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Planning and Assessment Division
Department of Planning, Industry and Environment
Returned via Major Projects Portal

Attention: Daniel Gorgioski

M1 Pacific Motorway extension to Raymond Terrace (SSI 7319)
Advice on the Environmental Impact Statement (EIS)

Dear Daniel Gorgioski

Thank you for the request for advice from Public Authority Consultation (PAE-24749572), requesting the review by the NSW Environment Protection Authority (EPA) of the Environmental Impact Statement (EIS) for the proposed M1 Pacific Motorway extension to Raymond Terrace (Application SSI-7319).

The EPA understands that the project involves construction of a new 15 Kilometre motorway connecting the existing M1 Pacific Motorway at Black Hill and the Pacific Highway at Raymond Terrace comprising of four new interchanges, 2.6km viaduct and bridge structures over local waterways as well as other associated upgrades and infrastructure and connections to the local road network.

The EPA has reviewed the EIS provided by the Department of Planning, Industry and Environment (DPIE) and offers advice with regards to noise and vibration, water quality and contaminated land in Attachment A to this letter.

Should you require further clarification please contact Annemarie Hopcroft on 4908 6861 or email annemarie.hopcroft@epa.nsw.gov.au

Yours sincerely

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ATTACHMENT A: EPA COMMENT ON EIS FOR
M1 PACIFIC MOTORWAY EXTENSION TO RAYMOND TERRACE (SSI 7319)

1. Noise and Vibration

The EPA has reviewed the M1 Pacific Motorway extension to Raymond Terrace Noise and Vibration Working Paper, dated July 2021, Transport for NSW, no reference (NIA).

There are a number of matters which require further information, justification or amendment in the NIA. The key issues are as follows:

- Noise monitoring – A number of matters of concern were identified including the location, method and amount of valid data collected.
- Extended construction working hours – An extension to the standard working hours has been sought, however the NIA does not appear to present sufficient justification. The EPA also considers that existing provisions for work outside of the standard hours already covers some of the extended hours applied for.
- Out of hours construction work – Particularly during the night period, the NIA does not present a clear application and justification for the location, duration and activities for out of hours work.
- Construction noise, vibration and blasting management and mitigation – The NIA does not provide sufficient information on the mitigation and management of the predicted impacts from construction work. It does not appear to satisfy the SEARs for this aspect.
- Maximum noise levels from operational road noise – The NIA does not provide sufficient information on mitigation for sleep disturbance impacts from road traffic noise.

As a result of these matters, the EPA is unable to assess the potential impacts of the project, nor gain an understanding of how impacts could be reduced and what residual impacts would remain. Our detailed comments are below.

Noise monitoring

A review of the noise monitoring graphs in NIA Appendix B.2 indicates that further justification for the adequacy of noise monitoring presented or additional information is required.
A significant amount of data appears to have been excluded due to either inclement weather or extraneous noise. The EPA is concerned that the extent of data excluded means that it may not be representative of long term background noise levels, and therefore its suitability to be used to establish reliable noise management levels could be called into question.
Locations L01 to L014 (inclusive) appear to have no more than 5 and in some cases less than 3 valid periods out of the total monitoring duration. Locations L15 to L20 appear to be less affected, however there it is still not clear if sufficient valid data has been presented.
Fact Sheets A and B in the Noise Policy for Industry (NPfI) set out the EPA's requirements for establishing background noise levels. Due to the amount of data excluded, it is currently not clear if these requirements have been satisfied nor if sufficient valid data has been presented in order to establish representative background noise levels.
Noise monitoring was also conducted in 2016 for the purposes of measuring road traffic noise. Due to the amount of data excluded at Locations L13 to L20, further justification is needed that the remaining data, after invalid samples were excluded, provides sufficient amount of data to enable a representative calculation of the traffic noise descriptors.

Recommendation

The proponent reviews the noise monitoring data in the NIA in the context of the monitoring requirements set out in the NPfI and for each location and either:

- Provide a justification and demonstrate that the requirements of the NPfI have been fulfilled; or
- Provide additional data that fulfills the monitoring requirements in the NPfI.

The EPA also recommends that the proponent either:

- Provides justification and demonstrate that the data presented for road traffic noise descriptors is sufficient to be representative; or
- Provides additional valid data.

2016 traffic noise monitoring

The NIA has referenced noise monitoring and traffic count data from 2016 to validate the traffic noise model. The NIA explains that this is because during 2020 the COVID-19 Public Health Orders impacted traffic flows so and any data collected during this period may not be representative.
Whilst the EPA understands the effect the Orders may have had on traffic flows, Chapter 4.4 of the NIA represents the monitoring from 2016 as "existing road traffic noise levels." However, the noise levels presented are 5 years old and therefore may not be representative of existing levels during typical traffic flows.

Recommendation
The EPA recommends that the NIA clarifies the purpose of the 2016 traffic noise monitoring, such as to validate the noise model and if this can be considered representative of contemporary traffic noise levels during normal conditions (i.e. in the absence of the effect of Public Health Orders that impact on traffic flows).

