Transport for NSW

Chapter 5
Response to NSW Government agency submissions and advice

NSW GOVERNMENT

5. Response to NSW Government agency submissions and advice

5.1 Overview

This section provides responses to the issues raised in submissions from the following NSW Government agencies:

- NSW Land and Housing Corporation (section 5.8).

The section also provides responses to issues raised in the advice provided to the Department of Planning and Environment (DPE) in relation to the project from the following NSW Government agencies:

- DPE Environment and Heritage Group (section 5.2)
- DPE Water (section 5.3)
- Department of Primary Industries (DPI) Fisheries (section 5.4)
- NSW Environment Protection Authority (NSW EPA) (section 5.5)
- Heritage NSW (Aboriginal Cultural Heritage) (section 5.6)
- Heritage NSW (for the Heritage Council NSW) (section 5.7)
- Sydney Olympic Park Authority (section 5.9).

As described in section 3.2.2 of this report, the issues raised in each submission and agency advice have been summarised broadly according to the order and headings provided in the submissions and agency advice. In some instances, related issues have been grouped under a single heading.

Further detail on issues raised in each submission and agency advice, including background, contextual information and full submissions, is provided in the detailed submissions available via the Department of Planning and Environment's Major Projects website: Parramatta Light Rail Stage 2.

5.2 Department of Planning and Environment (Environment and Heritage Group)

5.2.1 Flood impacts

Further design development to reduce level of flood impacts

Issue description

Department of Planning and Environment (Environment and Heritage Group) ('Environment and Heritage Group') states that further design development should continue to aim to reduce the level of flood impacts to below significant levels, which is generally defined as a 10 millimetre increase in flood levels in the one per cent annual exceedance probability (AEP) flood event.

Environment and Heritage Group also notes that no rationale has been provided for allowing impacts of up to 20 millimetres for commercial/industrial properties.

Response

The flood management objectives defined in section 17.1.3 of the EIS were developed in consultation with, and with input from, key project stakeholders, including City of Parramatta Council. The objectives were developed to be consistent with accepted industry practice and relevant guidelines, as well as similar objectives for other major infrastructure projects in NSW and are therefore considered to be appropriate for the project. The clarification in section 4.3.5 of this report provides further information on the flood management objectives and how they were developed.

In accordance with the flood management objectives, the project would be designed to ensure that, for flood events up to the one per cent AEP, there would be no afflux (an increase in inundation relative to the existing condition) greater than:

- 10 millimetres in residential zoned land
- 20 millimetres in commercial/industrial zoned land
- 50 millimetres in public land.

In accordance with mitigation measure W1, Transport has committed to undertaking further design refinement and modelling to achieve the flood management objectives (noted above) and the flood immunity standards defined in section 5 of Technical Paper 10 (Hydrology, Flooding and Water Quality).

Mitigation measure W1 has been amended to confirm that the flood management strategy will be based on revised flood modelling, taking into account further design development and construction planning, and that design responses and management measures will be developed in consultation with affected landowners/landholders. The flood management strategy will be prepared by a suitably qualified and experienced professional in consultation with City of Parramatta Council, City of Ryde Council, Sydney Olympic Park Authority, NSW State Emergency Service and the Department of Planning and Environment.

Flood impacts at Camellia

Issue description

Environment and Heritage Group states that the EIS shows severe flood impacts at the eastern end of Grand Avenue, Camellia of up to 270 millimetres. Proof that these impacts can be reduced through revised flood modelling should be provided, including mitigation measures. There may be other areas of significant impacts where this additional work is needed. Where flood modelling still predicts the project will have significant flood impacts even after further design work, consultation should be undertaken with landowners and, where relevant, tenants.

Response

As outlined in Chapter 4 (Actions taken since exhibition) of this report, Transport is proposing to amend the project to include a new alignment for the bridge between Camellia and Rydalmere.

Transport has carried out revised flood modelling to assess the potential impact of the amended project. The revised flood modelling demonstrates that the majority of potential flooding impacts on adjacent land can be avoided. The impacts at the eastern end of Grand Avenue noted in the submission do not apply to the project as amended. A discussion of the predicted flood levels as a result of the amended project, including revised flood mapping, is provided in section 6.10 of the Amendment Report.

As described above, Transport has committed to undertaking further design refinement and modelling to achieve the flood management objectives (noted above) and the flood immunity standards. This commitment is confirmed by mitigation measure W1, which has been amended to confirm that design responses and management measures will be developed in consultation with affected landowners/landholders.

Cumulative flood impacts

Issue description

Environment and Heritage Group states that the cumulative flood impact assessment has adopted assumptions for developments and other projects that are too conservative to enable consideration of cumulative impacts. It appears that large areas have been blocked out of the flood model, which is unrealistic and not reflective of the approval requirements.

Environment and Heritage Group requests that the assumptions for the cumulative impact assessment should be refined. Areas where impacts are predicted, such as at the Camellia Waste Facility, should be given due consideration. Areas that show no hydraulic interaction with the project do not need further consideration.

Response

An assessment of potential cumulative flood impacts of the project together with other proposed developments in the study area was undertaken as part of the flood impact assessment, and the results are described in section 7.1 of Technical Paper 10 (Hydrology, Flooding and Water Quality). As required, updated results are provided in the Supplementary Flooding Report. The predicted impacts were considered to be low provided the mitigation measures are implemented for the project, and proposed developments are designed and constructed to current standards.

The modelling of potential cumulative impacts was deliberately conservative where land survey data and designs for other developments were unknown or in areas with the potential for landform changes (such as areas proposed for redevelopment). These areas were represented in the flood models as areas that would totally exclude the flow of floodwater. In the absence of site-specific information for other developments this is considered to be an appropriate approach and represents a conservative worst-case scenario.

The potential for cumulative flooding impacts would continue to be considered during design development, based on revised modelling, which would include additional detail such as survey data, designs for surrounding developments, and landform changes in surrounding areas (where this information is available). In accordance with mitigation measure W1 (as amended), the flood management strategy will demonstrate how areas of potential impact will be managed, and identify design responses and management measures in consultation with affected landowners/landholders.

Stormwater design categories

Issue description

Environment and Heritage Group states that, in Table 5-2 Stormwater design categories, under category S1, it is suggested that the project will rely on the upgrade of downstream stormwater systems by others to mitigate project impacts. Environment and Heritage Group notes that this would only be acceptable where others already have a plan in place to upgrade that stormwater infrastructure (e.g. in a Floodplain Risk Management Plan or capital works plan of the City of Parramatta Council). Otherwise, the project must include provision for mitigating downstream impacts using onsite storage/detention of stormwater (e.g. through underground tanks or above ground detention). This should be listed as an environmental mitigation measure and would be in addition to any on-site stormwater detention requirements associated with the project's own site area.

Response

Transport would continue to work with relevant stakeholders and asset owners to ensure the potential impacts of the project on drainage and stormwater infrastructure is mitigated.

The stormwater design requirements in Table 5.2 of Technical Paper 10 relate to the design principles for stormwater systems where the project has the potential to affect existing pits, pipes or other subsurface drainage infrastructure. Table 5.2 is meant to be applied in conjunction with Table 5.3 as guiding principles for design development and not as a standalone mitigation measure.

Mitigation measure W2 commits to designing drainage and flood management infrastructure with regard to relevant design relevant drainage design requirements and guidelines, including the *Development Engineering Design Guidelines* (City of Parramatta Council, 2018) and *Sydney Olympic Park Authority Policy – Stormwater Management and Water Sensitive Urban Design* (SOPA, 2016).

During design development, where it is identified that the existing stormwater network does not have the capacity to manage the stormwater volumes generated as a result of the project, modifications would be undertaken in consultation with the relevant asset owner.

Flood risk and immunity

Issue description

Environment and Heritage Group requests that the critical infrastructure components that form part of the project be stated in Table 5-1 Flood immunity standards or elsewhere in the documents. These components should include critical communications equipment and a definition of why particular equipment would be critical.

Response

The project components that satisfy the definition of critical project infrastructure would include all communications, electrical equipment, traction power substations and mechanical equipment. The Parramatta Light Rail stabling and maintenance facility and operations control centre is also considered critical and would be protected via separate arrangements.

Flooding and climate change

Issue description

Environment and Heritage Group states that Technical Paper 10 (Hydrology, Flooding and Water Quality) says that climate change projections would be subject to review and update during design development using the latest rainfall intensity and sea level rise projections. In addition to using the latest data, the project should commit to using the latest version of the *Floodplain Development Manual* and associated guides. Environment and Heritage Group recommends that consideration be given to the 95th percentile projections for 2100 or mid-range projections for 2150.

Response

In accordance with mitigation measure W1 (as amended), and as part of preparing the flood management strategy, Transport commits to reviewing and updating (as required), the climate change projections to include the latest rainfall intensity and sea level rise projections available. Transport will consider a range of projections in future flood modelling, including the 95th percentile projections for 2100 or mid-range projections for 2150.

In relation to adopting the latest *Floodplain Development Manual* (DIPNR, 2005) and associated guides, Transport would consider the requirements relevant to the project, noting that the *Floodplain Development Manual* is designed for councils to assess flooding impacts of development and is not directly relevant to linear infrastructure.

5.2.2 Coastal hazards

Estuarine inundation

Issue description

Environment and Heritage Group states that there is no coastal vulnerability area mapping for the Parramatta River, the project must still comply with the *Coastal Management Act 2016* and the State Environmental Planning Policy (Resilience and Hazards) 2021 (the Resilience and Hazards SEPP).

Environment and Heritage Group also states that the risks associated with estuarine inundation have not been adequately considered in accordance with clause 2.12 of this SEPP. Relevant estuarine inundation for the project should be mapped, including under climate change conditions.

Environment and Heritage Group states that development consent should not be granted to development on land within the coastal zone unless the consent authority is satisfied that the proposed development is not likely to cause increased risk of coastal hazards on that land or other land.

Response

Section 2.12 of the Resilience and Hazards SEPP provides that 'Development consent must not be granted to development on land within the coastal zone unless the consent authority is satisfied that the proposed development is not likely to cause increased risk of coastal hazards on that land or other land'. As described in Table 4.2 of the EIS, section 5.22(2)(a) of the EP&A Act provides that SEPPs do not apply to or in respect of State significant infrastructure, except where they apply to the declaration of State significant infrastructure. Notwithstanding this, the potential impacts assessed by the EIS encompass relevant matters that are the subject of the Resilience and Hazards SEPP. This includes coastal hazards, which are considered in Chapter 17 (Water) of the EIS.

The inundation associated with climate change induced sea level rise has been considered and is shown on maps contained in Appendix A of the Supplementary Flooding Report, denoted as design events including climate change scenarios. The downstream boundary of the flood model adopted tidal surge still water levels. To incorporate climate change related sea level rise, a 0.84 metre increase was applied to these still water levels. This is equivalent to the representative concentration pathway (RCP) 8.5 (2100 sea level rise) scenario.

5.2.3 Open space / reserve land

Rehabilitation of public open space from temporary impacts

Issue description

Environment and Heritage Group states that mitigation measure LV11 (for the rehabilitation of public open space from temporary impacts) is supported, and recommends that impacted open space is rehabilitated to improve local biodiversity.

Response

Transport confirms its commitment to restoring and rehabilitating land (including public open space) that is disturbed during construction.

Mitigation measure LV13 (previously numbered LV11) confirms that temporary impacts on public open space will be rehabilitated in consultation with the relevant local council or Sydney Olympic Park Authority.

The rehabilitation strategy would be prepared in accordance with mitigation measure LP10 to guide rehabilitation planning, implementation, monitoring and maintenance of disturbed areas. This includes areas occupied by compounds and other areas disturbed during construction where final operational infrastructure is not be located (including private properties and areas of open space). The rehabilitation strategy will:

- identify rehabilitation objectives and criteria
- establish roles and responsibilities
- define rehabilitation actions and requirements
- define monitoring and maintenance requirements.

The rehabilitation strategy will integrate with the project's urban design requirements and residual land planning.

The design of new and improved open spaces would be guided by the proposed purpose and function of the open space. This would include consideration of improvements in public amenity and provision of active and passive recreation opportunities. The landscaping design would contribute to the proposed purpose and function, balancing biodiversity, Aboriginal heritage, non-Aboriginal heritage and maintenance objectives. For example, in Ken Newman Park the existing drainage corridor and bushland to the east of the park would be rehabilitated with endemic planting, whereas at the Atkins Road stop open space, tree planting would contribute to improved visual amenity within the open space and would integrate with the locally-listed heritage item Bulla Cream Dairy (Willowmere).

