water pollution risks associated with contaminated lands. Alternative or additional measures may be required subject to the results of the detailed site investigations.

#### **The EPA recommends the following condition of approval:**

*Prior to the commencement of construction, the applicant must prepare, in consultation with the EPA, a **Contaminated Areas Trigger Action Response Protocol (TARP)** setting out monitoring requirements, management criteria and mitigation measures for managing water pollution risks associated with work in areas of potential contamination. Mitigation measures considered should include but not be limited to:*

- *at-source controls (e.g. covering stockpiles, bunding, flow diversions)*
- *options to avoid contaminated stormwater discharges (e.g. full capture and reuse where appropriate; tankering offsite; diverting contaminated stormwater to wastewater treatment plants)*
- *additional or alternative treatment measures (e.g. increased sediment basin sizing).*

#### Wastewater Discharges (Operational Stage)

The TWPSWQH states that wastewater and intercepted groundwater would be directed to Gore Hill Freeway wastewater treatment plant. Treated wastewater would discharge via a drainage pipe to Flat Rock Creek, which flows to Middle Harbour.

The TWPSWQH states: “The permanent wastewater treatment plant at Artarmon should be designed to treat wastewater generated from tunnel groundwater ingress and rainfall runoff in tunnel portals and achieve the following discharge criteria:

- the relevant physical and chemical stressors set out in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC/ARMCANZ, 2000);
- the ANZG (2018) 95 per cent species protection levels for toxicants generally, with the exception of those toxicants known to bioaccumulate, which would be treated to meet the ANZG (2018) 99 per cent species protection levels; and
- the draft ANZG default guideline values for iron (in fresh and marine water) and zinc (in marine water).”

These discharges are likely to contribute to achieving the environmental values of the receiving waterways.

**The EPA recommends the following condition of approval to set out the discharge quality requirements consistent with the EIS:**

*Unless an EPL is in force in respect to the CSSI and that licence specifies alternative criteria, discharges from operation water treatment plants to surface waters must not exceed:*

*the Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2018 (ANZG, 2018) default guideline values for toxicants at the 95 per cent species protection level;*

*for physical and chemical stressors, the guideline values set out in Tables 3.3.2 and 3.3.3 of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC/ARMCANZ, 2000); and*

*for bioaccumulative and persistent toxicants, the ANZG (2018) guidelines values at a minimum of 99 per cent species protection level.*

*Where the ANZG (2018) does not provide a default guideline value for a particular pollutant, the approaches set out in the ANZG (2018) for deriving guideline values, using interim guideline values and/or using other lines of evidence such as scientific literature or international water quality guidelines, must be used to derive a guideline value.*

### **3. Hydrogeology**

In assessing against the NSW Aquifer Interference Policy minimal impact considerations, the TWPG identified that the saltwater intrusion and the potential migration of contaminants would reduce the quality of local groundwaters greater than 40 metres from the project alignment.

Given the predictions made from modelling, ongoing monitoring of groundwater quality is required during the construction phase of the project to validate model predictions and mitigate impacts caused as a result of project influence.

From the details provided, potential contaminant migration is expected at, and around, the Flat Rock Reserve precinct in Willoughby. A nested monitoring bore site (B134) currently samples for water quality in this area.

Saltwater intrusion modelling was confined to one specific cross section along the alignment. Due to the varying geology and hydraulic characteristics along the alignment, modelling of potential impact areas across the entire project area was limited. As a result of these limitations, spatial mapping of potential impact areas of encroaching salinity was not provided or discussed in detail but are captured as part of the ongoing groundwater monitoring plan.

The proponent has proposed to continue water level and comprehensive water quality monitoring and the EPA is satisfied with the proposed monitoring objectives. The EPA acknowledges the commitment to a Groundwater Management Plan with the inclusion of recent, updated and continuing monitoring rounds and details.

**The EPA recommends the following condition of approval:**

*The proponent must prepare a Water Management Plan and a Groundwater Monitoring Program (including ongoing updates to the baseline data, Trigger Action Response Plans and Mitigation Measures Plan) prior to the commencement of construction and operation of the project.*

### **4. Contamination**

The proponent's assessment of contamination matters included a desktop study to assess potential contamination issues at surface disturbance areas and evaluated areas of environmental interest.

The TWPC included a desktop review of available information, information from site inspections, a qualitative assessment of the potential contamination risks, and the need for land remediation.

A summary of investigation results for soil, groundwater and sediments was provided in the TWPC. Several areas of environmental interest were identified in the EIS and the supporting contamination report. However, a detailed site investigation report was not submitted in the EIS package.

High-level environmental management measures relating to soils, groundwater and ground gas impacts were recommended. However, these measures are generic and without regard to site specific levels and types of contamination.