Attended noise monitoring

It is not clear how attended noise monitoring has been considered in the NIA. Table 4-3 provides a summary of the nominated Rating Background Levels (RBLs) for each Noise Catchment Area (NCA) and note 8 of Table 4-3 states the following:
Background noise levels for locations L01A, L04A, L05A, L10A and L12 based on correlation with nominated long term monitoring locations, as discussed in Section 3.4.2.
Chapter 3.4.2 states the following:
Results of the short term attended noise measurements were compared to the results of a nearby representative long term monitoring location to determine a correlation between the two measurement locations. Results of the correlation are used to establish equivalent background noise levels during the day, evening and night periods at the short term attended measurement locations.

The attended monitoring does not appear to have been adequately reported in the NIA. There is no information on the date, time, location, duration, descriptors etc. It is also not clear what is meant in the above statements by "correlation" and how it is relevant and appropriate to "correlate" attended measurements with unattended locations which in some cases appear to be in significantly different noise environments to the attended measurements. For example, L04A and L05A have been compared with the unattended location L04. Locations L04A and L05A are located in suburban settings well removed from the New England Highway, whereas L04 is located adjacent to the Highway and therefore appears to be in a completely different noise environment.
It is also not clear why some areas were selected to use short term monitoring and others long term monitoring. For example NCAs 4 and 5 are predominately sensitive land use (residential areas), which had attended monitoring selected for these areas; whereas NCA9 which is predominately commercial and industrial use was selected to have an unattended monitor (L08). The EPA considers that it would be more appropriate to use long term monitoring at more sensitive areas as this is where impacts are more likely to occur than less sensitive areas.

Recommendation

The EPA recommends that the use of attended measurements in the NIA is clarified, including the methods used to establish RBLs for NCAs where unattended monitoring was not conducted, justification and demonstration that they are representative, or if this is not possible, additional information (such as additional monitoring data) should be provided. All attended monitoring relied upon in the NIA should be reported in full, using the reporting requirements of the NPfI.
The EPA also recommends that the proponent justifies the selective use of short term monitoring in some NCAs and not others and provide commentary on if and how the short term monitoring is appropriate, and representative of repeatable background noise levels in these areas. The proponent can also provide additional valid monitoring data to support its justification.

Morning and evening shoulder periods

NIA Table 3-4 has nominated morning and evening shoulder periods for background noise levels. Sufficient justification for this approach has not been provided in the NIA.

Recommendation

The EPA does not currently support this approach and would seek to recommend standard definitions of day, evening and night periods as defined by the NPfI.

NIA Table 3-4 note 2 states that the "*RBL periods based on the extended construction work hours presented in Section 3.5.1."* The proposed extended hours are:

- Monday to Friday 6am to 7pm,
- Saturdays, Sundays and Public Holidays 7am to 5pm.

It is not clear how the calculation of the RBL has been altered to fit in with the proposed extended hours. For example, NIA Table 4-3 Note 3 defines the morning shoulder period as 6am to 7am, and the evening shoulder period is 6pm to 7pm. However, note 2 implies that the RBL period has been adjusted to fit the extended working hours so that the day period for RBL calculation would be 6am to 7pm, which includes both "shoulder" periods.
If the RBL period for day has been extended from 6am to 7pm, then it makes the shoulder periods redundant. If the RBL period has not been altered, then the table notes may not represent what has been done.
Fact Sheet A provides guidance on using different time periods, including the data requirements to support a proposal to alter the default NPfI time periods.
It also appears that morning and evening shoulder periods have been applied to all NCAs, without justification that this is appropriate.

Recommendation

The proponent should clarify the time periods and methods used to calculate the RBL and provide a detailed justification for each NCA that it is appropriate to alter the time periods using information that fulfills the requirements of the NPfI.

Construction working hours

The NIA proposes to alter the proposed construction workings hours from the recommended standard hours in the Interim Construction Noise Guideline (ICNG).
Chapter 3.5.3 states the justification for this proposal is as follows:
As the majority of the construction work would be away from residences and sensitive receivers (e.g. between the proposed interchange at Tarro and the Tomago interchange) as shown in Figure 3-2, construction noise impacts to sensitive receivers are expected to be minimal
Chapter 3.5.3 then goes on to state:
To justify the extended working hours, the following have been considered:

- *• To ensure the health and safety or the public and construction crews during construction*

- *• To minimise disruption to existing traffic flows during the day.*

In addition, the benefits of extended working hours would include the following:

- *• Reducing the volume of traffic on roads during peak hours due to construction staff and construction*
- *vehicles travelling to and from the construction site outside of peak traffic periods*
- *• Time benefits, including potentially bringing forward the opening date for the project by increasing the allowable construction hours*
- *• Less disruption to sensitive receivers, the community, local business, motorists, pedestrians and cyclists as work would be completed earlier than currently planned*
- *• Enable greater flexibility in project scheduling. This would enable the contractor to make allowances for adverse weather and potential flooding events.*