For land subject to temporary use, mitigation measure LP11 commits to rehabilitating the land as soon as possible to the pre-construction condition (or as agreed with the landowner/landholder), taking into consideration the existing condition and land use characteristics.

Where areas of biodiversity significance and habitat are affected, land and property rehabilitation will also include habitat restoration and revegetation of local biodiversity. Mitigation measure BD14 has been amended to confirm the commitment to preparing and implementing a habitat restoration and revegetation plan as a key part of the overall rehabilitation strategy. Further information is provided in the responses in section 5.2.4 of this report.

Clarification of open space impacts and offsets

Issue description

Environment and Heritage Group states that existing reserve / open space areas provide opportunities for improve local biodiversity and amenity, and that not all open space areas that are permanently impacted by the project will be offset. The total area of RE1 land that will be permanently impacted should be clarified.

Environment and Heritage Group requests that the project should provide additional open space and conservation zoned land to offset the permanent loss of open space, public reserve and/or conservation zoned land.

Response

Transport is committed to minimising and offsetting the direct impacts of the project's land requirements on open space. As part of the project, Transport would provide a net increase in the area of open space along the alignment, including active transport links. Transport would seek to improve the quality of open space and recreation facilities directly affected by the project. This new and improved open space would cater for a broad range of recreation activities and support local biodiversity and waterway health.

Mitigation measure SE7 has been amended to confirm Transport's commitment to offsetting the direct impacts of the project's land requirements on open space (parks and reserves), in consultation with relevant councils and Sydney Olympic Park Authority, through the provision of a net increase in open space, including active transport infrastructure and improved open spaces and recreation facilities. It is also noted that in identifying opportunities to provide new open space and offset the project's impacts, Transport has balanced this objective with minimising private land acquisition and impacts on biodiversity.

Chapter 13 (Land use and property) of the EIS describes the potential impacts of the project's land requirements on zoned land. An estimate of the potential permanent impacts on zoned land located outside of existing transport corridors is provided in Table 13.4 of the EIS. This shows that about 2.7 hectares of land zoned RE1 Public Recreation and about 1.2 hectares of land zoned C2 Environmental Conservation would be impacted by the project as exhibited.

Since exhibition of the EIS, the project's temporary and permanent land requirements and the associated land use and property impacts have been updated to reflect the amended project (see section 6.6 and Appendix D (Updated preliminary land requirements) of the Amendment Report). It is estimated that the amended project would result in a small increase in the areas of land zoned RE1 and C2 that would be impacted – about 3.1 hectares of land zoned RE1 and 1.3 hectares of land zoned C2 would be impacted by the amended project, compared to 2.7 hectares of land zoned RE1 and 1.2 hectares of land zoned C2 that would be impacted by the project as exhibited. Further information is provided in section 6.6 of the Amendment Report.

In accordance with mitigation measure LP1, Transport commits to refining the design during design development to minimise land requirements and potential impacts on land uses and properties as far as reasonably practicable.

The impacts on biodiversity and amenity values associated with open space and conservation areas would also be offset by providing:

- biodiversity offsets in accordance with relevant legislation (mitigation measure BD2)
- a net increase in tree numbers and canopy as part of the project's tree offset strategy (mitigation measure LV6).

5.2.4 Biodiversity

Footprint and extent of works

Issue description

Environment and Heritage Group states that the footprint and extent of works associated within ecological areas needs to be clearly defined in the EIS and not deferred to detailed design stage.

Response

The EIS nominated and assessed a project site, which was defined as the area that would be directly disturbed by construction (for example, because of ground disturbance and the construction of foundations for structures). The project site for the purposes of the EIS and associated specialist assessments is described in Chapter 2 (Location and setting) and shown in Figure 2.1 to Figure 2.6 of the EIS.

It is noted that the term project site is used in the Biodiversity Development Assessment Report (BDAR) to assess direct impacts. The term study area, which is the 'subject land' referenced in the *Biodiversity Assessment Method* (DPIE, 2020b), includes the wider investigation area that incorporated alternate alignments that were also assessed in the BDAR.

Subsequent to EIS exhibition, the project site has been adjusted to accommodate the proposed amendments to the project (as outlined in Chapter 4 (Actions taken since exhibition) of this report and described in the Amendment Report). As described in section 4.2.1 of this report, the BDAR has been updated to assess potential impacts on biodiversity based on direct disturbance of the amended project site.

The project site represents a 'worst-case' footprint allowing for flexibility during design development and construction planning to refine the location of infrastructure and construction activities within this area, if required. Impacts on areas of biodiversity significance outside the nominated project site boundary would be subject to additional assessment as described in section 23.3.2 of the EIS and the conditions of approval for the project.

Biodiversity mitigation measures

Issue description

Environment and Heritage Group states that several biodiversity mitigation measures are not committed to and will only be implemented 'where reasonable and feasible' and 'as far as practicable'. This is the case for impacts from overhead wiring, light spill and the timing of works. Environment and Heritage Group states recommends that:

- Where threatened fauna on Sydney Olympic Park Authority land is likely to be impacted, the Biodiversity Management Plan that deals with these impacts should be prepared in consultation with Sydney Olympic Park Authority.
- Management measures for works adjacent to Newington Nature Reserve should be developed in consultation with the National Parks and Wildlife Service.
- Works which affect fauna habitat should be scheduled to avoid and minimise impacts during breeding periods on threatened and non-threatened native fauna, and addressed in the Biodiversity Management Plan.

Response

Transport's commitments to avoid and minimise the potential impacts of the project, including impacts on biodiversity, were defined by the mitigation measures provided in chapters in Part C of the EIS, and consolidated in Appendix K (Consolidated mitigation measures).

The mitigation measures (including those for biodiversity) have been reviewed and some changes have been made to:

- make additional commitments to respond to issues raised in the submissions
- modify the wording in some instances so that the intent and commitment of the measure is clearer
- respond to the findings of the updated and additional assessments described in section 4.2 of this report (including the Updated Biodiversity Development Assessment Report (updated BDAR).

The changes made are shown in Appendix B (Updated mitigation measures) of this report.

With respect to the recommendations made in the submission:

- Mitigation measure BD11 (as amended) commits to preparing and implementing a biodiversity management plan, which will include management measures to protect biodiversity and minimise the potential for impacts during construction. BD11 commits to developing measures for works within Sydney Olympic Park and the Millennium Parklands in consultation with Sydney Olympic Park Authority.

- Mitigation measures that are potentially relevant to Newington Nature Reserve (i.e. mitigation measures BD8, BD14 and BD18 (as amended), which are for nest boxes, habitat restoration and revegetation, and monitoring respectively) have been updated to reflect the need for these to be implemented in consultation with the NSW National Parks and Wildlife Service.
- Mitigation measure BD14 (as amended) commits to developing and implementing a habitat restoration and revegetation plan, as a key part of the project's overall rehabilitation strategy, in consultation with relevant stakeholders, including Sydney Olympic Park Authority.
- Mitigation measure BD9, which commits to developing construction management measures to avoid impacts on breeding of fauna (including threatened and migratory fauna), has been amended to include reference to an additional location at Hill Road (adjacent to Narawang Wetland, Newington Nature Reserve Wetland and Kronos Hill) to minimise impacts on migratory waders and the Green and Golden Bell Frog during spring and summer.

Buildings and microbats

Issue description

Environment and Heritage Group states that buildings to be demolished for the project should be surveyed for microbats, as they occasionally roost in buildings. No details are provided in the BDAR of the impacted buildings or if surveys have been undertaken, and different areas of impact are provided. This issue should be addressed, and impacted areas confirmed.

Response

The updated BDAR provides a discussion of buildings/structures and microbats (see section 9.7.1). Gould's Wattled Bat (*Chalinolobus gouldii*) is the only species that has been regularly recorded roosting in buildings in the Sydney area, while threatened species such as the Eastern Bentwing Bat are more likely to roost in disused rail tunnels and stormwater culverts (Sydney Bats, 2017). However, the removal of buildings/structures, particularly disused buildings or bridges and culverts, have the potential to result in the loss of roosting habitat for microbats. It is possible that microbats may roost in some buildings/structures that would require removal as a result of the project's land requirements, and microbats would lose these roost sites.

Overall, the updated BDAR concluded that impacts on threatened microbats would be unlikely. Notwithstanding this, mitigation measure BD13, which provides the requirement for pre-clearing surveys, has been amended to include a requirement to undertake surveys at any buildings/structures to be removed. Mitigation measure BD15 has also been updated to include monitoring of microbat roosts in buildings/structures to be removed.

Impacts of Parramatta River and Haslam Creek crossings

Issue description

Environment and Heritage Group states that the bridge design and construction of the bridge crossings should avoid and minimise impacts on existing native vegetation and riparian land.

Environment and Heritage Group requests that the EIS assess the potential impact of the proposed bridge crossings on riparian land and the potential to rehabilitate and improve riparian connectivity. Mitigation measures need to be included to address this.

Environment and Heritage Group also requests that where riparian land is permanently impacted it should be offset by rehabilitating an equivalent riparian area with locally occurring native species either in the vicinity of the works site or elsewhere along the Parramatta River and Haslams Creek. When the construction compounds at the bridge crossings are removed, any impacted riparian land should be replanted with local native species.

Response

Section 16.1.3 of the EIS describes how the design has been refined to avoid impacts on biodiversity values (including native vegetation and habitats) where possible. This has included locating the proposed bridges over the Parramatta River to make use of the natural gaps in the mangroves and proposing bridge types and construction methodologies to minimise direct impacts.

However, the BDARs (both the updated BDAR and Technical Paper 9 for the EIS) conservatively assume the complete removal of riparian vegetation within the project site to calculate biodiversity credits for these impacts (i.e. land temporarily and permanently impacted).

As design development and construction planning progresses, Transport is committed to minimising or avoiding impacts on native vegetation (including riparian vegetation), fauna movement and habitat in accordance with mitigation measure BD1. Where impacts cannot be avoided, Transport will prepare and implement a habitat restoration and revegetation plan in accordance with mitigation measure BD14 (as amended), as a key part of the project's rehabilitation strategy. Mitigation measure BD14 provides that the habitat restoration and revegetation plan will be prepared by a habitat restoration specialist and include:

- clear objectives for rehabilitation and re-establishment of native vegetation of local provenance in temporary disturbance areas, in accordance with Guide 3 (Re-establishment of native vegetation) of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA, 2011)
- active revegetation of mangroves at the proposed bridges over the Parramatta River, taking into account future shading impacts
- reuse of removed trees would be considered, in consultation with Sydney Olympic Park Authority ecologists and the NSW National Parks and Wildlife Service
- requirements for ongoing monitoring.

Section 11.2 of the updated BDAR details the requirements for offsetting impacts on marine vegetation. This has been updated to address DPI Fisheries' preference for rehabilitation of riparian land over monetary offsets. Transport is investigating options for on-ground works to offset biodiversity liabilities under the *Fisheries Management Act 1994* (FM Act). This includes investigating projects in Newington Nature Reserve and the Badu Mangroves in Bicentennial Park, or other areas within the Parramatta River estuary.

Bridge shading impacts

Issue description

Environment and Heritage Group states that it should be clarified as to whether the bridge design will include features to allow vegetation to grow underneath the structures. The submission recommends the following:

- The bridge designs should minimise shading impacts by considering bridge height and width, be elevated to allow local native trees to grow under the structures, and allow sufficient natural light and moisture to penetrate beneath the structures for plants to grow.
- Advice should be obtained from experienced habitat restoration professionals.
- Long term monitoring should be undertaken to assess the impact of shading on the rehabilitation of riparian vegetation.

Response

Section 13 of Technical Paper 1 (Design, Place and Movement) defines five bridge design objectives for the project, including to 'minimise impact to the environment through the placement of bridge elements and consideration of construction impacts'. Specific design principles include:

- minimise impacts on the sensitive ecological areas, particularly foreshore areas and mature trees impacted by the bridge locations and construction
- consider ways the bridge design can enhance the ecology of the river, parks and residual land through rehabilitation and habitat creation.

As noted in the above response, the design has sought to locate the proposed bridges over the Parramatta River to make use of natural gaps in mangrove vegetation. The bridges would also be elevated over the river foreshores (as shown in Figure 157 and 167 of Technical Paper 1).