The EPA notes the need for ground gas investigations in Flat Rock Reserve to further assess the potential presence of landfill-generated gas which could impact on the construction and/or operation of the project.

Limited intrusive site investigations have been conducted, and therefore ecological and human health risks posed by contamination have not been properly determined. Detailed investigations are required to determine the appropriate remedial measures that are required to make the areas suitable for the proposed use.

Given a highly likely requirement for remediation, **the EPA recommends a NSW EPA-accredited site auditor is engaged throughout the duration of works to ensure that any work required in relation to contamination is appropriately managed.**

The TWPHDPM noted key features of the operational infrastructure include groundwater and tunnel drainage management and treatment systems. However, these were not discussed further. Further, information on groundwater contamination modelling or how groundwater contamination will be considered in tunnel design also was not provided.

**As part of the Response to Submissions, the EPA recommends the proponent be required to submit:**

1. **a Sampling and Analysis Quality Plan (SAQP) which details how the type, quantity, and extent of contamination for the areas of environmental interest will be assessed.**
2. **interim audit advice from an EPA-accredited site auditor commenting on:**
  - (a) **the appropriateness of the contamination report prepared by Jacobs as part of this EIS and the sampling and analysis quality plan which is yet to be prepared;**
  - (b) **whether the areas of environmental interest have been appropriately identified; and**
  - (c) **adequacy of the proposed management measures.**

Further to the above, **the EPA recommends the following Conditions of approval:**

1. *Prior to the commencement of any works that would result in the disturbance of suspected, or known to be contaminated land, **Detailed Site Investigation Report/s** must be prepared, or reviewed and approved by consultants certified under either the Environment Institute of Australia and New Zealand's Certified Environmental Practitioner (Site Contamination) scheme (CEnvP(SC)) or the Soil Science Australia Certified Professional Soil Scientist Contaminated Site Assessment and Management (CPSS CSAM) scheme.*

*The detailed site investigations must be undertaken in accordance with guidelines made or approved under section 105 of the Contaminated Land Management Act 1997 (CLM Act).*

*The **Detailed Site Investigation Report/s** must document the nature and extent of contamination on the land upon which the Beaches Link and Gore Hill Freeway Infrastructure is to be carried out and land associated with Beaches Link and Gore Hill*



*Freeway, that is suspected, or known to be contaminated and must determine whether remediation is required to ensure the land is suitable for the proposed use and ecological and human health risks posed by the contamination are appropriately managed.*

2. *The proponent must engage a **NSW EPA-accredited Site Auditor** throughout the duration of works to ensure that any work required in relation to contamination is appropriately managed.*
3. *The contamination related sections of the Construction Environmental Management Plan (CEMP) Sub-plan and Soil and Water CEMP Sub-plan must be reviewed by a NSW EPA-accredited Site Auditor. A **Section B Site Audit Statement** and **Site Audit Report** which certifies the plans are appropriate must be submitted to the Planning Secretary prior to undertaking any works which may result in the disturbance of any contaminated soil, groundwater or sediments. Any variations to the approved plans must be approved in writing by the Site Auditor.*
4. *Prior to commencing with remediation, the proponent must submit to the Planning Secretary, the **Remedial Action Plan** and a **Section B Site Audit Statement** that certifies that the **Remedial Action Plan** is appropriate and that the site can be made suitable for the proposed use. The plan must include details on how the environmental and human health risks will be managed during the disturbance, remediation, management and/or removal of contaminated soil, groundwater, sediment, and ground gas. Any variations to the approved Remedial Action Plan/s must be approved in writing by the Site Auditor.*
5. ***Section A1 Site Audit Statement** or a **Section A2 Site Audit Statement** and accompanying **Site Audit Report** prepared by a NSW EPA-accredited Site Auditor must be submitted to the Planning Secretary and the relevant Council for information no later than one month before the commencement of operation. Contaminated land must not be used for the purpose approved under the terms of this approval until a **Site Audit Statement** determines the land is suitable for that purpose and any conditions on the **Site Audit Statement** have been complied with.*

## **5. Air Quality**

The TWPAQ advises that the twin-tunnel Beaches Link project will be longitudinally ventilated, with multiple variable-speed ventilation fans drawing air through each tunnel in the direction of traffic and discharging out the ventilation outlets near the exit portals of each tunnel. The design of the ventilation system will ensure zero portal emissions through use of jet fans to draw air back into the tunnel at the exit portals, to be emitted via the ventilation outlets.

The discharge ventilation outlets are to be located at Cammeray, Gore Hill, Burnt Bridge and Wakehurst Parkway. When two tunnels meet up (e.g. the Western Harbour Tunnel and Beaches Link tunnel), there will be no carry-over tunnel air, and fresh air will be brought into the tunnel at the juncture.

The EPA considers that the TWPAQ has been conducted in general accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*.