The justification put forward in the NIA is not sufficient to recommend that the EPA considers altering the ICNG's recommended standard hours. The reasons for this are as follows:
The NIA's claim that noise impacts are expected to minimal is not supported by NIA Chapter 5 which predicts noise levels above the NMLs in at least 8 of the assessed NCAs during the day, morning and evening shoulder periods. It is important to note that the impacts were predicted to be higher, and affect up to 10 NCAs, during the morning and shoulder periods, the periods which have been applied to be extended to.
A reduced overall duration of construction does not necessarily mean impacts and/or disruption will be lower. For example under an extended construction hours scenario, there is no day of the week for respite as weekend and public holiday work is proposed. Therefore the number of days exposed is potentially increased compared to a scenario under the recommended standard working hours. It also ignores the value of respite to the community whereby a longer overall duration may be tolerated if there is respite given during the works. The extended hours scenario does not appear to provision for any regular respite days.
The community may be willing to accept different working hours, which could be established through an appropriate level of community engagement.
The proposal for extended work hours does not account for the fact that whilst the majority of works are away from receivers, the majority of potentially affected receivers are near the works. The NIA has made no distinction between areas close to or far away from the proposed works, instead has proposed one rule for all circumstances which does not take into account the differing circumstances on the alignment.
Given the diverse range of exposure along the alignment, applying hours in a project wide fashion could lead to undesirable impacts along the project. For example, lack of respite and night work occurring in more sensitive areas.
The EPA already has mechanisms in place to address extended work hours where impacts are expected to be low. A typical infrastructure approval includes a provision for work outside of standard hours where the impacts are either negligible, or very low (for example below RBL + 5 dB), or are justified necessary works as defined by the ICNG and in the licence. This approach seeks to provide a high level of protection where it is needed and allowing flexibility where appropriately justified.
Table 3-25 presents activities and their proposed working hours. However this table is confusing because the shading which indicates the proposed working hours, is not consistent with the description in column 7 of the table. For example, the clearing, grubbing and demolition activity is only indicated to occur during the day, however the description states that work may take place outside of the day hours.
It also uses the day, evening and night periods, however since the NIA has provided several different definitions of each period in addition to those defined in the ICNG, its not clear exactly what is meant by the time periods.

Recommendation

The EPA does not support this proposal to extend construction working hours. The justification provided in the NIA is not sufficient, is not supported by the predicted impacts in the NIA and is not consistent with the ICNG. Furthermore a mechanism for flexibility in working hours already exists in the EPA's typical infrastructure licence conditions.
The EPA recommends that the EPA's typical approach to large infrastructure projects for working hours and work outside of standard hours is applied to this project.
The EPA also recommends that Table 3-25 is revised to so that is clear and consistent with which activities are proposed to be undertaken during which time periods.

Construction noise impact assessment

The NIA presents construction impacts as "peak" and "typical." In some cases, the difference between the peak and typical noise levels is 3 dB or less and this makes it unclear of how the community should interpret the predicted impact.
For example, the predicted noise level in NIA Appendix C for typical clearing, grubbing and demolition works in NCA04A is 87 dBA and its peak is 89 dBA. Table 3-25 states that this work will continue for 21 months. The NIA has not put forward any mitigation measures to control these significantly high noise levels, only a process by which they may be managed post-approval. Its not clear if when this level of noise does occur, what measures could be applied to this activity and location and how effective they may be.

Recommendation

The EPA recommends that the proponent explains how they intended the community to interpret these predictions, the mitigation proposed for levels that are predicted to be above the noise management levels and what residual impact may be expected after mitigation.

Construction noise and vibration mitigation

The construction noise and vibration assessment is not considered adequate due to the lack of information relating to the management of construction noise and vibration. The NIA predicts hundreds of receivers to experience noise levels above the noise management levels and sleep disturbance criteria. It has only provided a basic outline of some of the processes that are used to manage construction noise, however has provided no indication of what type of measures, their likelihood of being adopted, the potential effectiveness, outcome or residual impacts as a result of their proposed management strategy. As a result, the NIA does not currently appear to satisfy the SEARs.
SEARs Items 3.2 (d), (e) and (f) state the following:
(d) demonstrate how potential impacts have been avoided (through design, or construction or operation methodologies);
(e) detail how likely impacts that have not been avoided through design will be minimised, and the predicted effectiveness of these measures (against performance criteria where relevant); and
(f) detail how any residual impacts will be managed or offset, and the approach and the predicted effectiveness of these measures.

The NIA does not provide this information required by the SEARs and the EPA considers that committing to producing a Construction Noise and Vibration Management Plan after project approval does not provide sufficient information to satisfy the SEARs.
Through not providing this information, the NIA also lacks a suitable level of transparency. As a result, it is not clear how the community can make an informed comment on the EIS with regard to how construction noise will be managed, the level of impact they can expect, nor when (for example night works) and where they can expect to be impacted.
The NIA also provided no indication of the level of community engagement conducted to date and proposed to inform and feedback the community's views on construction noise management. The EPA considers community engagement is a critical component of noise management and where it

has been done well, it has benefitted proponents and the community on some of the state's largest infrastructure projects. The EPA considers a lack of or inappropriate community engagement increases the likelihood of undesirable environmental outcomes.