With respect to the suggestions made in the submission:

- It is not possible to provide penetrations or grates to allow for light and moisture, as the bridges need to be accessed by maintenance vehicles and buses (in the case of the bridge between Melrose Park and Wentworth Point). There is also a requirement to capture runoff on the bridge and treat it prior to discharge, which is likely to be achieved through drainage into gross pollutant traps and bioretention zones (where suitable to do so).
- Increasing the bridge height to accommodate local native trees to grow underneath would conflict with the aim of minimising shadow impacts on other environmentally sensitive areas such as mangroves and *Wilsonia backhousei* habitat. Large trees generally are not able to be directly planted under bridges as they can impact the structure of the bridge and impede maintenance.

The proposed amendments and the change in bridge locations over the Parramatta River have reduced the potential for indirect shading impacts (see section 6.9 of the Amendment Report and section 9.5 of the updated BDAR for more information). There may also be an opportunity to replant mangroves under the bridges, which would be confirmed as part of the habitat restoration and rehabilitation plan prepared in accordance with mitigation measure BD14. In accordance with the recommendations made in the submission, mitigation measure BD14 commits to a habitat restoration specialist preparing the habitat restoration and revegetation plan, and ongoing monitoring. Further information is provided in the above response (under the heading 'Impacts of Parramatta River and Haslam Creek crossings').

Rehabilitation of disturbed riparian land

Issue description

Environment and Heritage Group states that rehabilitation of riparian vegetation, fauna habitat, and connectivity along the river should be consistent with the requirements, plans and strategies listed in the submission. Details of the total area of riparian land that would be temporarily and permanently impacted should be provided. The total area of impacted riparian land should be offset by rehabilitating an equivalent riparian area with locally occurring native species, either in the vicinity of the works site or elsewhere along the Parramatta River and Haslams Creek.

Environment and Heritage Group also requests that details of the rehabilitation features listed in the submission, including a scaled map, be provided.

For riparian land (reserve and open space areas) that is not currently vegetated with local native species, Environment and Heritage Group requests that the rehabilitation strategy (mitigation measure LP9) improve and enhance local biodiversity by planting local native species and not just keep the status quo of the pre-construction condition.

Response

Mitigation measure LP10 (previously numbered LP9) commits to developing an overall rehabilitation strategy for the project to guide rehabilitation planning, implementation, monitoring and maintenance of disturbed areas outside the operational footprint following the completion of construction. As described in the above responses, mitigation measure BD14 (as amended) commits to preparing a habitat restoration and revegetation plan as a key part of the project's rehabilitation strategy to guide the restoration of vegetation disturbed during construction, including riparian vegetation. This will include rehabilitating and re-establishing native vegetation of local provenance in temporary disturbance areas (including on the Parramatta River and around Haslams Creek). The habitat restoration and revegetation plan will provide details of the final total area of riparian land that would be temporarily and permanently impacted, and a scaled map with rehabilitation extents and features. The plan, which will be prepared by a habitat restoration specialist, will take into account relevant guidelines and strategies, including those referenced in the submission.

As described in the above responses, Transport is investigating options for on-ground works to offset biodiversity liabilities under the FM Act and BC Act.

Vegetation management plan

Issue description

Environment and Heritage Group requests that a requirement to prepare a vegetation management plan (including the contents detailed in the submission) be included as a condition of consent.

Response

In accordance with mitigation measure BD11, a biodiversity management plan will be prepared prior to construction and implemented as part of the CEMP. The plan will include measures to protect biodiversity and minimise the potential for impacts during construction. The plan will include but not be limited to:

- measures to manage potential impacts on the Green and Golden Bell Frog
- measures to manage potential light, noise and vibration impacts on threatened and migratory fauna, such as the Green and Golden Bell Frog, within Sydney Olympic Park
- measures to manage biosecurity risks (including pathogens and weeds) in accordance with the *Biosecurity Act 2015*
- locations and requirements for pre-clearing surveys, including where clearing is required within Sydney Olympic Park and areas of mangrove, saltmarsh or other riparian vegetation
- an unexpected finds procedure
- hygiene controls in relation to chytrid fungus, cinnamon fungus (*Phytophthora cinnamomi*) and myrtle rust (*Pucciniales fungi*)
- locations and procedures for monitoring.

In accordance with mitigation measure BD16, monitoring of indirect impacts on mangroves, saltmarsh and the Narrow-leafed Wilsonia (*Wilsonia backhousei*) population will be undertaken during and following construction.

Further information is provided in Appendix B (Updated mitigation measures).

Green and Golden Bell Frog – impacts on constructed ponds and confirmation of species polygon

Issue description

Environment and Heritage Group states that if lands protected as an offset for the Sydney Olympics are impacted by the project, the values to be lost should be offset.

Environment and Heritage Group also states frog breeding in patches located immediately adjacent to Hill Road and Holker Street is unlikely given the high levels of disturbance from vehicles and pedestrians. The species may breed further in Narawang Wetland. It is unclear if these areas have been included in the species polygon.

Response

Offsetting impacts

To mitigate direct impacts on habitat values and trees, including in Sydney Olympic Park, Transport commits to finalising biodiversity offsets, undertaking habitat restoration, and offsetting the loss of trees. In particular, the following will be undertaken:

- Impacts on threatened species listed by the *Biodiversity Conservation Act 2016* (BC Act) and/or the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) would be offset as described in section 16.6.3 of the EIS. In accordance with mitigation measure BD2, biodiversity offsets will be finalised in accordance with the BC Act, the NSW Biodiversity Offsets Scheme, and the NSW Assessment Bilateral Agreement under the EPBC Act.
- In accordance with mitigation measure BD2, offsets required under the FM Act will be finalised in consultation with DPI Fisheries. As described in the above responses, Transport is investigating options for on-ground works to offset biodiversity liabilities under the FM Act.
- As described in the above responses, mitigation measure BD14 (as amended) commits to developing and implementing a habitat restoration and revegetation plan as a key part of the project's overall rehabilitation strategy. Mitigation measure BD14 commits to developing the plan in consultation with Sydney Olympic Park Authority ecologists and the NSW National Parks and Wildlife Service.
- In accordance with mitigation measure LV6, a tree offset strategy will be developed to offset the loss of trees and achieve a net increase in tree number and canopy. Further information on the proposed approach to managing the project's impacts on trees is provided in the clarification in section 4.3.3 of this report.
- Impacts on open space will be mitigated as described in the responses in section 5.2.3 of this report.

Species polygon for Green and Golden Bell Frog

The species polygon for the Green and Golden Bell Frog includes all areas of native vegetation (plant community types (PCTs)) that are associated with the species within the project site, in accordance with the *Biodiversity Assessment Method* survey guide for threatened frogs.

This includes areas of Estuarine Swamp Oak Forest (PCT 1234), Estuarine Mangrove Forest (PCT 920), Estuarine Saltmarsh (PCT 1126) and *Phragmites australis* and *Typha orientalis* freshwater wetland (PCT 1071) within the project site in the Sydney Olympic Park area, including impacts on narrow linear strips of native vegetation alongside Hill Road and Holker Street.

In response to feedback from, and consultation with, Sydney Olympic Park Authority, Transport is proposing an amendment to the proposed works at the bridge over Hill Road as outlined in section 4.1 of this report. This would involve removing the existing bridge and constructing a new bridge that would minimise direct impacts on Narawang Wetland. The amended alignment of the project and the bridge over Hill Road (and amended project site) would avoid direct impacts on existing ponds that are an important habitat for the Green and Golden Bell Frog, Latham's Snipe and other local fauna. There would be only limited direct impact on constructed ponds within Narawang Wetland (at the culvert under Hill Road) and no direct impact on constructed breeding ponds near the Holker Busway.

Areas of non-native and planted vegetation are categorised as movement habitat and assessed for prescribed impacts. Indirect impacts are considered in section 9.4 of the updated BDAR. Operational impacts are considered in section 9.5, and prescribed impacts (such as impacts on connectivity and from hydrological changes) are considered in section 9.7 of the updated BDAR. These areas are not included in the species polygon.

Green and Golden Bell Frog – habitat impacts

Issue description

Environment and Heritage Group requests further information and confirmation of the following:

- Duration of potential impacts on the Green and Golden Bell Frog underpass between Kronos Hill and Wentworth Common at Holker Busway, and the culvert between Narawang Wetland and Nuwi Wetland.
- Nature of proposed work at the underpasses and whether the proposed works will disturb and impact the frog breeding ponds on either side of the underpasses.
- If the bridge works will result in any temporary or permanent impacts on the ponds.
- Duration of the proposed construction works (including any proposed temporary/short period works) which have the potential to impact Green and Golden Bell Frog habitat, as the temporary nature of some works may be long enough to be permanent in a frog's life cycle.

Response

Impacts on the frog underpass between Kronos Hill and Wentworth Common at Holker Busway

No works are proposed to the frog underpass between Kronos Hill and Wentworth Common at Holker Busway.

Impacts on culvert (underpasses) between Narawang Wetland and Nuwi Wetland and nearby ponds

This culvert connects constructed ponds located on either side of Holker Busway. Connectivity between Haslams Creek and Narawang Wetland is via Nuwi Wetland, where a flood control weir is located west of the existing bridge over Hill Road. Narawang Wetland is located above the weir, and it is possible that frogs may traverse the weir and Nuwi Wetland, although Nuwi Wetland and Haslams Creek are not mapped as preferred Green and Golden Bell Frog habitat by Sydney Olympic Park Authority (2019), given the more saline nature of the habitats present.

In response to feedback from, and consultation with, Sydney Olympic Park Authority, Transport is proposing an amendment to the proposed works at the Hill Road bridge as outlined in section 4.1 of this report. This would involve removing the existing bridge and constructing a new bridge that would minimise direct impacts on Narawang Wetland. This forms part of the amended project described in the Amendment Report.

The project site is predominantly located in the road reserve of Hill Road near Narawang Wetland and Holker Busway, limiting direct impacts on Green and Golden Bell Frog habitat. The amended alignment of the project and the bridge over Hill Road would avoid direct impacts on existing ponds that are an important habitat for the Green and Golden Bell Frog, Latham's Snipe and other local fauna. The project site boundary (i.e. the area assumed to be directly impacted) has been revised to incorporate this amendment. There would be a reduced area of impact on the western side of Hill Road (at Narawang Wetland) and a small increase on the eastern side (at Nuwi Wetland) to accommodate the new bridge arrangement.

Construction works would occur in close proximity to some ponds, in particular pond N17 on Hill Road. Construction works in this area are expected to take about 18 months to complete (see Appendix A of the Amendment Report for the updated project description).

The updated BDAR has assessed the impacts of the proposed amendment and revised project site, including impacts on Nuwi Wetland. This includes updating calculations of the direct impacts on vegetation communities, and consideration of potential impacts on fauna, such as from noise, vibration, lighting and connectivity impacts. Further information is provided in section 6.9 of the Amendment Report.

Transport commits to minimising and managing potential impacts on the Green and Golden Bell Frog as described in the following responses.

Green and Golden Bell Frog – other impacts

Issue description

Concerns raised and recommendations made by Environment and Heritage Group about potential impacts on the Green and Golden Bell Frog included:

- A condition of consent should require that the flood management strategy ensure that the potential for movement of *Gambusia holbrooki* into breeding ponds is prevented and adequately addressed.
- The assessment has not considered the impacts of vehicle strike and fragmentation on the migration and dispersal of individuals.
- The impacts of noise and light on the Green and Golden Bell Frog have not been considered.

Response

Movement of Gambusia holbrooki into breeding ponds

It is noted that existing flooding regimes result in movement of *Gambusia holbrooki* between breeding ponds, and that this noxious species is actively managed by Sydney Olympic Park Authority. The flood management strategy prepared in accordance with mitigation measure W1 (see responses in section 5.2.1 of this report) will consider measures to minimise flooding impacts on flood sensitive areas and infrastructure within Sydney Olympic Park, including Narawang Wetland, the Brick Pit, and the existing leachate management system. This would help to limit the potential for movement of *Gambusia holbrooki* into breeding ponds where it does not currently occur.

Vehicle strike and fragmentation risks

Further discussion of the potential for vehicle strike and migration/dispersal of Green and Golden Bell Frog individuals during construction has been added to section 9.7.4 of the updated BDAR.

Noise and lighting impacts

The potential for noise and lighting impacts during construction and operation are considered in sections 9.4 and 9.5 of the updated BDAR. This includes further discussion of the potential for noise to impact on the calling pattern of the Green and Golden Bell Frog. To further minimise potential noise and lighting impacts, mitigation measure BD7, which originally provided that opportunities to minimise light pollution to ecologically sensitive areas will be investigated and implemented, has been amended to refer to the minimisation of noise pollution in addition to light pollution in consultation with Sydney Olympic Park Authority.

