

Attachment 1

1.0 Water

1.1 Construction Phase stormwater management

- 1.1.1 The EIS indicates that the construction phase sediment and erosion controls will be consistent with *Managing Urban Stormwater, Soils and Construction Vol. 1* (Landcom, 2004) and Vol. 2D *Main Road Construction* (DECC, 2008), and a *Construction Soil and Water Management Plan* will be prepared for the project and *Erosion and Sediment Control Plans* for all work sites. The EIS states that runoff from unpaved surfaces will be captured (e.g. sediment basins; low point sumps), tested (and treated if required) prior to reuse or discharge and provides indicative discharge criteria for pH, oil and grease and total suspended solids.

The EIS does not specify the design storm of sediment basins (indicative of the expected frequency of untreated managed overflows) or assess the potential impact of stormwater discharges.

Recommendation:

It is recommended that the proponent:

- specifies the design storm of the proposed sediment basins;
- assesses the potential impact of construction phase stormwater discharges on the environmental values of the receiving waterways:
 - with reference to the expected concentration of all potential pollutants of concern and the relevant *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* guideline values for slightly to moderately disturbed ecosystems;
 - including consideration of potential sedimentation impacts.

1.2 Wastewater discharges

a) Construction phase

As construction phase wastewater discharges would be regulated by an EPL, the EPA must consider the matters set out under Section 45 of the *Protection of Environment Operations Act 1997* (the POEO Act), including:

- the pollution caused or likely to be caused by the carrying out of the activity or work concerned and the likely impact of that pollution on the environment;
- the practical measures that could be taken to prevent, control, abate or mitigate that pollution, and to protect the environment from harm as a result of that pollution;
- in relation to an activity or work that causes, is likely to cause or has caused water pollution:
 - the environmental values of water affected by the activity or work;
 - the practical measures that could be taken to restore or maintain those environmental values.

The Water Quality Guidelines 80% species protection guideline values are proposed as discharge criteria for toxicants in construction phase wastewater discharges to the Cooks River and Muddy Creek. The EIS does not assess the impact of these discharges on water quality at the edge of the near field mixing zone or the environmental values of the receiving waterways.

It should be noted that while the proposed works will discharge to highly disturbed waterways the 80% species protection guideline values do not provide appropriate ambient water quality outcomes. The Water Quality Guidelines state that in highly disturbed ecosystems, ecological values can be maintained by applying the default guideline values for slightly disturbed systems (for most toxicants, this is the 95% species protection level). Given the long duration of the construction phase and the potential for cumulative impacts, the guideline values for slightly to moderately disturbed ecosystems provide appropriate ambient water quality targets to support the goal of improvement of the highly disturbed ecosystem rather than maintenance of the disturbed condition.

The EIS proposes adopting the 80th (and 20th for pH) percentile of reference site data as discharge criteria for physical and chemical stressors. The Water Quality Guidelines states that site specific guideline values for physical and chemical stressors should be derived based on the 80th percentile of reference site data (or the 20th percentile of reference site data for stressors that cause problems at low concentrations, such as oxygen) collected over 2 years of monthly sampling. The Water Quality Guidelines define reference condition as “an environmental quality or condition that is defined from as many similar systems as possible and used as a benchmark for determining the environmental quality or condition to be achieved and/or maintained in a particular system of equivalent type.”

Given that the goal should be to improve ecosystem condition, it is important that appropriate reference sites are used that are representative of slightly to moderately disturbed ecosystem condition. The site-specific values do not appear to have been derived consistent with these requirements as the data are from highly disturbed systems and it is unclear whether values were derived from 2 years of monthly sampling.

The EIS does not consider potential risks of acute toxicity or bioaccumulation associated with construction phase wastewater discharges.

It is unclear whether the proposed discharge criteria include all pollutants of concern potentially present in the wastewater (noting that total petroleum hydrocarbons, volatile organic compounds and chloroform were detected in groundwater along the proposed tunnel route, but no discharge criteria were proposed for these pollutants).

b) Operation phase

During operation, tunnel water will be pumped to a new water treatment plant at Arncliffe, combined with tunnel water from the New M5 and treated prior to discharge to the Cooks River. It is unclear whether these discharges would need to be regulated by an EPL. If the discharges will not be licensed, the operator may not have a defence against a pollution of waters offence, so it is important to ensure that discharges do not contain pollutants at non-trivial levels. If the discharges will be licensed, then the EPA must consider the matters set out in Section 45 matters discussed above in relation to construction phase discharges. Therefore, whether the operation phase wastewater discharges will be licensed or not, an assessment of the potential impact of discharges is required.

For toxicants, the EIS proposes adopting the Water Quality Guidelines 80% species protection guideline values as discharge criteria for the operational water treatment plant. Although the EIS assesses the potential impact of operation phase wastewater discharges on reach-scale water quality, it does not assess the potential impact on water quality in the vicinity of the discharge (i.e. the mixing zone) or consider the potential risk of bioaccumulation or acute impacts. The EIS assesses the combined impact of discharges of treated tunnel water from the proposed F6 Extension and the existing New M5 on pollutant concentrations in the Cooks River using a waterway box model to predict concentrations at each box (river reach). With the exception of manganese, the EIS does not compare predicted waterway pollutant concentrations to guideline values or consider whether the predicted water quality would support desired waterway outcomes.