Recommendation

The EPA recommends that the NIA is amended to satisfy the SEARs and to increase the level of transparency for construction noise mitigation and management.
Additional information can be supplied at a concept level where detailed information is not available. For example, the concept level includes where and for which activities mitigation measures can be considered, the type of mitigation to be considered, the likelihood of them being adopted or the factors affecting their adoption, their potential effectiveness and the residual impacts following their implementation.
Community engagement for construction noise mitigation management should be included as part of the noise mitigation and management measures. The current information on community engagement in the NIA is not sufficient. The NIA should include what has been done to date and detail what engagement is proposed for the community to provide views, feedback and indicate preferences (where appropriate) on how noise will be managed.

Maximum noise levels for operational road noise

Chapter 6.4 provides an assessment of maximum noise level events for operational road traffic. At the end of the chapter, it states:
With the implementation of noise mitigation measures, overall traffic noise levels would reduce, including LAmax noise levels.
However, no further information is provided on which measures, in which location or an indication of how much levels or the number of events may be reduced.

The EPA recommends that the location, type and effect of mitigation measures for operational road traffic noise is clarified for maximum noise levels.

2. Water Quality

Transport for New South Wales (TfNSW) proposes to construct the M1 Pacific Motorway extension to Raymond Terrace (the project), a 15-kilometre motorway in the lower portion of the Hunter River catchment.

The project would cross low-lying floodplain, intertidal areas, and coastal wetlands, and include a 2.6-kilometre viaduct over the Hunter River. Waterlogging, shallow groundwater, sodic and acid sulfate soils, and contaminated lands occur in areas of the site. An Acid Sulfate Soils Management Plan would be implemented and contaminated areas within the proposal site would be remediated during construction in accordance with a Remediation Action Plan.

The project would drain to several different waterways, ranging from small ephemeral streams within wetland catchments to the tidal estuarine main channel of the Hunter River. Currently, waterways in the project area generally have poor water quality and are unlikely to meet the NSW Water Quality Objectives.
Regional Operations North has requested advice from TAW regarding whether the *Environmental Impact Statement* (EIS) adequately addresses the potential water pollution risks.

Key Issues

Additional or alternative measures including enhanced erosion and sediment controls should be considered to avoid discharging intercepted groundwater to surface water.
The EIS indicates that dewatering would be required for excavations below the water table and proposes sediment basin discharges in areas where basins would intercept groundwater.

Groundwater sampling indicates potential for elevated pollutant concentrations, including electrical conductivity and metals. The potential impacts of discharges of groundwater related pollutants have not been assessed.

Where there is a risk of intercepting groundwater that may impact on waterways, alternatives to unlined sediment basins should be considered, such as lined sediment basins, elongated swales, and infiltration measures.

Practical alternatives to dewatering excavations to surface waters, such as re-infiltration and pumping between storages to optimise reuse, should also be considered.

Further details are required of the proposed reuse or other measures to avoid (uncontaminated) sediment basin discharges

The EIS indicates that stormwater with elevated electrical conductivity would be reused but does not make other commitments to reuse or measures to avoid discharges and minimise pollution.
Further details are required of the dredging of the Hunter River
The EIS provides limited information about the proposed dredging and associated mitigation measures.

Intercepted groundwater

Relevant SEARs:

- *demonstrate that all practical measures to avoid or minimise water pollution and protect human health and the environment from harm are investigated and implemented.*

Consistent with this requirement and to promote industry best practice, there is a need for the applicant to consider enhanced erosion and sediment control measures to avoid discharging intercepted groundwater to surface water, noting that the groundwater sampling indicates potential for elevated pollutant concentrations. For example:

- filtered aluminium ranged up to 40mg/L
    - 727 times the freshwater guideline value for pH >6.5 (55µg/L)
    - 50,000 times the freshwater interim working level for pH <6.5 (0.8µg/L)
    - 80,000 times the marine interim working level (0.5µg/L)
- filtered cadmium ranged up to 9.5µg/L, 48 times the freshwater guideline value (0.2µg/L) and slightly higher than the marine guideline value (5.5µg/L)
- filtered chromium ranged up to 36µg/L, 36 times the freshwater guideline value (CrVI - 1µg/L) and 8 times the marine guideline value (CrVI - 4.4µg/L)
- filtered iron ranged up to 160mg/L, 533 times the freshwater interim working level (300µg/L)
- filtered manganese ranged up to 9,300µg/L, 5 times the freshwater guideline value (1,900µg/L) and 116 times the marine interim working level (80µg/L)
- filtered nickel ranged up to 180µg/L, 16 times the freshwater guideline value (11µg/L) and 30 times the marine guideline value (99% species protection level - 7µg/L)
- filtered zinc ranged up to 830µg/L, 104 times the freshwater guideline value (8µg/L) and 55 times the marine guideline value (15µg/L)
- ammonia ranged up to 7.4mg/L
    - ~8 times the freshwater and marine toxicant guideline values (900µg/L; 910µg/L)
    - 370 times the lowland rivers stressor guideline value (20µg/L)
    - 493 times the estuary stressor guideline value (15µg/L).