Further information about how potential impacts on the Green and Golden Bell Frog will be minimised and managed is provided in the following response.

Green and Golden Bell Frog – mitigation and management

Issue description

Environment and Heritage Group states that the management plan for the Green and Golden Bell Frog should be prepared by a suitably qualified and experienced herpetologist. Details should be provided on the works that will potentially impact Green and Golden Bell Frog ponds, underpasses, and foraging habitat and mitigation measures, which should be developed in consultation with a suitably qualified ecologist with demonstrated experience with the Green and Golden Bell Frog and their habitat requirements.

Environment and Heritage Group also states if impacts on existing Green and Golden Bell Frog habitat cannot be avoided and minimised and the existing habitat protected, alternative and additional habitat needs to be created at Sydney Olympic Park to maintain the viability of the Parramatta Key Population. The creation of the additional habitat should be provided before any clearing and construction works commence. A suitably qualified and experienced ecologist and Sydney Olympic Park Authority should be involved with identifying suitable locations and the design of this additional habitat. Monitoring of additional habitat should be undertaken.

Response

Management plan and measures to minimise impacts to the Green and Golden Bell Frog

Transport is committed to avoiding and minimising the potential impacts of the project, including impacts on biodiversity. As noted in the above responses, Transport is proposing an amendment to the proposed works at the bridge over Hill Road to minimise direct impacts on Narawang Wetland. The amended alignment of the project and the bridge over Hill Road would avoid direct impacts on existing ponds that are an important habitat for the Green and Golden Bell Frog, Latham's Snipe and other local fauna. The project site boundary (i.e. the area assumed to be directly impacted) has been revised to incorporate this amendment.

Potential impacts on the Green and Bell Frog will be managed by implementing the biodiversity mitigation measures provided in Appendix B (Updated mitigation measures) of this report. In particular, and in accordance with new mitigation measure BD12, a Green and Golden Bell Frog management plan will be prepared as part of the biodiversity management plan by a qualified herpetologist, in consultation with Sydney Olympic Park Authority ecologists. The plan will define measures to:

- ensure that habitat connectivity and quality is maintained during construction
- minimise direct impacts during construction (such as from noise and lighting).

The plan will include requirements for:

- temporary frog-proof fencing to be installed around work areas in Sydney Olympic Park where existing frog-proof fencing is impacted
- permanent frog-proof fencing to be reinstated following construction
- temporary noise barriers to be installed near Newington Nature Reserve wetland, Narawang Wetland, and Kronos Hill during construction.

Other relevant mitigation measures include:

- Mitigation measure BD3 provides that design development in Sydney Olympic Park and the Millennium Parklands will ensure that habitat connectivity and quality for the Green and Golden Bell Frog is maintained in consultation with Sydney Olympic Park Authority and a suitably qualified and experience ecologist.

- Mitigation measure BD7 has been amended to commit to investigating opportunities to minimise noise as well as light pollution to ecologically sensitive areas (including Parramatta River, Newington Nature Reserve and the Millennium Parklands) and implement in consultation with Sydney Olympic Park Authority.
- Mitigation measure BD14 has been amended to confirm that a habitat restoration and revegetation plan will be prepared and implemented as a key part of the rehabilitation strategy (mitigation measure LP10) in consultation with relevant stakeholders, including Sydney Olympic Park Authority and the NSW National Parks and Wildlife Service. The habitat restoration and revegetation plan, which will be prepared by a habitat restoration specialist, will provide for rehabilitation and re-establishment of native vegetation of local provenance in temporary disturbance areas.
- Mitigation measure BD15 has been amended to confirm that the fauna monitoring program will include monitoring the response of the Green and Golden Bell Frog to construction noise.

Alternative and additional habitat

To mitigate direct impacts on habitat values and trees, including in Sydney Olympic Park, Transport commits to finalising biodiversity offsets, undertaking habitat restoration, and offsetting the loss of trees. Further information is provided in the above responses (including under the heading 'Green and Golden Bell Frog – impacts on constructed ponds and confirmation of species polygon').

Tree removal

Issue description

Environment and Heritage Group requests that, prior to any tree clearing, an inventory of trees and tree hollows to be removed needs to be undertaken, including details on the:

- total number of trees to be removed
- type and size of trees
- tree species and whether the trees are native to the local area / non-local natives / exotic / and invasive
- size, type, number, and location of tree hollows to be removed.

Environment and Heritage Group states that the project should aim to avoid and minimise the removal of existing locally indigenous species. Invasive trees should be replaced with local natives.

Response

The clarification in section 4.3.3 of this report provides further information on Transport's proposed approach to managing impacts on trees during construction. As design development and construction planning progresses, it is important to have up-to-date information on the potential impacts on trees, which also captures changes to the local environment, such as the growth of recently planted trees. As such, Transport commits to preparing a tree register (in accordance with mitigation measure LV4) to identify all trees with the potential to be impacted by the project.

In accordance with mitigation measure LV5, the design will continue to be refined to avoid or minimise impacts on trees. Mitigation measure LV5 has been amended to confirm that any tree within the project site boundary which will not be directly impacted by infrastructure or utility works, will be assessed for retention through careful consideration of design and construction methods. Further information on the approach to minimising the loss of tree hollows is provided in the following response.

Further information is provided in section 4.3.3.

Loss of hollow-bearing trees

Issue description

Environment and Heritage Group states that it is unclear how many hollows are to be removed. Details need to be provided on the number, size, type and location of existing tree hollows that are proposed to be removed.

Environment and Heritage Group states that it is unlikely that tree hollows in adjacent areas would provide alternative habitat for fauna impacted by the loss of trees hollows, as the hollows in adjacent areas are likely to already be used by other native fauna. It is also noted that the proposed removal of trees is also likely to remove the potential supply of future hollows that would be expected to form in time. Table 9.14 in Technical Paper 9 (Biodiversity Development Assessment Report) acknowledges that the removal of vegetation reduces the area for creation of future habitat features such as hollows which are a critical resource for many fauna species, but it does not address how this issue is to be mitigated.

Response

Sections 9.3.2 and 9.8 of the updated BDAR include additional information about hollow-bearing trees with the potential to be impacted during construction. This includes around 20 planted street trees (see also the Arboricultural Report in Appendix B to Technical Paper 1 (Design, Place and Movement)) and around 40 hollow-bearing mangroves. Most affected hollows are small, and only suitable for microbats and exotic species such as rats. No large hollows suitable for owls or cockatoos would be removed.

The following measures would be implemented to mitigate impacts on hollow-bearing trees:

- Mitigation measure BD8 provides that the design of the proposed bridges over the Parramatta River, and works to bridges in Sydney Olympic Park, will include provision for micro bat-friendly roost features. This would allow for permanent habitat replacement and avoids the need to attach nest boxes to bridge structures. Mitigation measure BD8 has been amended to commit to investigating and installing nest boxes appropriate for use by microbats and other small fauna at other locations, in consultation with Sydney Olympic Park Authority and NSW National Parks and Wildlife Service.
- Impacts on hollows in planted street trees would be offset in accordance with the tree offset strategy (mitigation measure LV6). LV6 has been amended to confirm that the tree offset strategy will be prepared in accordance with the tree replacement ratios detailed in the *Biodiversity Policy* (Transport for NSW, 2022a) and the *Tree and hollow replacement guidelines* (Transport for NSW, 2022b).

Further information on the proposed approach to managing impacts on trees is provided in section 4.3.3 of this report.

Replacement nest boxes

Issue description

Environment and Heritage Group states that the management measures in Table 10.1 of Technical Paper 9 (Biodiversity Development Assessment Report) do not provide certainty that replacement nest boxes will be provided. The need for nest boxes to replace lost habitat should be determined in consultation with Sydney Olympic Park ecologists. Replacement nest boxes and/or artificial hollows should be installed using a HollowHog tool (https://www.hollowhog.com.au/) prior to removal of any existing tree hollows and the release of any hollow dependent fauna.

Environment and Heritage Group requests that mitigation measure BD8 be amended to ensure the nest boxes are appropriate for use by microbats and small fauna, as the EIS indicates the tree hollows are suitable for microbats and small fauna.

Response

A response to issues raised about the wording of mitigation measures is provided above (under the heading 'biodiversity mitigation measures').

As noted above, mitigation measure BD8 provides that the design of the proposed bridges over the Parramatta River, and works to bridges in Sydney Olympic Park, will include provision for micro bat-friendly roost features. Transport cannot prescribe the use of a specific commercial product; however, nest boxes will be installed in accordance with industry best practice methods and tools. BD8 has been amended to commit to investigating and installing nest boxes appropriate for use by microbats and other small fauna in consultation with Sydney Olympic Park Authority and NSW National Parks and Wildlife Service.

Pre-clearance fauna surveys, relocation of native fauna and reuse of removed trees

Issue description

Environment and Heritage Group provided recommended conditions of consent are provided relating to pre-clearance surveys, relocation of native fauna, and reuse of removed trees.

Response

Mitigation measure BD13 commits to undertaking pre-clearance surveys in accordance with Guide 1 (Pre-clearing process) of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA, 2011). BD13 has been amended to also reference Guide 9 (Fauna handling) to ensure appropriate relocation of fauna and to require that pre-clearing surveys of vegetated land within Sydney Olympic Park will be conducted in accordance with the *Sydney Olympic Park Biodiversity Strategy and Management Plan* (SOPA, 2022c), in particular Section 3 (Frog habitat clearance) of Environmental Procedure 3 (Works in and near habitats).

In accordance with mitigation measure BD14 (as amended), the habitat restoration and revegetation plan will consider measures for reusing removed trees (where beneficial as ground habitat) in consultation with Sydney Olympic Park Authority ecologists and the NSW National Parks and Wildlife Service.

Net increase in tree numbers and canopy, tree replacement ratio

Issue description

Environment and Heritage Group states that the SEARs require the proposal to achieve a net increase in both tree numbers and canopy. It is recommended that mitigation measure LV5 (tree offset strategy) is amended to be consistent with the SEARs and that the tree offset strategy addresses this. The trees removed (which are not covered by a biodiversity offset strategy) should be replaced at a ratio of greater than 1:1.

Environment and Heritage Group requests that replacement trees comprise a diversity of local native provenance species from the relevant vegetation community that once occurred in this locality. It is also recommended that any trees to be planted are advanced or established local native species, where they are commercially available, to increase urban tree canopy cover.

Response

As described in the above responses, the clarification in section 4.3.3 of this report provides further information on Transport's proposed approach to managing impacts on trees, which has taken account of the issues raised in this and other submissions.

Mitigation measure LV6 (previously numbered LV5) commits to developing a tree offset strategy to offset the loss of trees and achieve a net increase in tree number and canopy. LV6 has been amended to confirm that the tree offset strategy will be prepared in accordance with the *Biodiversity Policy* (Transport for NSW, 2022a) and the *Tree and hollow replacement guidelines* (Transport for NSW, 2022b). The tree offset strategy will identify the tree replacement ratios that would apply to offset the removal of trees with

reference to these guidelines. The number of replacement trees depends on the tree size, and is greater than a 1:1 ratio. The guidelines provide for a minimum of two replacement trees for a small tree and up to 16 trees for a very large tree.

Replacement trees would comprise a mix of endemic, native and exotic trees to give appropriate streetscape, heritage and biodiversity outcomes (including in areas of environmental sensitivity). When selecting the size for landscaping/replacement trees the following would be balanced:

- mitigating visual amenity impacts
- prioritising the use of larger trees in centres with paved areas to provide shading, and in locations where the project would have impact on a significant tree with cultural or heritage value
- the use of less mature trees that establish more quickly and have a greater chance of survival (the bigger the tree the longer it takes to establish as the tree is being transferred from its original location to the new environment).

Transport acknowledges the requirement for forward planning to acquire appropriate tree stock, particularly for advanced plantings and for certain species.

Light and noise

Issue description

Environment and Heritage Group is concerned about the long-term operational impacts of light and noise on native fauna within the Sydney Olympic Park environs, river crossings and the Newington Nature Reserve.

Environment and Heritage Group requests that adequate mitigation measures be implemented to lessen long term impacts on native fauna, including the White-bellied Sea-eagle, Powerful Owl, migratory waders, and the Grey-headed Flying-fox.

Environment and Heritage Group states that the mitigation measures included in the BDAR do not include a specific measure for 'noise impacts', although it does refer to the use of noise barriers under the 'timing impact' etc, and that the measures included for lighting do not provide certainty that these measures will be implemented.