However, the EPA has identified some points that require clarification and some others that require further assessment and recommends additional information be provided as follows:

### Parameters for the ventilation outlets have been updated

Following the approach presented for the Western Harbour Tunnel (WHT) project, 'Do Something Cumulative' (DSC) scenarios are used to assess the potential cumulative impacts from the project in combination with existing roads as well as other road projects.

Whilst it was expected that the ventilation outlet parameters previously used in the WHT assessment were used for the assessment of Beaches Link tunnel and Gore Hill connection project, it is noted that some of the ventilation outlet parameters exhibited in Table G-8 (Annexure G to the TWPAQ) are different from those previously presented for the WHT assessment. This means that although 'DSC' modelling scenarios prepared for the WHT and the Beaches Link projects follow the same approach (e.g. sources), there are differences when comparing the predicted results from each project. For instance, it is likely that this is one of the reasons<sup>1</sup> why the 'top 10'<sup>2</sup> receptors selected for the 1-hour NO<sub>2</sub> contemporaneous assessment in the vicinity of the Cammeray Ventilation Outlets (G and H) in the Beaches Link and Gore Hill Connection assessment are different from those selected in the WHT TWPAQ.

**The EPA recommends that for transparency of assessment evaluation, the proponent provide a detailed discussion on the rationale behind the different ventilation outlet parameters and confirm that the discharge parameters used in the Beaches Link TWPAQ are both appropriate for predicting reasonable worst-case impacts and consistent with the Beaches Link and WHT project designs.**

#### There is uncertainty regarding the selection of the exit velocity used for the Regulatory Worst Case (RWC) Scenarios

An assessment of regulatory worst case was undertaken for all pollutants for the 2037-DSC scenario. The estimated mass emission rates for the project were based on a combination of concentration limits for the tunnel ventilation outlets taken from the NorthConnex, WestConnex M4 and WestConnex M8 conditions of approval and, assumed ventilation settings.

Whilst section 8.4.2 in the TWPAQ seems to indicate that the lowest exit velocity (of the different source groups) is used to estimate the mass emissions rates, it is acknowledged that based on information provided in Table G-163 (Annexure G), the maximum exit velocity is used instead.

Considering that results presented in the Response to Submissions report for the WHT project show that modelling at the maximum flowrate:

- increased cumulative impacts by up to 10%, and
  - for almost all pollutants, worst case impacts occurred when the flowrate was at a maximum,
- the EPA considers that for transparency of assessment evaluation, the proponent should clarify whether the maximum exit velocity is used in the calculation of the mass emissions rates used in the RWC modelling scenarios.

**The EPA recommends the proponent clarifies and justifies the selection of the adopted flow rate and exit velocity for predicting reasonable worst-case impacts. Where necessary, results and conclusions for all relevant RWC modelling scenarios must be revised and updated accordingly.**

#### Predicted exceedances at elevated receptors

Section 8.4.9 of the TWPAQ provides the results of the assessment undertaken for elevated receptors, for the expected traffic cases and the regulatory worst case (RWC) at heights of 10 metres, 20 metres, 30 metres and 45 metres above ground level.

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<sup>1</sup> Another reason may be related to use of a maximum exit velocity to calculate the mass emissions rates used in the RWC scenarios (See Point 2 in Attachment A).

<sup>2</sup> The 1-hr NO<sub>2</sub> contemporaneous assessment (part of the Regulatory Worst Case (RWC) scenario) is only undertaken for the 10 RWR receptors where the largest ventilation outlet contributions are predicted.

For the 'Expected Traffic' modelling scenario there are two predicted exceedances, one 24-hour PM<sub>10</sub> and one for 24-hour PM<sub>2.5</sub>). Both exceedances are predicted at a non-existing receptor (RWR-17555, at 45 metres) within a 300 metre radius from the ventilation Outlet I.

For the 'RWC at elevated receptors' results, the following is noted:

- For the maximum 24-hour average PM<sub>10</sub> concentrations, there are predicted exceedances at 20 metres, 30 metres and 45 metres when considering all RWR receptor locations. When considering existing RWR receptors at each modelled height, there is one predicted exceedance at 30 metres at receptor RWR-12249. This receptor is located in the vicinity of the ventilation Outlets G and H. At this receptor, the contribution from the ventilation outlets to the total 24-hour PM<sub>10</sub> predicted concentration is approximately 25%.
- For the maximum 24-hour average PM<sub>2.5</sub> concentrations, there are predicted exceedances at 20 metres, 30 metres and 45 metres when considering all RWR receptor locations. When considering existing RWR receptors at each modelled height, there is one predicted exceedance at 30 metres at receptor RWR-12249. This receptor is located in the vicinity of the ventilation Outlets G and H. At this receptor, the contribution from the ventilation outlets to the total 24-hour PM<sub>2.5</sub> predicted concentration is approximately 43%.
- There are several predicted exceedances of the annual PM<sub>2.5</sub> and of the 24 PM<sub>10</sub> and PM<sub>2.5</sub> criteria at non-existing receptors located in the vicinity of ventilation Outlets H, I, K.
- For the maximum 1-hour average formaldehyde concentrations, there is one predicted exceedance at a non-existing RWR receptor (RWR-17555 at 45m). This receptor is located in the vicinity of ventilation Outlet I.