The maximum reported concentrations of several of these pollutants are potentially in the acutely toxic range.

The *Environmental Impact Statement* (EIS) proposes sediment basin discharges but many of the proposed basins would intercept groundwater and the potential impacts of discharges of

groundwater related pollutants have not been appropriately assessed. The EIS indicates that groundwater ingress could also limit the capacity of the proposed basins, potentially resulting in more frequent overflows.

The applicant is proposing installing liners for sediment basins within the Tomago Sandbeds Catchment Area to prevent saline surface water from impacting on groundwater. Liners are not proposed for other basins that are expected to intercept groundwater.

Unlined sediment basins that intercept groundwater may not be appropriate to manage the potential water pollution risks at the site. Instead a range of enhanced erosion and sediment control measures should be considered to avoid and minimise potential impacts.

For example, where there is a risk of intercepting groundwater that may impact on waterways, alternatives to unlined sediment basins could be used, such as lined sediment basins, elongated swales, and infiltration measures. In areas of low risk, standard erosion and sediment controls could be appropriate (see below under 'Uncontaminated Stormwater').

The EIS also indicates that dewatering would be required for excavations below the water table. Appendix K discusses water pollution risks associated with this dewatering, but the impacts of these discharges are not assessed consistent with ANZG (2018) and EPA licensing requirements. Noting the potential for these discharges to contain elevated pollutant concentrations, it is appropriate to consider practical alternatives, such as re-infiltration of the intercepted groundwater and pumping collected water between storages to optimise reuse.

It is recommended that the applicant considers:

- *enhanced erosion and sediment controls for the project that include alternatives to standard practices (e.g. lined sediment basins, elongated swales, and infiltration measures) in place of unlined sediment basins intercepting groundwater*
- *alternatives to dewatering excavations via surface water discharges, such as reinfiltration and pumping water between storages to optimise reuse.*

If discharges are required, then a water pollution impact assessment consistent with Section 45 of the *Protection of Environment Operations Act 1997* and the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG, 2018) would be required for all pollutants at non-trivial levels. This assessment would include:

- details of the practical measures that would be implemented to avoid surface water discharges (e.g. reuse; infiltration measures) and minimise pollution (e.g. treatment)
- a characterisation of the proposed discharge in terms of the concentrations and loads of all pollutants present at non-trivial levels—this should be based on the groundwater sampling results and expected treatment performance
- an assessment the impact on the environmental values of the receiving waterways with reference to the relevant guideline values
- where relevant, details of mitigation measures to address any identified impacts.

Uncontaminated stormwater

Avoiding discharges and minimising pollution

Relevant SEARs:

- *demonstrate that all practical measures to avoid or minimise water pollution and protect human health and the environment from harm are investigated and implemented.*

Where sediment basins are proposed to manage uncontaminated stormwater, discharges should be avoided where practical (e.g. stormwater reuse), only occurring where alternative options have

been exhausted. The EIS indicates that stormwater with electrical conductivity greater than 7,500µS/cm would be reused but does not make other commitments to reuse or measures to avoid discharges and minimise pollution.

It is recommended that, in relation to any proposed sediment basins (i.e. to manage uncontaminated stormwater), the applicant provides details of the practical measures investigated and proposed to avoid or minimise water pollution.

Water pollution impact assessment

Relevant SEARs:

- *identify and estimate the quality and quantity of all pollutants that may be introduced into the water cycle by source and discharge point and describe the nature and degree of impact that any discharge(s) may have on the receiving environment, including consideration of all pollutants that pose a risk of non-trivial harm to human health and the environment.*

Further information is required to address this requirement.

Section 6.2.6 of Appendix K presents 'proposed calculated turbidity' levels for sediment basin discharges to each of seven receiving waterways. The method is not described, however, 'proposed calculated turbidity' levels appear to be calculated using total suspended solids (TSS) to turbidity correlations presented at Appendix C of Appendix K and assuming a TSS of 50mg/L. The 'proposed calculated turbidity' may not be a reliable prediction of discharge turbidity for the following reasons:

- It is unclear whether the assumed discharge TSS of 50mg/L reflects the expected discharge quality given the site characteristics and treatment performance. For example, recent road projects in the Sydney region have predicted a maximum sediment basin discharge turbidity of 50NTU based on a ratio of 2:1 to a TSS of 25mg/L and aligning with the ANZECC (2000) guideline range for lowland rivers.
- The correlations may not reflect those of stormwater collected in each of the basins. For example, the water quality of the Hunter River sites is influenced by a range of factors that are not relevant to the sediment basins, including inputs from the entire catchment, hydrodynamics, and high salinity.
- The correlations are based on limited sampling (sometimes only 2 or 3 samples) and in some cases the range of values are substantially outside those that would be expected for the proposed controlled discharges. For example, the Hunter River correlation data include a sample with a TSS concentration of more than 500mg/L and turbidity of more than 750NTU.