Response

Noise and lighting impacts during construction and operation are discussed in sections 9.3, 9.4 and 9.5 of the updated BDAR. The includes consideration of the potential for noise to affect the calling pattern of the Green and Golden Bell Frog. To manage these potential impacts, and as noted in the above responses:

- Mitigation measure BD7 has been amended to commit to investigating opportunities to minimise noise as well as light pollution to ecologically sensitive areas (including Parramatta River, Newington Nature Reserve and the Millennium Parklands) and implemented in consultation with Sydney Olympic Park Authority.
- Mitigation measure BD9 which requires measures (such as quieter construction methods and appropriate siting of lighting) to avoid impacts on breeding of fauna (including threatened and migratory fauna) has been amended to directly reference the Green and Golden Bell Frog. BD9 has also been amended to require that such measures be implemented at Hill Road adjacent to Narawang Wetland, Newington Nature Reserve Wetland, and Kronos Hill to minimise impacts on migratory waders and the Green and Golden Bell Frog during spring and summer.
- The Green and Golden Bell Frog management plan, prepared in accordance with new mitigation measure BD12, will define measures to minimise direct impacts during construction (such as from noise and lighting).

Overhead wiring and bat roosting on Parramatta River bridges

Issue description

Environment and Heritage Group disagrees with the statement in the EIS about the relatively minor increase in risk of injury and mortality from overheard wiring for raptors (birds of prey), migratory species, Grey-headed flying-foxes, and the White-bellied Sea-eagle.

Environment and Heritage Group states that Technical Paper 9 includes a key mitigation measure for 'minimising of overhead wiring adjacent to Newington Nature Reserve, along Holker Busway and Hill Road to limit impacts on the Grey-headed Flying-fox, White-bellied Sea-eagle and migratory waders'. Relevant sections in Technical Paper 9 where this measure is included do not list removing wiring from the two new Parramatta River bridge crossings to mitigate potential impacts on native fauna. The mitigation measures should be amended to include the requirement to remove/minimise the use of overhead wiring from the new bridges.

Environment and Heritage Group also states that encouraging bats to roost on the Parramatta River bridges has the potential to increase the potential for collision with the overhead wires if they are there. The BDAR proposes the preparation of a microbat management plan which would include installing next boxes or inclusion of bat-friendly roosts in the design of bridge structures to mitigate the loss of hollows. The BDAR has not adequately addressed this issue.

Response

Section 9.5 of the updated BDAR acknowledges that while overhead wiring and buildings are an existing threat in the area, new wiring would increase the risk of collision for migratory birds and raptors. Wiring used to power light rail vehicles (i.e. catenary wires) are not expected to pose a significant risk to Grey-headed Flying-foxes, as this is a single wire rather than two parallel wires, and so would not conduct electricity through a roosting individual. Microbats are much less susceptible to mortality from overhead wiring as they do not use wires for resting and are highly manoeuvrable fliers.

The clarification in section 4.3.2 of this report provides further information about the options to power light rail vehicles (including wire-free power), constraints that influence the extent of wire-free sections which can be provided, and how the location of wire-free sections of the alignment would be confirmed during design development. Key stakeholders (including Sydney Olympic Park Authority and City of Parramatta Council) have been consulted regarding the prioritisation of additional wire-free sections.

Mitigation measure BD4 commits to minimising the use of overhead wiring as far as practicable in areas adjoining Grey-headed Flying-fox foraging habitat and the flight paths of the White-bellied Sea-eagle and migratory waders, particularly on the bridges over the Parramatta River, adjacent to Newington Nature Reserve and Narawang Wetland, and the Holker Busway.

Mitigation measure BD8 provides that the design of the proposed bridges over the Parramatta River, and works to bridges in Sydney Olympic Park, will include provision for microbat-friendly roost features. This will allow for permanent habitat replacement and avoids the need to attach nest boxes to bridge structures. As noted above, bat-friendly roost features are targeted at microbats. These species are unlikely to collide with catenary wires given their high manoeuvrability.

Monitoring of the White-bellied Sea-eagle

Issue description

Environment and Heritage Group requests that it be consulted regarding the monitoring program for the White-bellied Sea-eagle. Based on the findings of the first two years of operational monitoring it is recommended monitoring continues for a minimum of five years. The monitoring data should be made publicly available and published.

Response

Mitigation measure BD18 has been amended to include an option to extend operational monitoring for a further three years, based on the advice of a suitably qualified ecologist as to whether further data is required to confirm any operational impacts of the project on the behavioural response of the White-bellied Sea-eagle and Green and Golden Bell Frog. The mitigation measure has also been amended to ensure consultation about monitoring is also undertaken with Environment and Heritage Group and NSW National Parks and Wildlife Service.

The monitoring methods (including the need for baseline data), reporting requirements (including their availability online), and adaptive management will be defined by the biodiversity management plan, which will be prepared in accordance with mitigation measure BD11.

Grey-headed Flying-fox

Issue description

Environment and Heritage Group states that planting of feed trees and roosting habitat for Grey-headed Flying-fox is not recommended near residences at Wentworth Point. The *Living with grey-headed flying foxes fact sheet* (OEH, 2012) advises that food trees preferred by flying-foxes should be planted away from houses.

Response

Mitigation measure BD5 has been amended to remove reference to planting feed trees at Wentworth Point.

Wilsonia backhousei and Coastal saltmarsh

Issue description

Environment and Heritage Group states that the timing of mitigation measure BD17 (monitoring of indirect impacts on mangroves, saltmarsh and the *Wilsonia backhousei* population) should be amended to state that monitoring is to be undertaken both during and post construction.

Response

Mitigation measure BD16 (previously numbered BD17) commits to undertaking monitoring during and following construction.

Site landscaping and use of native provenance species

Issue description

Environment and Heritage Group states that vegetation approved for removal should be replaced by a diversity of local provenance native trees, shrubs and groundcover species. Further details on the suitability of using local provenance species should be provided, including the rehabilitation of riparian corridors and details of any locations where using local natives may not be possible due to modified soils.

Environment and Heritage Group requests that mitigation measure BD6 be amended to reflect the use of local provenance species (if appropriate).

Environment and Heritage Group states that the project landscape plans should be prepared and implemented by an appropriately qualified bush regenerator/ecologist and in consultation with Sydney Olympic Park Authority.

Environment and Heritage Group requests that the EIS demonstrate that enough space is available to accommodate existing trees that are to be retained and any trees to be planted so trees can grow to maturity without the need for lopping/trimming. Lopping trees removes the potential for tree hollows to form.

Response

The habitat restoration and revegetation plan, prepared in accordance with amended mitigation measure BD14, will include clear objectives for rehabilitation and re-establishment of native vegetation of local provenance in temporary disturbance areas. Mitigation measure BD14 also commits to the restoration and revegetation plan being prepared by a habitat restoration specialist in consultation with relevant stakeholders, including Sydney Olympic Park Authority.

It is noted that, given the highly modified nature of the project site and the presence of recent landscaping and plantings, the use of local provenance species may not be possible in all areas. There may be some locations where landscaping would be determined by the requirements of the heritage interpretation strategy (mitigation measure AH3), Designing with Country commitments, and/or the requirements of relevant stakeholders.

The project's landscaping plans, including the appropriate locations of trees, will be defined by the urban design requirements (prepared in accordance with mitigation measure LV1) and the tree offset strategy (prepared in accordance with mitigation measure LV6). The plans would show existing trees, trees to be removed and new trees, to ensure sufficient space is provided for vegetation to grow to maturity. Tree sizes would be determined based on the planting landscape, and advanced plantings would be considered in appropriate locations.

5.3 Department of Planning and Environment: Water

5.3.1 Water demands, take and licensing

Water demands and sources

Issue description

Department of Planning and Environment: Water (DPE Water) states that insufficient information was provided to confirm the water demands for construction and operation, where the water is to be sourced from, and the licensing arrangements.

DPE Water requests that further information be provided to clarify the maximum annual site water demands and proposed sources (if water is required). Where water is required, the proponent needs to demonstrate sufficient water entitlement is available and/or agreements with third party providers are obtained.

Response

Construction water

As described in section 22.2 of the EIS, water would be required during construction for the following activities:

- dust suppression
- concrete construction, including for light rail and bridge foundations and structures
- road works, including concreting and compaction of pavement
- cutting equipment, such as road saws and concrete cutters
- construction site office and amenities.
- wash down of plant and equipment
- landscaping
- non-destructive digging.

The required volume of water would depend on climatic conditions during construction, however based on construction of Parramatta Light Rail Stage 1 it is estimated up to 25 mega litres per year would be required for construction of the project. It is expected that potable water (from drinking or recycled water supply utilities) or recycled/non-potable water would be used for this purpose, with the construction contractor to confirm the annual site water demands, investigate the various sources of water available and obtain any necessary approvals (if required) during construction planning. Water supply infrastructure is generally located close to the work areas and compounds (such as the adjacent footpath) and water supply is considered 'business as usual' for Sydney Water. No surface water harvesting is proposed.

The use of non-potable water would depend on the location and nature of the water use activity as well as the quantity and quality of available water at the time. Non-potable water sources could include water carted in by a licensed supplier, treated wastewater (from groundwater dewatering or from stormwater basins) or harvested rainwater. As described in section 17.3.2 of the EIS, groundwater dewatering may be required during periods of high rainfall, particularly where excavations are close to the Parramatta River and Haslams Creek. In addition, groundwater inflows of up to 1,350 litres per day may be experienced at the cutting in Boronia Street. This is less than the three megalitres per annum trigger for a water licence.

Mitigation measure W16 commits to developing a dewatering management strategy to confirm the approach to managing dewatering of excavations during construction. The strategy will outline measures to minimise groundwater inflow and identify proposed methods for managing extracted water, which could include reuse, infiltration, reinjection, discharge to stormwater, disposal to the wastewater system, and collection for off-site disposal.

In accordance with mitigation measure WR3, a waste and resource management plan will be prepared to define the waste and resource management processes, responsibilities and management measures, including measures to minimise water use, that would be implemented during construction.

Operation water

The project is expected to require only minimal water during operation (up to two megalitres per year). Water would be required at the stabling and maintenance facility (for washing and maintenance of light rail vehicles) and for irrigation of landscaped areas, including areas of green track.

As described in section 22.3 of the EIS an integrated approach to water management would be implemented during operation to minimise the use of potable water for maintenance, light rail vehicle wash activities and irrigation. The Parramatta Light Rail stabling and maintenance facility already includes sustainability measures to minimise waste (particularly wastewater generation), including a series of stormwater tanks, a recycled water network, and the use of recycled water for the light rail vehicle wash facility.

During operation, the nominal seepage into the Boronia Street cutting would be the only groundwater seepage requiring dewatering. It is estimated that the quantities would be less than three megalitres per annum, and no water licence would be required. Opportunities to reuse this water for irrigation or other operational requirements would be investigated by Transport during design development.

Groundwater take and aquifer interference, water access licence

Issue description

DPE Water states that insufficient information has been provided to confirm the potential water take due to aquifer interference. Estimates are requested. Should the total be more than three megalitres, the water take would not be exempt from licensing requirements, and sufficient water entitlement would need to be obtained.

DPE Water requests that further information should be provided to quantify the potential for groundwater take associated with aquifer interference activities.

DPE Water states that the EIS notes that the potential for groundwater interception and volumes will need to be considered in terms of exemption or licensing requirements to ensure the requirements of the water regulatory framework can be met. It is noted that the exemption for rail infrastructure facilities in Schedule 4, Clause 1 of the Water Management (General) Regulation 2018 does not apply to SSI projects.

DPE Water requests that the proponent obtain a water access licence under the *Water Management Act 2000* for groundwater interception unless the water take is less than or equal to three megalitres per year for any aquifer interference activities listed in clause 7 of Schedule 4 of the Water Management (General) Regulation 2018. Should the activity meet the requirements for an exemption under clause 7 of Schedule 4, the proponent will be required to meet the recording and reporting requirements detailed in clause 21(6).

Response

As described in section 17.3.2 of the EIS, most excavation work is unlikely to intercept groundwater. However, during periods of high rainfall, there is potential for elevated groundwater levels to seep into some excavations, particularly where they are located close to the Parramatta River and Haslams Creek. Raised groundwater levels may require dewatering in some cases. This potential impact would be localised and temporary. In addition, the lower part of a cutting at Boronia Street in Ermington is likely to intercept groundwater. Analytical modelling predicts that groundwater inflows could range between 340 and 1,350 litres per day at the cutting, depending on rainfall. Groundwater take during construction due to groundwater inflow at excavations near Parramatta River and Haslams Creek, and the cutting at Boronia Street, is considered unlikely to exceed three megalitres per year.