For most pollutants, the 'assumed discharge quality' concentrations reported in Table 6-10 are substantially less than both the proposed discharge criteria and the default guideline values for slightly to moderately disturbed systems. This suggests that these pollutants are unlikely to pose a risk to aquatic ecosystem health (Note that Tables 6-9 and 6-10 of Appendix L of the EIS do not specify units for pollutant concentrations. Therefore, these were assumed to be $\mu\text{S/cm}$ for salinity and mg/L for all other pollutants.). However, it is noted that the 'assumed discharge quality' concentrations of arsenic, ammonia and phosphorus are substantially greater than the default guideline values and the combined discharge is predicted to increase the concentrations of some pollutants in the Cooks River (e.g. Ammonia concentrations are predicted to increase by 2.6% to $280 \mu\text{g/L}$, more than 18 times the default stressor guideline value for estuaries [$15 \mu\text{g/L}$]).

It is unclear whether the assessment considers all pollutants of concern potentially present in the wastewater (noting that total petroleum hydrocarbons, volatile organic compounds and chloroform were detected in groundwater along the proposed tunnel route, but the assessment does not consider these pollutants).

As noted in relation to construction phase discharges, the *Water Quality Guidelines* default guideline values for slightly to moderately disturbed ecosystems would provide appropriate targets to support the goal of improvement of the Cooks River.

As per construction phase discharges, the EIS proposes deriving discharge criteria for physical and chemical stressors based on 'reference' site data and it is unclear whether this is consistent with the *Water Quality Guidelines* (See 'Construction phase' section).

Recommendation:

It is recommended that the proponent assesses the potential impacts of construction and operation phase wastewater discharges on the environmental values of the receiving waterways. This assessment should:

- characterise the expected typical and maximum discharge concentrations of all potential pollutants of concern based on the influent quality (with reference to the groundwater assessment), treatment measures and expected treatment performance;
- compare expected discharge concentrations and resulting waterway concentrations at the discharge location to the *Australian and New Zealand*

Guidelines for Fresh and Marine Water Quality guideline values for slightly to moderately disturbed ecosystems

- For toxicants, this is generally the 95% species protection level with the 99% species protection level recommended to manage potential bioaccumulation or chronic impacts.
- If site-specific physical and chemical stressor guideline values are adopted, then consistent with the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* these should be derived based on the 80th percentile of reference-site data (or the 20th percentile for stressors that cause problems at low levels) collected over 24 months of monthly sampling (reference sites should be slightly to moderately disturbed condition to reflect the goal of improving the condition of the receiving waterways).
- All relevant guideline values should be considered, including interim working levels and physical and chemical stressor guideline values. For example, ammonia concentrations should be compared to the stressor the relevant guideline value (in addition to the toxicant guideline value).
- demonstrate that discharges will not cause bioaccumulation of pollutants and that maximum discharge concentrations are not at acutely toxic levels.

1.3 Guidelines values

The following errors and omissions in the guideline values cited in Table 3-3 of the *Surface Water Technical Report* are noted:

- Chlorophyll a in freshwater
 - The coastal lowland rivers guideline value is 3 µg/L, not 5 µg/L. See footnote *d* under ANZECC (2000) Table 3.3.2.
- Salinity in freshwater
 - The coastal lowland rivers guideline value is 300 µS/cm, not 2,200 µS/cm. See explanatory notes in ANZECC (2000) Table 3.3.3.
- pH in freshwater
 - The lowland rivers guideline range is 6.5 to 8.5, not 6.5 to 8.0. See footnote *m* under ANZECC (2000) Table 3.3.2.
- Arsenic III in marine water
 - Table 3-3 adopts the freshwater guideline value. The marine water interim working level is 2.3 µg/L. See the *Australian and New Zealand*

Guidelines for Fresh and Marine Water Quality (ANZG, 2018) - -

<http://www.waterquality.gov.au/anz-guidelines>

- Arsenic V in marine water
 - Table 3-3 adopts the freshwater guideline value. The marine water interim working level is 4.5 µg/L. See the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG, 2018) - <http://www.waterquality.gov.au/anz-guidelines>
- Chromium III in freshwater
 - Table 3-3 does not include a guideline value for chromium III in freshwater. The freshwater interim working level is 3.3 µg/L. See the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG, 2018) - <http://www.waterquality.gov.au/anz-guidelines>
- Iron fresh- and marine water
 - Table 3-3 does not include guideline values for iron. The interim working level is 300 µg/L for both freshwater and marine water. See the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG, 2018) – <http://www.waterquality.gov.au/anz-guidelines>
- Manganese in marine water
 - Table 3-3 adopts the freshwater guideline value. The marine water interim working level is 80 µg/L. See the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG, 2018) - <http://www.waterquality.gov.au/anz-guidelines>

Note that these errors and omissions are also reflected in Table 10-17.