Appendix D of Appendix K presents a simple dilution assessment for sediment basins discharging directly to the Hunter River. This assessment may not reliably predict water quality outcomes, given that it assumes complete mixing of discharge flows with the entire Hunter River flow. The river flow is based on gauges located a substantial distance upstream on the Hunter River at Greta and on the Williams River at Glen Martin, rather than the tidal flows on the Hunter River at or near the project site. An assessment based on the near field mixing zone would be more appropriate. The EIS does not predict the waterway pollutant concentrations resulting from proposed discharges to other waterways and does not assess the impact of discharges of other pollutants.

Appendix K discusses risks from sediment basin discharges with high electrical conductivity (due to the ingress of saline groundwater). Appendix K suggests that these discharges could increase waterway salinity, but states "…given the temporary nature of construction, this is not expected to impact on achieving the WQOs."
This qualitative assessment is not consistent with ANZG (2018).

For proposed sediment basin discharges that would not contain pollutants other than 'clean' sediment, a simple dilution assessment based on the relative volumes of the discharge and initial near field mixing zone may be appropriate, providing:

- appropriate measures are implemented to avoid discharges, with discharges only occurring when alternative options have been exhausted
- appropriate erosion and sediment controls will be implemented
- the immediate receiving waterways are not sensitive (e.g. not a conservation area or endangered ecological community)
- the assumed discharge turbidity reflects the expected discharge quality given the site characteristics and treatment performance
- the initial near field mixing zone is appropriately defined—It may be appropriate to assume complete mixing in a small flowing stream, but discharges to the Hunter River at the project location would not mix completely with the river flow and a more appropriate mixing zone would need to be defined for the assessment.

It is recommended that the applicant provides a revised water pollution impact assessment for any proposed sediment basin discharges. This assessment should be consistent with the Australian and New Zealand Guidelines for Fresh and Marine Water Quality *(ANZG, 2018) and include:*

- *details of the practical measures that would be implemented to avoid discharges (e.g. reuse) and minimise pollution*
- *a characterisation of the proposed discharge in terms of the concentrations and loads of all pollutants present at non-trivial levels—TSS/turbidity levels should be adequate for uncontaminated discharges*
- *an assessment of the impact on the environmental values of the receiving waterways with reference to the relevant guideline values from the* Australian and New Zealand Guidelines for Fresh and Marine Water Quality *(ANZG, 2018), under typical through to worst case conditions*
- *where relevant, details of mitigation measures to address any identified impacts.*

If the proposed discharges would not contain pollutants other than 'clean' sediment, a simple dilution assessment may be appropriate to assess potential sediment related impacts. This should assess both the impact within the immediate near-field mixing zone and cumulative impacts of multiple sediment basins discharging to a waterway.

In-stream works

Relevant SEARs:

- *demonstrate that all practical measures to avoid or minimise water pollution and protect human health and the environment from harm are investigated and implemented.*
- *identify and estimate the quality and quantity of all pollutants that may be introduced into the water cycle by source and discharge point and describe the nature and degree of impact that any discharge(s) may have on the receiving environment, including consideration of all pollutants that pose a risk of non-trivial harm to human health and the environment.*
- *identify proposed monitoring locations, monitoring frequency and indicators of surface and grou ndwater quality.*

Further details are required of the dredging of the Hunter River proposed to allow barge access for construction of the viaduct.

The EIS proposes enclosing these operations within a floating, 2-3 metre deep, silt curtain, with a shallow silt curtain also installed next to ecologically sensitive areas. The EIS states, "Suitable dredged material would be either transported to an ancillary facility for assessment, treatment and potential reuse on site, or disposed of off-site to a licensed facility."

The EIS notes that there are potential water pollution risks associated with disturbance of sediment and acid sulfate soils, but these risks are not considered in detail.

It is recommended that that, in relation to any proposed dredging and associated in-stream works within the Hunter River, the applicant:

- *provides further details of the practical measures investigated and proposed to avoid or minimise water pollution (e.g. dual silt curtains, closed bucket environmental clam shell, no overflows from hoppers)—including providing justification for the proposed measures (e.g. why silt curtains would limited to 2-3m depth)*
- *provides details of the sediment quality within the proposed works areas identifying any potential water pollution risks*
- *provides details of proposed water quality monitoring and associated water pollution management triggers and responses—this should include turbidity monitoring immediately outside the silt curtain and at a background site(s), with management triggers set relative to the background turbidity.*

Hydrogeology

Documents reviewed are as follows:

M1 Pacific Motorway extension to Raymond Terrace, Environmental Impact Statement, (Part 1 – Contents, certification, and glossary), dated July 2021, prepared by Transport for NSW