As noted in the above response the only potential water take during operation would be at the cutting at Boronia Street, which would equate to less than three megalitres per year.

It is understood that groundwater take of more than three megalitres per year would not be exempt from licensing requirements, and a sufficient water entitlement would need to be obtained. For groundwater take less than three megalitres per year, in accordance with the exemption under clause 7 of Schedule 4 of the Water Management (General) Regulation 2018, Transport would ensure that the requirements of clause 21(6) are met, which includes the requirement to:

- record the water take within 24 hours in the approved form and manner
- provide the water take records to the Minister by no later than 28 July for the year ending 1 July, during which the water was taken (e.g. included in the annual report)
- keep the water take records for a period of five years.

5.3.2 Waterfront land

Guidelines for Controlled Activities on Waterfront Land

Issue description

DPE Water states that the proposed activities include works within waterfront land. The *Guidelines for Controlled Activities on Waterfront Land* provides appropriate design, construction and management advice to mitigate impacts. Works within waterfront land should be designed and constructed in accordance with the *Guidelines for Controlled Activities on Waterfront Land*.

Response

In accordance with mitigation measure W14, works within or near watercourses will be undertaken with consideration of the *Guidelines for watercourse crossings on waterfront land* (DPI, 2012) and *Guidelines for controlled activities on waterfront land – Riparian corridors* (NRAR, 2018).

5.4 Department of Primary Industries (DPI) Fisheries

Offsetting impacts on marine vegetation

Issue description

DPI Fisheries does not support the method for offsetting impacts on marine vegetation outlined in the EIS. DPI Fisheries will not accept a compensation payment for harm to marine vegetation unless Transport for NSW undertakes a thorough offset feasibility analysis and demonstrates that there is no potential for on-ground offset works in the Parramatta River estuary.

DPI Fisheries is confident that Transport for NSW will find ample opportunity for on-ground mangrove and saltmarsh rehabilitation if it liaises with appropriate agencies and environmental groups, such as Sydney Olympic Park Authority and the Parramatta River Catchment Group.

DPI Fisheries recommends that the EIS be revised to reflect these offset preferences and provide consistency with the *Policies and Guidelines for Fish Habitat Conservation and Management* (DPI, 2013).

Response

As described in sections 4.2.1 and 5.2.4 of this report, the BDAR prepared for the EIS (Technical Paper 9) has been updated to assess the potential impacts of the amended project.

Section 11.2 of the updated BDAR details the requirements for offsetting impacts on marine vegetation. This has been updated to address DPI Fisheries' preference for rehabilitation of riparian land over monetary offsets. Transport is currently investigating options for on-ground works to offset biodiversity liabilities under the FM Act. This includes investigating projects in Newington Nature Reserve and the Badu Mangroves in Bicentennial Park, or other areas within Parramatta River estuary. This is being undertaken in consultation with Sydney Olympic Park Authority, NSW National Parks and Wildlife Service and NSW DPI Fisheries.

As described in the responses in section 5.2.4 of this report, mitigation measure BD14 has been amended to commit to preparing a habitat restoration and revegetation plan as a key part of the project's rehabilitation strategy to guide the restoration of vegetation disturbed during construction, including riparian vegetation. This will include active revegetation of mangroves at the proposed bridges over the Parramatta River, taking into account future shading impacts.

5.5 NSW Environment Protection Authority (EPA)

5.5.1 Requirement for an Environment Protection Licence

Issue description

The NSW EPA states that, based on the information provided, the project will require an environment protection licence (EPL) in accordance with clause 33 of Schedule 1 in the *Protection of the Environment Operations Act 1997* (POEO Act) for Railway activities – railway infrastructure construction.

Response

The requirement for an EPL is noted and confirmed in section 4.2.1 of the EIS. An EPL will be obtained for each package of work that meets the threshold for scheduled activities.

5.5.2 Noise and vibration

Proposed construction working hours

Issue description

The NSW EPA notes that the proposed project hours of 7 am to 7 pm, seven days per week are outside the standard working hours identified in the *Interim Construction Noise Guideline* (DECC, 2009) (ICNG).

The NSW EPA has considered the outcomes of community and stakeholder engagement contained in the EIS.

While the NSW EPA is satisfied that significant consultation has been undertaken, it remains concerned about how noise impacts from the proposed extended work hours would be managed, as this is deferred to detailed design.

The NSW EPA notes that, in the absence of detailed design, significant information (as detailed in the agency advice) relevant to the assessment of the proposed extended hours is unknown. Based on the absence of detailed design to inform expected noise impacts, and the lack of detail about expected noise impacts that can be provided to the community, at this stage the NSW EPA is unable to support a seven-day week work regime that offers only limited respite on one Sunday per month.

The NSW EPA recommends standard hours of construction in accordance with the ICNG.

Response

Proposed primary project working hours

Data from the project's community and stakeholder engagement indicated support for reducing the overall construction period. This provides an opportunity for Transport to propose options to meet this request from the community. In response to requests for a shorter overall construction period, Transport proposed the primary project working hours. The primary project hours would also:

- permit works within the road corridor at times when traffic volumes are lower, reducing the potential for disruption to the general public and providing safety benefits for workers
- minimise potential disruptions to critical utilities during times of greatest needs
- enable works within or near the Parramatta CBD, Sydney Olympic Park (including Sydney Showground) and Rosehill Gardens Racecourse to be planned around special events.

Engagement with the community was carried out to determine if this was an acceptable option. Feedback was sought from an extensive number of residents and local community members along the alignment. The clarification in section 4.3.1 of this report provides further information about the proposed primary project working hours, why these are proposed, and how the community has been and would continue to be consulted.

Level of detail provided and how impacts would be managed

The construction noise and vibration assessment prepared for the EIS (described in Technical Paper 3 (Noise and Vibration) and summarised in section 10.4 of the EIS) is based on a reference design and indicative construction methodology, and is considered sufficient to assess the environmental impacts, and inform the risks and issues potentially associated with the project. In addition, the assessment considered a range of construction scenarios and predicted noise levels from typical plant and equipment that is likely to be used, based on other light rail construction projects.

The modelling represents a representative 'realistic worst-case' scenario based on the assumption that several items of construction equipment would be used at the same time within individual construction scenarios. The adopted sound power levels (noise levels) for each scenario consider the range of plant and

equipment likely to be used. As a result, the predictions identify worst-case construction noise levels, which may not be reached or only reached infrequently.

The further development of measures and design responses to respond to the identified issues and risks is a matter for detailed design and construction planning, which would be undertaken in accordance with the mitigation measures (provided in Appendix B (Updated mitigation measures) of this report) and the conditions of approval. This is consistent with current practice for major project assessments in NSW and elsewhere.

Further information is provided as follows to respond to the NSW EPA's queries:

- The standard management and mitigation measures defined by the *Construction Noise and Vibration Strategy* (Transport for NSW, 2019a) would apply for all construction works with the potential to generate noise and vibration impacts, as defined by the noise and vibration management plan prepared as part of the CEMP, in accordance with mitigation measure NV5.
- Location and activity-specific construction noise and vibration impact assessments will be undertaken in accordance with mitigation measure NV6, based on a more detailed understanding of construction methods, including the size and type of construction equipment, duration and timing; and detailed reviews of local receivers, as required.
- Additional mitigation would be implemented in accordance with the project-specific management and mitigation measures (provided in Appendix B (Updated mitigation measures) of this report) where noise levels have been predicted to exceed the noise management levels, as identified in section 10.4.2 of the EIS.
- The effectiveness of the mitigation measures is described in section 3.4.5 of Technical Paper 3. As described in that section, mitigation at the source is considered to be the most effective mitigation option, where it is reasonable and feasible. It benefits the greatest number of receivers because it reduces overall noise emissions.
- As described in sections 3.4.6 and 3.7.4 of Technical Paper 3, once all reasonable and feasible mitigation measures have been applied, residual noise impacts would be mitigated by applying the additional mitigation measures identified in the *Construction Noise and Vibration Strategy*.
- Section 3.3.4 of Technical Paper 3 describes the indicative duration for the construction scenarios that form the basis of the assessment.

Based on the above, Transport considers that the information provided is appropriate to enable assessment of the potential impacts associated with the primary project working hours and the provision of information to the community of the expected noise impacts.

Additionally, Transport notes that with regards to respite periods, the following mitigation measures provide the potential for respite to be more frequent than one Sunday a month:

- In accordance with mitigation measure NV8 appropriate respite periods will be identified, in consultation with the community and in accordance with the *Construction Noise and Vibration Strategy*, for work with the potential to result in noise levels above 75 dBA and/or that needs to occur outside the primary project working hours.
- In accordance with mitigation measure NV9, where construction activities are predicted to exceed noise management levels at sensitive receivers, no work would be permitted in that area one weekend per month, unless it is otherwise agreed by a substantial majority of the sensitive receivers impacted by the proposed works.

Requirement for work outside standard hours

Issue description

While the NSW EPA recommends standard hours of construction, works outside these hours and within the project hours could be undertaken subject to detailed assessments of impacts once construction work packages are confirmed, and contracts are awarded. These can be dealt with within the environment protection licence framework.

As such, the NSW EPA recommends that the proponent, or its contractor, be required to prepare and submit a detailed noise and vibration impact assessment based on detailed design, that includes the information listed in the submission.

The NSW EPA states that the requirement for contract/package-based detailed noise and vibration impact assessments could be included either as a stand-alone condition, or as part of the 'Variation to Work Hours' condition.

Response

In accordance with mitigation measure NV6, location and activity-specific construction noise and vibration impact assessments would be undertaken:

- prior to works with the potential to generate noise levels above 75 dBA and/or exceed relevant human response and cosmetic damage criteria for vibration
- prior to works that need to occur outside the primary project working hours
- where any changes to heavy vehicle routes affect local roads not considered by the noise and vibration assessment (Technical Paper 3 (Noise and Vibration)).

Mitigation measure NV6 provides that the results of the location and activity-specific construction noise and vibration impact assessments will be documented in construction noise and vibration impact statements. Where potential exceedances are identified, the statements will define feasible and reasonable mitigation and management measures, developed in accordance with the *Construction Noise and Vibration Strategy*. Mitigation measure NV6 has been amended to confirm the following:

- The construction noise and vibration impact assessments would be based on a more detailed understanding of the construction methods, including the size and type of construction equipment; duration and timing of works; and detailed reviews of local receivers, as required.
- Potentially impacted residents will be informed of the nature of works to be carried out, the expected noise levels and duration, and will be provided with details of the complaints management system (prepared in accordance with mitigation measure SE3).

The requirement to prepare Construction Noise and Vibration Impact Statements is also a standard condition of approval for linear infrastructure projects.

As described in the EIS, work outside the *Interim Construction Noise Guideline* (DECC, 2009) recommended standard hours would be undertaken with appropriate noise management controls and management measures, implemented in accordance with the conditions of approval and the proposed mitigation measures.

Mitigation measure NV11 provides that an out-of-hours work protocol will be developed to define the process for considering, approving and managing out-of-hours work that is not subject to an environment protection licence. The protocol will include implementing feasible and reasonable measures and communication requirements in accordance with the *Construction Noise and Vibration Strategy*. In accordance with mitigation measure NV11, measures will focus on proactive communication and engagement with potentially affected receivers, provision of respite periods, and/or alternative accommodation for defined exceedance levels.

Further information about the contents of the out-of-hours work protocol is provided in section 3.7.6 of Technical Report 2.

Potential impacts from specific construction activities would be managed in accordance with location and activity-specific construction noise and vibration impact statements (mitigation measure NV6) and the construction noise and vibration management plan, which will be prepared and implemented as part of the CEMP (mitigation measure NV5).

Further information about how construction during and outside the primary project working hours would be managed is provided in the clarification in section 4.3.1 of this report.

5.5.3 Water quality

Soil and Water Management Plan

Issue description

The NSW EPA states that the water quality assessment adequately identifies and assesses key water quality risks, including the exposure of acid sulfate soils, contaminated soils, and mobilisation of sediment during in-stream construction.

The NSW EPA recommends that a soil and water management plan be prepared and implemented as part of the CEMP, including the contents listed in the submission. The plan should also include a water quality monitoring program to monitor the potential impacts of in-channel construction activities. The monitoring program should include a trigger action response plan for sediment and contaminant monitoring of the waterway, including a contingency plan for any sediment or contaminant levels that exceed the specified maximum levels.