Additionally, the EIS applies estuarine and marine guideline values to the freshwater Rockdale Bicentennial Park Pond. The freshwater guideline values should be adopted for Rockdale Bicentennial Park Pond.

Recommendation:

- The proponent should amend the EIS to address these issues.

2.0 Noise

2.1 Assessment requirements for noise and vibration.

- 2.1.1 The EIS has generally adequately considered and assessed construction and operational noise and vibration, including cumulative impacts, the potential for construction (noise) fatigue, and road traffic noise within and outside of the study area.

Further details are required, however, on the how impacts will be managed, consistent with the requirements summarised in Section 8, Appendix G of the EIS. These management measures must be fully developed and implemented as part of the conditions of consent (if approved).

2.2 Construction noise and vibration

- 2.1.1 The construction program is estimated to take up to 4-years. Some work activities are proposed outside of the recommended standard hours (defined in the *Interim Construction Noise Guideline* (ICNG)) and the EIS does not exclude the possibility of work on weekends and on public holidays. The assessment does not provide sufficient information to identify and justify what construction activities are necessary outside of the recommended standard hours.

The assessment does not offer sufficient supporting details on the proposed activities, the location, and volume of out-of-hours (OOH) works including where there is a risk of sleep disturbance – to allow the community to understand how they will be affected by noise over the duration of the project. This information is essential considering that predicted construction noise levels for some work activities will be 20 dB greater than the relevant noise management level. This will be highly intrusive and clearly audible when such activities take place near sensitive receivers.

To provide greater certainty for the community, the proponent should provide justification and further information. In the absence of justification for OOH works and details assessment of the impacts of those works, construction should be restricted to standard construction hours as per the ICNG.

c) Tunnelling and tunnelling support

Tunnelling, and tunnelling support work are proposed to operate 24-hours per day. 'Tunnelling support work' should be defined to ensure that any out-of-hours works

associated with tunnelling is appropriate and limited to essential activities necessary to enable tunnelling.

The proponent should investigate alternatives to removing spoil off-site outside of the recommended standard hours. The EPA considers that an assessment of spoil night-time spoil storage (with removal during standard construction hours) should be undertaken.

d) Ancillary construction facilities

Significant and ongoing exceedances of the construction noise management levels are predicted for out of hours works at the Arncliffe construction ancillary facility. This facility is currently in use for the New M5 Motorway works. Ongoing construction activity at this site may result in construction fatigue in the local community.

Cumulatively with construction work for the New M5 Motorway project, some sensitive-receivers may be affected by construction noise for up to 8-years. The EIS should contain information as to how this will be managed through community engagement and respite when noisy activities are taking place.

Given the likely duration of construction at this site, further work is needed to identify feasible and reasonable noise mitigation. It is noted that the assumed insertion loss for the Arncliffe construction ancillary facility is 10 dB. By comparison, the assumed insertion loss at the Rockdale construction ancillary facility is reported as 20 dB. It is recommended that the Arncliffe construction ancillary facility be acoustically treated, particularly given the duration of works at this location to manage construction noise impacts and construction fatigue on the affected community.

e) Blasting

The proponent is proposing blasting as a method to excavate the tunnel bench and suggests this could reduce exposure to noise and vibration and shorten excavation timeframes. It is recommended that information on the benefits of blasting against other construction methods is provided, including the duration of work if blasting is used instead of other construction methods.

f) Construction groundborne noise and vibration

Although significant groundborne noise and vibration impacts are not predicted (except a minor exceedance of 1 dB at one location), groundborne noise and vibration may be perceptible when construction activities and tunnelling is taking place near sensitive receivers.

The assessment indicates that tunnelling would progress at a rate of approximately 7-metres per day, and perceptible at sensitive receivers for approximately 5-days. The community should be notified about the work, including when it will take place, and when it is likely to be perceptible and for how long.

g) Construction of the permanent power supply

Construction of the permanent power supply will generally be carried out during the daytime where it will be audible to nearby sensitive receivers as work progresses. The EIS states that some work will be necessary outside of the recommended standard hours. Justification is required for out of hours works, and the community should be consulted to identify appropriate times of work, including respite periods.

h) Cumulative construction noise and construction fatigue

Impacts from cumulative projects more broadly, including the New M5 Motorway may result in cumulative construction noise impacts and ongoing work, resulting in construction fatigue. This must be carefully managed through effective community engagement.

Recommendation:

That the conditions of approval require:

- The proponent to provide further information regarding the volume and justification for OOH works.
 - The proponent should develop and implement a community engagement strategy and provide the community with a clear understanding of the likely impact of construction and how impacts will be managed
 - The proponent should provide details specific to affected areas including the construction activities that will take place, where they will take place, when they will take place, and for how long and what feasible and reasonable mitigation measures will be applied. Community views should be considered when developing feasible and reasonable mitigation.
 - Following commencement of construction, the proponent provide the community with a three month rolling schedule of OOH works.
- The proponent to consider further noise mitigation measures for the project. These measures, in addition to those identified in the EIS, be implemented.