The predicted ventilation outlets contribution to the predicted exceedances for non-existing receptors are potentially significant. If building heights and/or future developments are not carefully considered within 300 metres of the ventilation outlets, there could be significant exceedances in 24-hour average and annual average PM and 1-hour average formaldehyde at existing and future buildings at height.

**The EPA recommends the proponent provide robust justification to demonstrate that the ventilation outlet emissions at the proposed emission limits will not cause adverse air quality impacts. Analysis should include, at a minimum:**

1. **a focus on:**
  - **PM exceedances at existing receptors (at 30 metres) near the Cammeray stack, and**
  - **predicted exceedances of PM and formaldehyde at non-existing receptors;**
2. **frequency (contemporaneous assessment), likelihood and severity of exceedances;**
3. **operational management and mitigation measures, including but not limited to augmentation of the ventilation outlets; and**
4. **review of the appropriateness of proposed emission limits for the ventilation outlets.**

Additional receptors may need to be included in some of the Elevated and Regulatory Worst-Case Scenarios

Stack only contributions (i.e. incremental results) for the Expected Traffic modelling scenario are presented in Annexure J in the TWPAQ. A reviewed of the '1-hour NO<sub>x</sub> for all ventilation outlets' contour plots indicate that it is possible for localised concentrations to be predicted in areas approximately 3-5 kilometres to the north of the Wakehurst (J) and Burnt Bridge (K) ventilation outlets. For instance, Figures J-26 and J-30 show that there are localised concentrations in the area near the Northern Beaches Hospital.

It should be noted that none of the RWR receptors located in 'close' proximity to Northern Beaches Hospital were incorporated in either of the following scenarios:

- RWC at the 'Top 10' receptors (1-hr NO<sub>2</sub> contemporaneous);
- Expected Traffic - Elevated Receptors; or

- RWC at Elevated Receptors.

Considering the potential for localised concentrations and that the building heights in the area are between 0-15 metres, the EPA considers that RWR receptors in this area (including the Northern Beaches Hospital), should be included in the above-mentioned modelling scenarios. If approved, the EPA will be regulating the ventilation outlets via emission limits informed by the modelled emissions in the regulatory worst-case scenario. As such, the EPA needs to be confident that the operation at the proposed licence limits will not cause significant adverse air quality impacts.

**The EPA recommends the proponent provides further assessment of existing and approved elevated receptors located to the north of ventilation outlet J including the Northern Beaches Hospital and surrounding areas. The additional assessment must:**

1. **be conducted for the following modelling scenarios:**
  - **RWC at the 'Top 10' receptors (1-hr NO<sub>2</sub> contemporaneous);**
  - **Expected Traffic - Elevated Receptors;**
  - **RWC at Elevated Receptors;**
2. **consider the potential individual contributions from ventilation Outlets J and K;**
3. **present incremental (ventilation outlet), background (surface road and other non-surface road contributions) and cumulative concentrations for NO<sub>2</sub> (1 hour) and air toxics (1 hour); and**
4. **if applicable, present information regarding the predicted frequency (contemporaneous assessment), likelihood and severity of exceedances.**

## **6. Waste**

Waste that is generated by the project will need to be segregated, uniquely identified, classified using the NSW EPA Waste Classification Guidelines, and tracked to its destination. Further, waste must only be delivered to facilities that can lawfully accept the waste. The Environment Protection Licence of a potential waste facility must be referred to ensure that the elected facility can lawfully accept that type of waste.

The proponent will also be required to perform audits of the waste tracking process to ensure that waste is being delivered to the appropriate destination.

Some examples of Waste Tracking and Auditing Protocols include:

- Volumetric surveys;
- Reviewing of Waste Classification Reports prepared by Environmental Contractors for the waste;
- Tracking the transport of waste from the area of waste generation to disposal;
- Reviewing the receiving waste facility's Environment Protection Licence; and
- Storing and reviewing waste disposal dockets.

**The EPA recommends the following approval conditions:**

1. *The proponent will need to identify and track all waste during generation, transfer, storage, processing and re-use or disposal.*
2. *All waste generated by the project and requiring disposal or recycling will need to be taken to a facility that can lawfully accept that type of waste.*
3. *The proponent will need to create and undertake a routine Waste Auditing Program that ensures compliance with relevant environmental legislation at all stages of waste processing during the project.*