Response

Transport is committed to managing the potential surface water, groundwater and land impacts of its activities in accordance with relevant legislation, policies and strategies. Transport's commitments in relation to soil and water management for the project are defined by the mitigation measures provided in Appendix B (Updated mitigation measures) of this report. In particular:

- Mitigation measure W9 provides that a soil and water management plan will be prepared as part of the CEMP and implemented during construction. The plan will detail processes, responsibilities and measures to manage potential soil and water quality impacts during construction, including measures to minimise the potential for pollutants to enter surface water and groundwater.
- Mitigation measure W13 provides that the soil and water management plan will detail measures to manage potential changes to hydrodynamic processes within the Parramatta River and ensure appropriate mitigation measures are implemented to minimise erosion, scour and destabilisation of the river banks.
- In accordance with mitigation measure CS7 the soil and water management plan will detail processes, responsibilities and measures to manage potential soil impacts during construction, including potential impacts associated with the presence of existing contamination, stockpile management, saline soils and acid sulfate soils. This would include consideration of the potential impacts associated with stormwater runoff from contaminated areas.
- Mitigation measure W10 provides that discharge to surface water will be undertaken in accordance with the *Water Discharge and Reuse Guideline DMS-SD-024 version 4.1* (Transport for NSW, 2019b), and project-specific objectives.

- Mitigation measure W11 commits to developing and implementing a water quality monitoring program as part of the soil and water management plan to monitor potential surface water quality impacts. Mitigation measure W11 has been amended to note that the monitoring program will include a trigger action response plan. In accordance with mitigation measure W11 the monitoring program will be developed in consultation with relevant stakeholders, including the NSW EPA. Transport will address the NSW EPA's specific requirements for monitoring as part of developing the monitoring program.

5.5.4 Contamination

General

Issue description

The NSW EPA states that the project crosses multiple contaminated sites regulated by the NSW EPA under the *Contaminated Land Management Act 1997* (CLM Act). It is important to ensure that the works will be undertaken lawfully and do not result in the release of contamination into the greater environment, damage to existing remediation systems, or unacceptable contaminant exposure risks to the community and environment.

Response

Transport acknowledges the need to undertake works in regulated contaminated sites in accordance with all relevant regulatory requirements, including the *Contaminated Land Management Act 1997* (CLM Act). Mitigation measures CS1 to CS13 provide Transport's commitments to minimising potential impacts due to contamination and damage to existing remediation systems. In particular:

- Mitigation measures CS2 to CS4 commit to managing the project's interactions with existing remediation systems and minimising the potential for impacts.
- Mitigation measure CS7 provides that the soil and water management plan (prepared as part of the CEMP in accordance with mitigation measure W9) will detail processes, responsibilities and measures to manage potential soil impacts during construction, including potential impacts associated with the presence of existing contamination.

As noted in Appendix J (Outline Construction Environmental Management Plan) of the EIS, the soil and water management plan will be prepared in accordance with relevant legislation, guidelines and standards, including the CLM Act.

Contamination in Melrose Park

Issue description

The NSW EPA states that the alignment is close to the Melrose Park development area (former Reckitt Benckiser and Pfizer sites), which is contaminated land. The NSW EPA determined that this site was not significant enough to warrant regulation under the CLM Act, with the understanding that the contamination would be remediated when the site was developed under the planning framework. The project needs to be mindful of this site, which may or may not have been already remediated.

Response

Section 18.2.3 of the EIS provides an overview of areas of contamination concern according to the suburbs along the project site. This includes listed contaminated sites located within/close to the project site. In Melrose Park the following listed contaminated sites were identified in the vicinity of the project site:

- Pfizer Australia Pty Ltd – located at 38-42 Wharf Road, West Ryde / Melrose Park, about 280 metres north of the project site.
- Reckitt Benckiser – located at 44 Wharf Road, West Ryde / Melrose Park, directly north of the project site.

As described in section 4.2.2 of this report, further contamination assessment has been undertaken across the project site. Based on this further assessment, the *Parramatta Light Rail Stage 2 – Interpretative Contamination Report* (Nation Partners, 2023) concludes that the potential for contamination at the Melrose Park North development site to act as a source of contamination that would impact the construction and operation of the project would be low, based on the:

- location, type and depth of contamination present at the Melrose Park North development site
- extent and depth of ground disturbance activities required to construct the project at this location, which would be limited to the width and depth of the track slab excavation
- anticipated requirements for completion of a site audit in accordance with the CLM Act as part of the Melrose Park North development, which would require potential pathways for off-site migration of contaminants to be mitigated.

As noted in the above response, a range of mitigation measures would be implemented to minimise the risks from existing contamination, including potential contamination from listed contaminated sites in the vicinity of the project site. This includes mitigation measures CS5 to CS9 and CS11 to CS13.

Sydney Olympic Park

Issue description

The NSW EPA states that the alignment intersects Haslam's Reach landfill and possibly other landfills located within Sydney Olympic Park. The following will need to be considered if excavating into landfills:

- Under Section 110A of the Protection of the Environment Operations Waste Regulation 2014, the proponent must obtain written consent from the NSW EPA prior to any exhumation of waste from landfill sites.
- Certain landfills located in Sydney Olympic Park are regulated by the NSW EPA under the CLM Act through an Ongoing Maintenance Order issued to Sydney Olympic Park Authority. Under the Order, Sydney Olympic Park Authority is required to obtain written consent from the NSW EPA prior to undertaking excavations meeting a certain depth and area.

The NSW EPA also states that the project presents a potential risk of damaging the landfills and leachate management infrastructure. Interface with landfills and associated infrastructure must be managed appropriately. The works must be designed to minimise the potential for a pollution event, and ensure infrastructure is reinstated to its original condition.

The NSW EPA recommends dilapidation surveys of landfills and landfill infrastructure to assist with reinstatement works.

Response

Transport acknowledges the requirements to obtain written consent from the NSW EPA prior to any exhumation of waste from landfill sites and for Sydney Olympic Park Authority to obtain written consent from the NSW EPA prior to undertaking excavations meeting a certain depth and area.

The potential for impacts on landfills and leachate management systems was considered as part of soils and contamination assessment described in Chapter 18 (Soil and contamination) of the EIS. In accordance with mitigation measure CS4, where the potential for disturbance of existing remediation systems in Camellia and Sydney Olympic Park is not consistent with the existing management plans, a remediation action plan(s) will be prepared in consultation with the landowners and NSW EPA. The plan(s) will describe how these systems will be managed during construction, and/or how these systems will be reinstated such that they continue to operate effectively after construction is complete.

Based on consultation with Sydney Olympic Park Authority, dilapidation surveys may cause damage to the existing leachate systems and, as such, alternative methods should be used to determine the current status of the systems. Therefore, mitigation measure CS3 has been amended to commit to confirming the location, layout and functioning of the leachate management systems in Sydney Olympic Park prior to construction. In accordance with mitigation measure CS3, where the project has the potential to affect the leachate management systems in Sydney Olympic Park, negotiation will be undertaken with Sydney Olympic Park Authority to understand the extent of the potential interaction. The controls and protocols outlined in the existing management plan will be implemented such that the systems continue to operate effectively.

Accredited site auditor

Issue description

The NSW EPA states that a NSW EPA-accredited site auditor should be engaged for the duration of construction works to audit contamination investigations, remediation and validation work, and to issue a Section A Site Audit Statement and Report at the completion of work, stating suitability of the land for the intended uses.

Response

As described in section 4.2.2 of this report, additional intrusive soil and groundwater investigation has been undertaken across the project site. Transport has engaged a site auditor accredited under the site auditor scheme under the CLM Act to review the contamination assessments undertaken to date, provide a written opinion on the contamination risk, the appropriateness of the reports, and any proposed recommendations. As described in section 4.2.2 of this report, the site auditor has provided advice in the form of an interim site audit statement and concluded that:

> ...many, but not all, of the aspects of contamination assessment under the CLM Act framework required to be considered by a site auditor have been addressed in the investigation reports. However, the EIS and Nation Partners (2023) propose means to address the data gaps and uncertainties via further investigation and remediation or management during detailed design and construction phases of the project. In high-risk areas of the project site such as at Camellia, Wentworth Point and Sydney Olympic Park, these are proposed to be conducted under the CLM Act framework and site audit, which should consider site suitability. This is considered acceptable provided the recommendations are adopted and implemented appropriately.

Where further investigation is required, mitigation measure CS1 provides that an independent site auditor accredited under the site auditor scheme under the CLM Act will review the scope and results of the further investigation.

As described in section 18.3.4 of the EIS, where the need for remediation is identified following further investigation, it would be undertaken in general accordance with the following:

- Remediation action plan(s) would be prepared by a suitably qualified environmental consultant, as defined in Schedule B9 of the NEPM, and certified by either the Environment Institute of Australia and New Zealand (Certified Environmental Practitioner (Site Contamination)) or Soil Science Australia (Certified Professional Soil Scientist Contaminated Site Assessment and Management).
- Remediation action plan(s) would be approved by a site auditor accredited under the site auditor scheme under the CLM Act.
- The implementation of the remediation action plan(s) would be validated by a suitably qualified environmental consultant, who would document the validation in a validation report that would be reviewed by a site auditor.

- The requirements for ongoing monitoring and maintenance of the reinstated systems, and any new structures constructed to manage existing contamination, would be documented in an environmental management plan(s) that would be prepared for the project site.
- Following preparation and approval of the environmental management plan(s) the site auditor would prepare a Site Audit Statement confirming the suitability of the project site for the proposed development.

Mitigation measure CS5 provides that where a remediation action plan (s) is/are determined to be required they will be reviewed by an independent site auditor (accredited under the site auditor scheme under the CLM Act), to certify the appropriateness of the plan(s) and that the site can be made suitable for the proposed use.

Additional contamination information

Issue description

The NSW EPA states that Chapter 18 includes:

> *Further contamination investigation across the project site is currently underway, and will provide more information on contaminants present, their concentration in soil and groundwater, and their coverage across the project site. These additional sampling results would be used to inform further actions and decisions in relation to the need for remediation of areas and the approach to mitigation.*

The NSW EPA requests that the additional information noted be provided as part of the response to submissions.

Response

The results of the additional contamination assessment undertaken since exhibition of the EIS are summarised in section 4.2.2 of this report. Further information is provided in the *Parramatta Light Rail Stage 2 – Interpretative Contamination Report* (Nation Partners, 2023).

5.5.5 Air quality

Air quality management plan

Issue description

The NSW EPA recommends that an air quality management plan be prepared and implemented as part of the CEMP.

Response

Mitigation measure AQ1 commits to preparing and implementing an air quality management plan as part of the CEMP.

5.6 Heritage NSW (Aboriginal Cultural Heritage)

5.6.1 Adequacy of information

Adequacy of the ACHAR and impacts on Aboriginal cultural heritage

Issue description

Heritage NSW advised Transport for NSW that the Preliminary Aboriginal Cultural Heritage Assessment Report (ACHAR) (Technical Paper 4) does not include adequate information on impacts on Aboriginal cultural heritage values, archaeological sites/areas of potential archaeological deposit (PAD), and that the community consultation process is incomplete. As acknowledged in the Preliminary ACHAR, there are significant gaps in the information required to compete an ACHAR:

- cultural values assessment (to be completed in consultation with the registered Aboriginal parties)
- results of the archaeological testing program excavations conducted within areas of archaeological potential
- significance assessment for sites/areas of archaeological potential within the study area
- evaluation of actual and likely harm to Aboriginal objects from the project
- provision of detailed and specific management and mitigation recommendations (including any associated methodologies for implementation).

Heritage NSW states that, as acknowledged in the Preliminary ACHAR, finalising the ACHAR is contingent on the completion of archaeological test excavations, which Heritage NSW understands are currently being completed.

Heritage NSW requires that a finalised ACHAR be submitted, which must incorporate the outcomes of consultation with the registered Aboriginal parties, including documenting and addressing any comments received on the draft ACHAR.

Response

Finalising the ACHAR

As described in section 4.2.1 of this report, additional investigations, assessment and consultation with registered Aboriginal parties has been carried out and the Aboriginal Cultural Heritage Assessment Report (ACHAR) has been updated. This included a cultural values assessment prepared by an anthropologist and informed by a site inspection and detailed cultural interviews with three Aboriginal cultural knowledge holders (see Appendix G of the ACHAR). The ACHAR also includes an overview of the test excavation program and findings from the testing completed for one potential archaeological deposit (PAD) at Broadoaks Park, together with revised assessments of significance and mitigation measures (including measures to prepare a project specific methodology for testing and for salvage, if required).