3.0 Air Quality

3.1 Construction Impact Assessment

3.1.1 Uncertainty with assessment of odour from landfill excavation

The Air Quality Technical Report has considered the potential impacts of Hydrogen Sulphide (H₂S) from the proposed landfill excavation during construction as a method of assessing potential odour impacts. The method for assessing H₂S impacts is based on dispersion modelling utilising emission rate data for acid sulfate soils collected by the CSIRO (i.e. not site-specific data).

The EPA considers that there is significant uncertainty associated with the quantitative assessment of odour impacts from the proposed landfill excavation. This is due to a number of factors including but not limited to a lack of site specific odour data, uncertainty in the material characterisation and general modelling uncertainty associated with constructing a robust scenario for quantitatively assessing impacts from this activity.

Given the nature of the activity proposed, conducting further detailed quantitative assessment (modelling) is unlikely to remove all uncertainty and definitively characterise potential odour impacts. Noting previous experiences with the excavation of the Alexandria Landfill for other infrastructure projects, there is a risk of odour impacts during construction. This risk should be adequately considered by the proponent and communicated to potentially affected receptors.

Should the project be approved, the proponent will be responsible for managing and minimising any odour impacts and complying with Section 129 of the *Protection of the Environment Operations Act 1997*. This will require implementation of robust proactive and reactive odour mitigation measures including the development of contingency measures that can be implemented in the event that nominated routine mitigation measures do not achieve the desired outcome.

Recommendation:

- The proponent and consent authority carefully consider the risk of potential odour emissions and odour impacts during construction. Potentially affected receptors should be adequately consulted on this issue.

3.1.2 Assessment of Particulate Matter impacts during Construction

The Air Quality Technical Report assesses particulate matter impacts during construction based on guidance published by the UK Institute of Air Quality

Management. The qualitative assessment identifies areas of high risk associated with generalised activities of the construction stage such as demolition and earthworks.

The risk identification process is conducted with no mitigation measures applied. The qualitative assessment has been utilised to develop generalised mitigation measures for implementation, which are tabulated in Chapter 9.

The management and mitigation measures will need to be further developed upon construction contractor engagement. The risks identified with particulate matter impacts should be adequately considered by the proponent and communicated to potentially affected receptors. It is noted that the development and implementation of a stakeholder communications plan prior to work commencing on site is nominated within Chapter 9. Engagement with potentially affected stakeholders must be conducted on an ongoing basis.

Recommendations:

- The proponent should develop management plans detailing robust best practice, proactive and reactive particulate matter mitigation measures to prevent and minimise particulate matter emissions.
- The proponent and consent authority carefully consider the risk of potential dust emissions and dust impacts during construction. Potentially affected receptors should be adequately consulted on this issue.

3.2 Operational Impact Assessment

The Air Quality Technical Report provides number of scenarios for assessing impacts duration operation. The assessment indicates that:

- Predicted total concentrations of all criteria pollutants at receptors were usually dominated by the existing background contribution;
- For some pollutants (such as NO₂) there was a significant contribution from the modelled surface road traffic;
- Under expected traffic conditions, the predicted contribution of tunnel ventilation outlets to pollutant concentrations was minimal for all receptors;
- Predicted changes in concentration were driven by changes in the traffic volumes on the modelled surface road network, not the tunnel ventilation outlets;

- For the expected traffic scenario, exceedances of the EPA's impact assessment criteria are predicted for 1-hour average NO₂, 24-hour average PM₁₀, annual average PM₁₀, 24-hour average PM_{2.5}, and annual average PM_{2.5};
- Exceedances of some criteria were predicted to occur both with and without the project (1-hour NO₂, 24-hour PM_{2.5}, annual average PM_{2.5} and 24-hour PM₁₀).

The assessment predicts general improvements in air quality along several roads (Botany Street, Southern Cross Drive, General Holmes Drive, The Grand Parade to the north of President Avenue, President avenue to the east of the project and Marsh Street) with the project, due to a reduction in traffic on these roads. However, there was deterioration in air quality along President Avenue to the west of the F6 Extension Stage 1 project and Princes Highway to the south of the junction with Rocky Point Road.

3.2.1 Assessment of impacts at elevated receptors has only been considered for PM_{2.5} for the 2036-DSC scenario and there is a lack of clarity on the existence of receptors at a height where notable increases in pollutant concentrations are predicted.

The Air Quality Technical Report assesses the potential impacts at additional heights above ground level (heights of 10, 20, 30 and 45 metres). The assessment of impacts at height are conducted for annual average PM_{2.5} and 24-hour average PM_{2.5}, for the 2036-DSC scenario and does not include existing background. The predictions are presented in concentration changes.

The Air Quality Technical Report advises that:

- *“some of the buildings in the general areas around the F6 Arncliffe and Rockdale ventilation outlets were taller than 30 metres”*
- *“the available information on building height was approximate (and incomplete)”, and*
- *“there were significant gaps in the building height data for the subset of RWR receptors”*

The Air Quality Technical Report predicts, a noticeable change in concentration for a receptor height of 45 metres for both annual average and 24-hour average PM_{2.5}.