M1 Pacific Motorway extension to Raymond Terrace, Environmental Impact Statement - Executive summary, dated July 2021, prepared by Transport for NSW

M1 Pacific Motorway extension to Raymond Terrace, Environmental Impact Statement - Chapter 10: Hydrology and Flooding, dated July 2021, prepared by Transport for NSW

M1 Pacific Motorway extension to Raymond Terrace, Environmental Impact Statement - Chapter 11: Surface water and groundwater quality, dated July 2021, prepared by Transport for NSW

M1 Pacific Motorway extension to Raymond Terrace, Environmental Impact Statement - Chapter 16: Soils and contamination, dated July 2021, prepared by Transport for NSW

M1 Pacific Motorway extension to Raymond Terrace, Environmental Impact Statement – Appendix K: Surface and Groundwater Quality Working Paper, dated July 2021, prepared by Transport for NSW

Matters to be addressed prior to determination

Review of the EIS reveals areas of concern where the groundwater quality could be impacted during construction and operation of the project, if approved. Specifically, the proposed unlined temporary sediment dams in the Hunter Alluvium, excavated to depths below the water table, will have the capacity to induce groundwater inflows that may affect treatment methods volumes. The potential impact from these inflows is the addition of saline water to collected surface runoff, potentially influencing the ability to treat anticipated pollutants, i.e. the ability to flocculate, coagulate, or settle.

Lined sediment dams and the Tomago Sandbeds

The liner details for temporary and permanent sediment dams protecting the Tomago Sandbeds drinking water catchment, have not been provided in the EIS. With the sandbeds determined as a sensitive receiving environment, the nature of the lining proposed is unknown, and the degree of containment to prevent groundwater quality impacts to the drinking water catchment cannot be determined.
The criteria used in the EIS to determine if lining is necessary for proposed sediment dams is based on the exceedance of locally measured groundwater EC levels over 7500µS/cm and a

shallow groundwater table. Across the project footprint, the applicant has nominated 4 dams that fit this criteria, 3 of which are located on the western side of the Hunter River near the Tarro interchange, and 1 dam on the eastern side of the Hunter River opposite the Hunter Regional Botanic Gardens. Review of these areas against submitted groundwater monitoring results for EC, suggest there are other dams proposed in these locations that would also exceed the nominated EC levels and should also be proposed as lined, namely: TPB09, TB05, TPB11, TPB19, TPB20, TPB21, and TPB22.

Recommendation

Prior to project approval the applicant provide further information regarding the criteria for selected dam lining, as well as the design, liner material options, and the prevention of seepage or groundwater ingress into or from the sediment basins.

Matters to be addressed with conditions

Groundwater Management Plan
The proponent has proposed to continue groundwater level and comprehensive water quality monitoring up to and during the construction phase of the project, as well as into the operation phase of the project.
The EPA acknowledges the commitment to groundwater impact mitigation through the provision of a Construction Soil and Water Management Plan, complete with the inclusion and analysis of results from groundwater quality samples collected from recent, current, and continued groundwater monitoring rounds in accordance with their developed Groundwater Monitoring Program.

Recommendation

Prepare and provide a Construction Soil and Water Management Plan, complete with a Groundwater Monitoring Program (including ongoing updates to the baseline data, Trigger Action Response Plans and Mitigation Measures Plan) to the EPA prior to the commencement of construction and operation of the project.

3. Contaminated Lands

Documents reviewed are as follows:
Environmental Impact Statement – M1 Pacific Motorway extension to Raymond Terrace prepared for Transport for NSW, dated July 2021. (EIS) [Chapter 16 – Soils and Contamination]
Soils and Contamination Working Paper – M1 Pacific Motorway extension to Raymond Terrace prepared for Transport for NSW, dated July 2021. [Appendix P of the EIS]

The SEARs, dated 20 March 2019, required an assessment of potential impacts of acid sulfate soils, contamination of soil and groundwater, salinity issues, and the impacts on soil and land resources (including erosion risk or hazard). The requirement for contamination states:

The Proponent must assess whether the land is likely to be contaminated and identify if remediation of the land is required, having regard to the ecological and human health risks posed by the contamination in the context of past, existing and future land uses. Where assessment and/or remediation is required, the Proponent must describe how the assessment and/or remediation would be undertaken in accordance with current guidelines.

Key Issues

1. **The EIS provided has not satisfactorily addressed the requirements of the SEARs.**

The EPA believes that the EIS has not satisfactorily addressed the SEAR for contamination since the nature and extent of contamination across the project site has not been fully assessed.

Whilst a preliminary site investigation (desktop review) has been undertaken to identify areas of potential contamination risk, a detailed site investigation (DSI) or a targeted site investigation has not be prepared to provide more complete and definitive information on issues raised in the preliminary site investigation. The EPA believes that further investigation is required to determine the nature and extent of contamination and to inform the appropriate measures to manage contamination within the project footprint.