Based on the information provided, it appears that there are no receptors at a height where a noticeable increase in concentration for PM_{2.5} is predicted. However, the Technical Report advises that there are data gaps in building height information. Further, assessment for other pollutants and averaging times has not been conducted.

Recommendations:

It is recommended that the proponent:

- Confirm receptor heights located in proximity to ventilation outlets given the significant data gaps on building height described within the Air Quality Technical Report;
- Present predicted impacts for all pollutants and averaging periods for receptors located at height in proximity to ventilation outlets. This includes 1-hour average air toxics and for relevant pollutants accounting for background air quality;
- Present predicted impacts for all pollutants and averaging periods for receptors located at height in proximity to ventilation outlets, for the regulatory worst-case scenario.

3.2.2 Discrepancy between proposed emission limits and emission concentrations derived from information presented in Annexure G for the regulatory worst-case scenario

The Air Quality Technical Report includes a regulatory worst-case scenario where emission estimates are based on proposed limit concentrations for each ventilation outlet. Emission rates are provided in Table G-94 and Table G-95 of Annexure G for the regulatory worst-case scenario.

Based on the discharge parameters and pollutant emission rates presented in Table G-94 and Table G-95, estimated discharge concentrations for the Stage 1 Rockdale and Stage 2 Rockdale ventilation outlets are lower than the proposed limit concentrations.

Recommendation:

- the proponent verify the pollutant emission rates in the regulatory worst-case scenario are consistent with the proposed emission limits.

3.2.3 Assessment of total 1-hour air toxic impacts not clearly presented for the regulatory worst-case scenario

The Air Quality Technical Report provides an assessment of air toxics (expected and regulatory worst case scenarios) by comparing the change in the maximum predicted one hour average concentration of each compound to the corresponding impact assessment criterion in the EPAs *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (the Approved Methods). It is also noted that maximum ventilation outlet contributions at any receptor is compared against the impact assessment criterion in the Approved Methods. The predicted total concentration for individual air toxics is not contained within the Air Quality Technical Report.

It is noted that the Human Health Technical Report (Appendix F) presents maximum predicted 1 hour average concentrations (background plus project) for the 2026 and 2036 scenarios. Based on the maximum 1 hour values presented within Appendix F and the maximum outlet contributions for the regulatory worst case assessment (presented in the Air Quality Technical Report) it can be deduced that total concentration for some individual air toxics (e.g. benzene, 1,3-butadiene, formaldehyde) is likely to be below the impact assessment criterion contained in the Approved Methods (for the regulatory worst case scenario). It is noted that utilising these pieces of information to deduce total concentration is likely to “double count” contributions from some sources for the purposes of informing total concentration from ventilation outlets and surface roads (for the regulatory worst-case scenario).

However, total predicted concentration for some compounds cannot be deduced from the information presented for the regulatory worst-case scenario. For example, the Air Quality Technical Report presents maximum 1 hour ventilation outlet contributions for PAHs and Ethylbenzene, however the Human Health Technical Report does not present 1 hour average concentrations for PAHs and Ethylbenzene. Hence total concentration for all air toxics cannot be deduced for the regulatory worst-case scenario, to enable a comparison against impact assessment criterion contained in the Approved Methods.

Recommendation:

- To provide a transparent review of predicted air toxic concentrations, it is recommended that the proponent provide predicted impact (ventilation outlet and

surface road) at receptors for speciated air toxics for both the expected traffic and regulatory worst-case scenarios.

3.2.4 Analysis of model evaluation does not include site specific monitoring data

Two project-specific stations were established for the F6 Extensions in late 2017. One of the stations (F6:01) was at a background location, and the other at a roadside location. Annexure D of the Air Quality Technical Report advises that given the date of deployment, the time period covered was too short for these to be included directly in the development of background concentrations and for model evaluation. However, the data from the stations has been presented within Annexure D.

During review of other infrastructure projects (i.e. the new M5), the EPA had recommended that future projects should include up to date analysis of project specific monitoring data, with respect to modelling methodologies (i.e. conversions of NO_x to NO₂) and model evaluation.

The EPA notes that Annexure H includes a model evaluation, however the model evaluation has not been conducted for the project specific monitoring locations. The EPA considers that the evaluation with project specific monitoring data should be included despite the noted difference in the time periods covered by the site-specific data.

Annexure E of the Air Quality Technical Report provides the analysis conducted for the derivation of the empirical formula for NO_x-to NO₂ conversion. TA-Air notes that Figure E-7 includes project specific monitoring data collected for the two project specific stations. However, a comparison of the empirical approach with the site-specific data does not appear to be included. The EPA considers that a comparison of project specific data with the NO₂/NO_x function adopted for the project assessment should be included.

Recommendations:

- the assessment include a model evaluation with the site-specific monitoring data;
- project specific monitoring be compared against the NO₂/NO_x function adopted for the project.

3.2.5 Implications of ventilation design on air quality assessment outcomes

The EIS advises that a plume rise assessment would be carried out in accordance with the Civil and Aviation Safety Authority's (CASA) requirements and that approval may be required for the F6 Extension Stage 1 ventilation outlets with regards to the CASA requirements.

Based on this information it is unclear if the design of the ventilation system will need modification to accommodate outcomes of any plume rise assessment. The EPA advise that should variations to the ventilation system design be required, then reassessment of air quality impacts would also need to be conducted.

Recommendation:

- Should the project design be modified as a result of the plume rise assessments, then reassessment of air quality impacts will need to be undertaken.

4 Contamination

4.1 General review comments

There are no sites within the proposed development footprint which are regulated by the EPA under the *Contaminated Land Management Act 1997* (the CLM Act). There are two sites relatively close to the proposed development, which are on the public list of notified sites to the EPA under Section 60 of the CLM Act:

- Caltex service station, 29 President Avenue Kogarah
- 7 Eleven service station, 736 Princes Highway Kogarah

The Contamination Technical Report (EIS Appendix J) identifies the above sites as not being above the tunnel alignment, but they are adjacent to the 'project on surface'. Although these sites have been determined by the EPA as not warranting regulation under the CLM Act, there may be potential for disturbance and compromise of underground petroleum storage systems (UPSS) from the development, which could result in petroleum hydrocarbon contaminants being released into the environment.

The Contamination Technical Report (Appendix J of the EIS) has focused on a number of specific areas over the site and identified several other commercial and industrial properties within the vicinity of the development footprint with potentially

contaminating activities. These include but are not limited to: the Suez Waste Transfer Station at 5 Lindsay Street Rockdale, 23 Field Regiment of the Royal Australian Artillery at 40 Beach Street Rockdale, and various small industrial and commercial businesses. Historical contaminating activities have been identified above the alignment including but not limited to former dry cleaners, chemical manufacturers, and plastics manufacturers. The depth to groundwater is anticipated to be quite shallow in many locations (refer to Section 4.1.12 of the contamination report). The contamination technical report has also identified an area of historical landfilling in Rockdale Bicentennial Park and lands east of Muddy Creek. Therefore, any excavation works may result in the generation of contaminated soil, groundwater or hazardous gas from these current or former activities.

There has not been sufficient sampling and assessment over identified areas of concern to confirm risks arising from contamination. As such, further detailed assessment is required.

The presence of contamination has been confirmed at the Rockdale Bicentennial Park and Civic Avenue Reserve (in vicinity of proposed Ancillary Facilities), with contamination confirmed in groundwater (nutrients, and volatile total recoverable hydrocarbon contamination reported in Table 4-8 of report), soil (contaminated fill by a range of contaminants including putrescible fill, see Table 4-32) and landfill gas (carbon dioxide and hydrogen sulphide gas results exceeding workplace criteria). It is not clear how deep this material was buried so it is difficult for the EPA to assess if the concentrations have been determined appropriately.

The proponent needs to provide additional information assessing the risks arising from the landfill at Bicentennial Park. From the information presented in the EIS it was not clear where the landfills are located or if there is one or more, but landfills may lie across C2 and C3 areas (the Rockdale construction Ancillary facility and President Avenue Ancillary facilities). It is not clear how potential landfill leachate or gases will be appropriately managed. The EPA agrees with the Contamination Technical Report findings that there will be a need to undertake further investigations in several areas across the development area following detailed design.

4.2 The methodology used to determine the risks associated with the areas of contamination and the contaminants

4.2.1 Contamination Technical Report (Appendix J of the EIS report)

The methodology for the assessment is typical of a large-scale contamination assessment report. The report prepared a preliminary conceptual site model in which several medium to high risk areas of concern were identified. The EPA considers that all these areas will need further detailed assessment to ensure sufficient sampling density has been used to adequately characterise and manage the contamination.

4.2.2 Groundwater and Surface Water Technical Reports (Appendix K and L of the EIS)

The methodology undertaken for the groundwater and surface water technical reports is acceptable to provide a general large-scale assessment of risks arising from potential contamination. However, there is a need for ongoing monitoring of surface waters and groundwaters before, during and after the construction to assess for a range of contaminants of concern.

4.3 Adequacy of any mitigation measures proposed

High level mitigation measures have been presented under the EIS to address potential contamination. These are presented in the technical reports for contamination, groundwater and surface waters. The EPA considers that further assessments need to be undertaken to better characterise the extent and risk surrounding potential contamination, and plans developed to mitigate those risks.

The contamination assessment information presented in the EIS is not detailed enough to clearly identify the depths and general extent of all likely contamination relative to the proposed development, so any mitigation measures proposed so far need to be refined on the basis of further contamination investigations. Such detailed investigations should be conducted to fully characterise areas of the site with medium to high risk which will be subject to the redevelopment. The investigation should include further and detailed assessment of soil, groundwater, soil vapour, hazardous ground gas, and acid sulfate soils where applicable, for contaminants of concern. Regarding the areas in vicinity of the landfills, it is recommended environmental monitoring should be undertaken for contaminants of concern associated with landfills. This should also include assessment of per and polyfluoroalkyl compounds, and hazardous ground gas parameters.