Given the extent of the project footprint and to ensure that the data collected is representative and provides a robust basis for site assessment decisions, it is recommended that a sampling and analysis quality plan (SAQP) be submitted as part of the Proponent's response to submission. The SAQP must be submitted to ensure that field investigations and analyses will be undertaken in a way that enables the collection and reporting of reliable data to meet project objectives, including (where applicable) the relevant site characterisation requirements of the detailed or targeted site investigation.

Section 16.3.6 of the EIS does not provide measures to prevent sediment disturbance in the Hunter River during construction works. Given that the consultant identified that sediment disturbance may interact with acid sulfate soils, the Proponent must develop management measures to ensure minimal river sediment disturbance during construction works (e.g. piling for bridge construction and temporary platforms along the Hunter River).

The proposed management measures (Section 16.5), if properly implemented, can help minimise the risks of exposure to potential contamination. The management measures include the preparation of a Contaminated Land Management Plan and Acid Sulfate Soils Management Plan. However, there was no provision for an independent review of the appropriateness and adequacy of the above-mentioned plans. As such, the EPA recommends that a NSW EPA accredited Site Auditor be engaged to review these documents and later prepare a Site Audit Statement which certifies that the areas within the project footprint are suitable for the proposed use. The Site Auditor should be engaged throughout the duration of works for this project to ensure that any work required in relation to contamination is appropriately managed.

In summary, additional documentation/plans and management measures must be prepared to address the SEAR for contamination.

2. A NSW EPA accredited site auditor must be engaged throughout the duration of works

The EIS highlights areas of potential contamination risk throughout the project footprint. However, the Proponent was proposing to engage a NSW EPA accredited site auditor only to review a remedial action plan (RAP) for the former mineral sands facility.

The EPA does not agree with this proposal. This is because the EIS and the supporting contamination working paper provided only high-level identification of areas of potential contamination risk. Targeted site investigations of the areas of potential contamination risk are required to adequately assess the nature and extent of contamination in these areas of potential contamination risk. Furthermore, the targeted site investigations will inform the type of remediation or management required to ensure that contamination is appropriately dealt with during the construction phase and that these areas will be suitable for the proposed use.

Given that areas of potential contamination risk have been identified across the project site, a NSW EPA accredited site auditor is recommended to be engaged for the entire project footprint and throughout the duration of works for this project to ensure that any work required in relation to contamination is appropriately managed, including any unexpected contamination finds, and so that there is confidence that the site will be suitable for the proposed use.

Recommendations to DPIE (Planning)

a. Response to Submission

As part of the Response to Submissions, the EPA recommends the proponent be required to provide the following:

1. a SAQP, prepared in accordance with the relevant guidelines made or approved by the EPA under s105 of the *Contaminated Land Management Act 1997* (CLM Act), to ensure that field investigations and analyses will be undertaken in a way that enables the collection and reporting of reliable data to meet project objectives, including (where applicable) the relevant site characterisation requirements of the detailed or targeted site investigations;
2. a Contaminated Land Management plan which includes the proposed measures to manage contamination during construction works;
3. a Sediment Management Plan which includes measures to appropriately manage river sediment disturbance during construction works;
4. an Acid Sulfate Soils Management Plan; and
5. interim audit advice from an NSW EPA-accredited site auditor commenting on:
    (a) the nature and extent of the contamination,
    (b) the adequacy of the Sampling and Analysis Quality Plan and any Targeted Site Investigations which have been completed for the project; and
    (c) the appropriateness of Contaminated Land Management Plan, the Sediment Management Plan and the Acid Sulfate Soils Management Plan.

b. Conditions of approval

Recommended conditions of SSI Approval will be provided when the response to submission has adequately addressed the SEARs for contamination.

Recommended Conditions of SSI Approval

Not to be provided at this stage.

Recommendations to Proponent

The EPA reminds the Proponent of the following:

1. The processes outlined in State Environmental Planning Policy 55 - Remediation of Land (SEPP55) are to be followed in order to assess the suitability of the land and any remediation required in relation to the proposed use.

2. The Proponent must 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 [note that this would render the Proponent the 'person responsible' for the contamination under section 6(2) of *Contaminated Land Management Act* (CLM Act)].

3. The EPA should be notified under section 60 of the CLM Act for any contamination identified which meets the triggers in the Guidelines for the Duty to Report Contamination www.epa.nsw.gov.au/resources/clm/150164-report-land-contamination-guidelines.pdf

4. The EPA recommends use of "certified consultants". Please note that the EPA's Contaminated Land Consultant Certification Policy (https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/clm/18520-contaminated-land-consultant-certification-policy.pdf?la=en&hash=D56233C4833022719BCE0F40F870C19DC273A1F7) supports the development and implementation of nationally consistent certification schemes in Australia, and encourages the use of certified consultants by the community and industry. Note that the EPA requires all reports submitted to the EPA to comply with the requirements of the CLM Act to be prepared, or reviewed and approved, by a certified consultant.