If additional contamination is found during the detailed site assessment, a NSW EPA accredited site auditor should be engaged to review the adequacy of any future contamination assessments and management plans and also evaluate site suitability for proposed use.

The proponent should also clarify if the landfill will be intersected and provide plans for reinstatement of any capping or protective barriers to ensure containment of the landfills.

4.4 Further investigation into risks associated with the construction and operation of the project are required.

Further investigation is warranted to quantify risks associated with exposure to contamination (fill material, landfill leachate, landfill gas, and other potential contamination) during construction and operation of the project.

If the project is approved, the consent should require the development of Construction Environment Management Plans and Remedial Action Plans to manage short term risks as well as Operational Environment Management Plans to manage long term risks associated with exposures to potential contamination which cannot be fully remediated. The requirements should include long term operational EMPs for management of groundwater (and subsequent contamination), and possibly landfill leachate and hazardous ground gas.

4.5 The short term, long term and cumulative impacts of the works on the community from ongoing WestConnex works.

There is the potential for contamination to be released into the environment as a consequence of the development, if the in-situ potential contamination is not controlled appropriately. Several areas of environmental concern have been identified in proximity to the Project. There are both short term and long-term consequences associated with potential exposures of contaminants to the community and environment.

- Exposures of site workers to hazardous concentrations of landfill gases and contaminated leachate.
- Exposures of site workers and surrounding community to contaminated seepage waters from the tunnelling works.
- Exposure to contaminants resulting in potential damage to existing subsurface infrastructure, degradation of groundwater resources and land quality, reduction in ecological communities and diversity in the surrounding surface water receiving environments.

Recommendations

1. The proponent should ensure the proposed development does not

- result in a change of risk in relation to any pre-existing contamination on the site so as to result in significant contamination.
 - result in release of pollution on the site.
2. The proponent conduct further **detailed site assessments** across the footprint of the site, focusing on areas of environmental concern which have been identified with medium to high risk, and areas which have not been able to be accessed previously for site assessment. The detailed site assessments must include further assessment and sampling of soil, groundwater, soil vapour and landfill gas where applicable. Any groundwater assessments should target groundwater from the alluvial and sandstone aquifers, and paleochannels. The assessment findings should be used to refine the Conceptual Site Model, provide conclusions on suitability of the site for intended use and recommendations for remediation and management of any encountered contamination.
 3. The proponent must develop Remedial Action Plans to address any contamination on the site which may pose unacceptable risks to human health and environment.
 4. Further assessment and management of potential contamination is required in areas where the proposal will intersect former landfills, including the buried waste at Rockdale (to determine how deep this material is buried and whether the concentrations of contaminants have been determined accurately) and Bicentennial Park. The EIS contamination report included a summary of a previous landfill gas assessment, however this is insufficient as it is based on single reading from three wells and it is not known where the wells were situated or if sampling was representative. The EPA makes the following specific recommendations for further assessment and planning around **landfills**:
 - a) Monitor surface waters and groundwaters during construction and operational phases of the development for contaminants of concern associated with landfills (including but not limited to per and polyfluoroalkyl compounds) and hazardous ground gases.
 - b) In accordance with recent amendments to the *Protection of the Environment Operations (Waste) Regulation 2014 (Waste Regulation)*, EPA approval is

required prior to the exhumation of waste from any current or former landfill (see Waste section below).

- c) The proponent must conduct **further assessments** in all potential landfill areas, to assess and monitor risks to construction workers and future site users from landfill leachate and landfill gas and assess the extent of those risks.
- d) If a landfill mass will be excavated into under the development, the proponent must undertake measures to reinstate any capping or protective material.
- e) The proponent must prepare and follow a **landfill gas management program** for the management of landfill gas and leachate during any construction and operational phases of the development on the site.
- f) The proponent must adopt **reporting triggers** including reporting to the relevant authority in the event that unacceptable levels are reached on the site. **Remedial Action Plans** where applicable must be developed for any landfill sites requiring works to ensure compliance with *Environmental Guidelines: Solid Waste Landfills* (NSW EPA, 2016) and requirements of the *Protection of the Environment Operations Act (1997)*, and to ensure mitigation strategies during the construction and post construction phases. There needs to be contingency actions listed in the event that landfill gas is reported above safe thresholds, to ensure protection of remediation workers.
- g) Post-construction, the proponent should issue a **Validation and Verification Report** with endorsement from a NSW accredited contaminated site auditor who has significant experience with landfill gas and landfill leachate management, outlining the gas protection measures adopted at the site and vicinity of the site, and an independent report validating the performance of these systems and verifying their adequacy.
- h) The proponent should prepare **Long Term Environment Management Plans (LTEMPs)** for the landfills where ongoing management will be required, or revise any existing LTEMPs once remedial actions have been completed, and following amendments to any monitoring strategy. The plans must prescribe procedures for the maintenance of any landfill gas and

leachate mitigation systems, procedures for the periodic monitoring of landfill gas on the site, and contingency plans for unexpected finds and for unacceptable risks that are detected or encountered.

5. The proponent should prepare and follow a **Construction Environment Management Plan** and **Operational Environment Management Plan** to manage potentially contaminated groundwater arising from dewatering and excavated material which may be generated during construction and operational phases of the development. The CEMP and OEMP should include a comprehensive and representative program for monitoring and reporting of groundwater and surface waters across the development to confirm if there is any migration of contamination and subsequent degradation of water quality as a consequence of the development, and provide protocols in the event that rising contamination is found. The groundwater monitoring program should assess contaminants of concern as informed by further detailed contamination site assessments, targeting in both the alluvial and sandstone aquifers, and any paleochannels as relevant.
6. The proponent should prepare a **Hazardous Materials Protocol** to include procedures and mitigating measures to be followed in the event that hazardous building products including asbestos, and hazardous chemicals, are found.
7. The proponent should prepare a detailed **Acid Sulfate Soil Management Plan** for the management of excavated material in accordance with the NSW ASSMAC (1998) Acid Sulfate Soil Manual. The proponent must pay proper regard to the EPA Waste Classification Guidelines (2014) for all acid sulfate soils that need to be transported and treated offsite. There is potential for acid sulfate soils to be present in the development which could present a risk to the site by acidification and mobilisation of any contamination present.
8. The proponent should prepare an **Unexpected Finds Protocol**. The protocol should include procedures and mitigating measures to be followed in the event unexpected contamination is encountered during the development (which potentially could include asbestos containing materials), prior to commencing any work on the development site. The proponent should ensure that the procedure includes details of who will be responsible for implementing the unexpected finds procedure and the roles and responsibilities of all parties involved.

9. The proponent must assess and manage contamination at the site with proper regard to guidelines made or endorsed by the NSW EPA under the *Contaminated Land Management Act 1997* including but not limited to:
- Sampling Design Guidelines (NSW EPA, 1995)
www.epa.nsw.gov.au/resources/clm/95059samppgdline.pdf
 - Guidelines for the NSW Site Auditor Scheme (3rd edition) (NSW EPA, 2017)
<https://www.epa.nsw.gov.au/publications/contaminatedland/17p0269-guidelines-for-the-nsw-site-auditor-scheme-third-edition>
 - Guidelines for Consultants Reporting on Contaminated Sites (NSW OEH 2011)
www.epa.nsw.gov.au/resources/clm/20110650consultantsglines.pdf
 - Guidelines for the Assessment and Management of Groundwater Contamination (NSW DEC 2007)
 - The National Environment Protection (Assessment of Contamination) Measure 1999 (as amended 2013, NEPC 2013)
 - Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG 2018)
 - Australian and New Zealand Guidelines for Fresh and Marine Water Quality - Water Quality for primary industries (ANZECC 2000)
10. The proponent must ensure that any contamination identified as meeting the trigger in the EPA '*Guidelines for the Duty to Report Contamination*') is notified (or re-notified) in accordance with requirements of section 60 of the Contaminated Land Management Act'.
11. The processes outlined in *State Environmental Planning Policy 55 - Remediation of Land (SEPP55)* be followed, to assess the suitability of the land and any remediation required in relation to the proposed use.

5 Waste

The types and quantities of waste have been estimated by the proponent and include waste types such as tunnel spoil, asbestos, VENM, ASS, some hazardous waste etc. All waste generated from the entire Project is to be recorded, classified and disposed to a facility that can lawfully accept that waste.

The EIS identified that approximately 1M tonnes of tunnel spoil will be generated from the Project and some taken offsite for reuse or disposal. Any tunnel spoil generated from the Project will require a resource recovery order and/or exemption in order to be reused and will need to be applied for and granted prior to its generation – note the tunnel spoil will not necessarily be classified as VENM. The EPA recommends that the EIS provides more detailed information on how spoil from the project will be holistically managed to ensure adequate oversight of spoil haulage and disposal by any future construction contractors should the project be approved.

The EPA notes that the assessment contains information regarding the generation and disposal of hazardous waste, however it appears there is no reference to those wastes being immobilised prior to disposal. The proponent should contact the EPA (HIEH Hazardous Waste Section) for immobilisation approvals and/or information about transport and disposal of hazardous waste to ensure it is conducted in a manner that does not impact on human health and the environment. Table 21.3.1 of the Waste Management report mentions that hazardous waste would be sent for the “recovery of energy where possible”. The EPA is unaware of any energy from waste facilities that accept hazardous waste for energy recovery and this is not permitted by the EPA’s energy from waste policy.

The EPA considers that there may be impacts associated with previously landfilled waste at Rockdale Bicentennial Park/Scarborough Park area. Impacts that may occur from exhuming previously landfilled waste include air quality impacts, odour, exposure of leachate and gas, and uncovering of unclassified/unknown wastes. As outlined above, recent changes to the *Protection of the Environment Operations (Waste) Regulation 2014* require EPA approval prior to the exhumation of waste from any current or former landfill. For the EPA to grant this approval, the EIS should detail how construction activities will be managed to prevent or minimise those impacts. Details regarding the nature and extent of the capped old landfill/s, proposed impacts on the capping and how the proponent will either restore the cap after works or manage environmental impacts from those works is also required.