The draft ACHAR was provided to registered Aboriginal parties for the minimum 28 day review from 18 March to 18 April 2023. An Aboriginal Focus Group meeting was held on 27 March 2023. The draft ACHAR was updated to document and address feedback received (see section 9.6.2 of the ACHAR).

Further information is provided in section 4.2.1 of this report.

Test excavations

Test excavations commenced on 31 October 2022 overseen by archaeologists and Aboriginal Site Officers. Test excavations were not able to be completed safely or in accordance with the test excavation methodology at the majority of locations due to the presence of asbestos and deep fill. However, testing was completed at one PAD in Rydalmere (PAD5 Broadoaks Park / AHIMS 45-6-4076) with eight artefacts found in fill layers. Based on the results of the test excavation it was concluded that this PAD location is highly disturbed and has no archaeological value.

Mitigation measure AH5 has been amended to confirm that further investigation (testing) is required to determine the presence, extent, and scientific significance of areas of identified archaeological sensitivity. Testing is required at three potential archaeological deposits (PAD1 Ermington Boat Ramp, PAD3 Rydalmere Wharf and PAD6 Ken Newman Park), two AHIMS middens sites in Melrose Park and two AHIMS sites in the Parramatta CBD.

A project-specific methodology, which reflects the need for mechanical excavation at PAD3 (to excavate past the deep levels of fill), asbestos management and the requirements of mitigation measure AH5, will be prepared in consultation with registered Aboriginal parties.

In accordance with mitigation measure AH5 (as amended), where testing confirms that Aboriginal objects are present:

- options to modify the project will be investigated in accordance with mitigation measure AH1
- the assessments of significance provided in the ACHAR will be updated.

Unavoidable impacts will be managed in consultation with registered Aboriginal parties. Any salvage required will be undertaken in accordance with the salvage methodology (mitigation measure AH6).

5.6.2 Opportunities to improve the ACHAR

Issue description

Heritage NSW detailed opportunities for the ACHAR to be improved and clarified in the submission.

Response

Feedback received from Heritage NSW, including the matters listed in the submission, was considered when preparing the ACHAR. Further information is provided below to respond to Heritage NSW feedback and queries.

Project description and depth of proposed subsurface impacts

The depth of subsurface conditions and potential impacts in the ACHAR have been informed by a literature review and known site conditions (i.e. results of geotechnical testing). The results of test excavations, once completed, and design development would further inform the understanding of these impacts.

Reference to SEARs and project site boundary

The final SEARs table, and a response to where each SEAR is addressed, has been revised and is provided in section 1.4 of the ACHAR.

The primary purpose of Figures 7.1 to 7.5 in the ACHAR is to illustrate the survey units identified within the study area which took place prior to a project site being nominated. As the project site has since been amended and also extends beyond the study area for some road work tie-ins (but which has still been assessed as part of the ACHAR) it is not considered that the project site boundary is a meaningful layer to include for this figure set.

Non-surveyed areas in Melrose Park

The proposed amendment to the location of the bridge between Melrose Park and Wentworth Point (see section 4.1 of this report) has resulted in changes to the project site boundary, which avoids the potential area of archaeological sensitivity in Melrose Park. As no ground disturbing works would occur within this potential area of sensitivity, the need for mitigation and management is no longer required.

Section 7.3.8 of the Preliminary ACHAR/ACHAR provides the reasoning for identification of an area of archaeological sensitivity in Melrose Park. The gardens and backyards at 10 residential properties in the study area, if undisturbed, were identified as having archaeological sensitivity given their proximity to the Parramatta River and a nearby AHIMS shell midden. However, limitations to arranging property access meant they could not be surveyed during preparation of the EIS. As noted above, the change in the project site boundary at Melrose Park has avoided this area of potential archaeological sensitivity, and no additional investigations are required.

Social impacts on listed Aboriginal site

The term 'social impact' was used in Technical Paper 4 (Preliminary Aboriginal Cultural Heritage Assessment Report) in the context of cumulative impacts at the Private hospital and hotel at Hunter Street. This should be read as 'cultural impacts' and has been updated in the ACHAR.

Methodology for test excavation (and salvage) for Parramatta CBD section of project site

Section 5.2.3 of Technical Paper 4 identified two PADs located partially within the Parramatta CBD section of the project site (AHIMS 45-6-2977 and 45-6-4015). However, given that the site is an operational road, it was not proposed to undertake testing at this stage of the project. The design will continue to be refined in accordance with mitigation measure AH1 to avoid intact soil profiles as far as practicable. Where impacts are unavoidable, testing and salvage (if required) would be undertaken in accordance with mitigation measures AH5 (as amended).

Review of salvage management measures

The ACHAR has been updated to include a detailed cultural values assessment informed by cultural interviews held with three Aboriginal cultural knowledge holders. The Cultural Values Assessment Report is provided in Appendix G of the ACHAR. The statement in section 11.2 of the ACHAR that no mitigation (i.e. salvage) would be required for sites with no archaeological values has been revised to note that this would be the case only when no cultural values have also been identified.

5.6.3 Commentary on archaeological test excavation methodology

Issue description

Heritage NSW notes that comments regarding the archaeological test excavation methodology were provided in our previous advice dated 16 September 2022. These comments have not been repeated, however, it is expected that these have been taken into consideration in the current test excavation program.

Response

The test excavation methodology was developed taking into account Heritage NSW's comments and feedback from registered Aboriginal parties on the draft test excavation methodology. The final methodology followed for the test excavations that commenced in October 2022 is provided in Appendix C of the ACHAR.

5.7 Heritage NSW (for the Heritage Council NSW)

5.7.1 Built heritage

Impacts to State heritage items

Issue description

Heritage NSW states that the impacts on State Heritage Register (SHR) items within or in the vicinity of the project site (St John's Anglican Cathedral (SHR No. 01805), Newington Armament Depot and Nature Reserve (SHR No.01850), Sewage Pumping Station 67 (SHR No. 01643)), have been assessed as No Impact or Minor. This is considered acceptable.

Response

The potential impacts on heritage items were described in Technical Paper 5 (Statement of Heritage Impact) and summarised in Chapter 12 (Non-Aboriginal heritage) of the EIS. Subsequent to EIS exhibition, and as outlined in Chapter 4 (Actions taken since exhibition) of this report, Transport has proposed amendments to the project. As described in section 4.2.1 of this report, the Statement of Heritage Impact has been updated to assess the potential impacts of the amended project. A summary of the findings of the updated assessment in relation to the potential impacts of the amended project on items listed on the State Heritage Register is provided in section 6.5 of the Amendment Report.

Impacts to Bulla Cream Dairy (Willowmere)

Issue description

Heritage NSW notes that impacts on the Bulla Cream Dairy (Willowmere) (I64 – Parramatta Local Environment Plan Heritage Schedule) are assessed as being Moderate to Major. It is understood that alignment Option 2 was selected in part to reduce the track's proximity to the main residence structure. It is noted that this option results in the demolition of the "Billiard Room" structure and numerous mature landscape elements.

Heritage NSW also states that, given the nature of the place's history and significance, the loss of the landscape features is regrettable, and the applicant is urged to try and minimise this impact especially if construction related. Likewise, the relocation of significant plantings within the site is encouraged (where possible) as recommended in the proposed mitigation measures.

Response

Section 7.1.10 of Technical Paper 5 (Statement of Heritage Impact – Built Heritage) assessed the potential impacts on the locally-significant Bulla Cream Dairy (Willowmere). The selection of the preferred alignment (option 2) through this area prioritised retention of the main house. It would also provide opportunities for adaptive reuse of the main house and improve community access to the heritage item as part of the project's proposed open space improvements.

However, as noted in Technical Paper 5, the preferred alignment is located close to the highly significant Billiards Room. This structure may need to be removed to construct the project due to the potential height differences between the existing ground level and the light rail slab track, which may require construction of a batter or retaining wall. Two scenarios for the Billiards Room were considered by the Statement of Heritage Impact – retention or removal. Impacts on the structure would be confirmed during design development, including confirmation of existing and operational ground levels.

Transport commits to continuing to refine the design to avoid direct impacts on items/sites of non-Aboriginal heritage significance. This commitment is confirmed by mitigation measure NAH1 (see Appendix B (Updated mitigation measures)). In addition, and in accordance with mitigation measure NAH5, design refinement will be undertaken to minimise potential impacts on Bulla Cream Dairy (Willowmere) as far as practicable. This will include minimising encroachment of the curtilage, retaining significant heritage fabric (i.e. Billiards Room in addition to the Main House), and retaining or relocating significant tree plantings where practicable.

Impacts to local heritage items

Issue description

Heritage NSW states that as the proposed works impact local heritage items included on the Parramatta Local Environment Plan (and other local items are in the vicinity) advice should be sought from the relevant local council.

Response

Potential impacts on locally-listed items have been assessed in Technical Paper 5 and the Updated Statement of Heritage Impact.

Heritage issues raised by the City of Ryde Council in their submission are addressed in section 6.3.5 of this report.

Heritage issues raised by the City of Parramatta Council in detailed comments provided separate to their submission have been addressed directly with Council.

5.7.2 Historical archaeology

Extent of impacts

Issue description

Heritage NSW states that the staged approach means that the significance of the potential archaeological resource, and therefore the true extent of the impact to that resource, is not yet understood. Until archaeological testing is completed, and the archaeological resources are properly understood, Heritage NSW cannot comprehensively comment on the appropriateness of the proposed mitigation measures. Following the finalisation of the archaeological testing outcomes, we would appreciate another opportunity to comment on the proposed management approached decided upon by the proponent.

Response

The potential impacts on historical archaeology were described in Technical Paper 6 (Historical Archaeological Assessment) and summarised in Chapter 12 (Non-Aboriginal heritage) of the EIS. Mitigation measure NAH3 in the EIS committed to undertaking test excavations to clarify the significance, extent and integrity of deposits in accordance with the Archaeological Research and Excavation Framework provided in Technical Paper 6.

Archaeological test excavations commenced on 31 October 2022. However, the excavations could not be completed safely, or in accordance with the Archaeological Research and Excavation Framework, due to the presence of asbestos, deep levels of fill, and the need for Aboriginal test excavations to be completed first.

As described in section 4.2.1 of this report, the Historical Archaeological Assessment has been updated to assess the potential impacts of the amended project. The changes to the project site associated with the proposed amendments to the project has led to changes to the Historical Archaeological Management Units (HAMUs), which are considered by the Updated Historical Archaeological Assessment. Further information is provided in section 6.5 of the Amendment Report.

Testing is required for four HAMUs within the project site identified as having at least a medium potential for State significant archaeology:

- HAMU 29 Western Eric Primrose Reserve
- HAMU 07 Broadoaks Park
- HAMU 11 Ken Newman Park
- HAMU 15 Ermington Wharf and Archer Park.

The methodology, research, rationale, and results of the limited test excavations undertaken in accordance with the Archaeological Research and Excavation Framework has been integrated into a wider archaeological Research Design and Excavation Methodology for the project as a whole, which is provided in Appendix B of the Updated Historical Archaeological Assessment. The Research Design and Excavation Methodology has been prepared based on the limited testing undertaken to date (as described above) and includes a set of appropriate research questions and a clear methodology for how to address them.

Mitigation measure NAH3 has been amended to commit to undertaking test excavations, prior to construction, to clarify the significance, extent and integrity of deposits in accordance with the Research Design and Excavation Methodology. Where testing confirms that archaeological resources are present, additional site-specific research will be undertaken to refine the understanding of significance to ensure future management is in line with research values. This process would enable any archaeological resources that are present to be properly understood.

Management of State significant archaeology

Issue description

Heritage NSW reiterates its previous advice that the current approach for the management of State significant archaeology is preservation and conservation in situ as the preferred heritage outcome. We strongly encourage the applicant to ensure that appropriate heritage management is undertaken for the project and that all the options are considered for the mitigation of potential impacts on State significant historical archaeology including (but not limited to) avoidance through redesign and conservation in situ.

Response

Transport is committed to avoiding and minimising impacts on State significant archaeology. This commitment is confirmed by mitigation measure NAH1, which provides that the design will continue to be refined to avoid direct impacts on archaeological sites of State significance as far as reasonably practicable.

Some examples of design refinement where areas of potential State significant archaeology have been avoided since the EIS was exhibited are noted in the Updated Historical Archaeological Assessment. The proposed amendment to the location of the bridge between Melrose Park and Wentworth Point (i.e. locating the bridge further west) would avoid the area of potential State significant archaeology identified in Technical Paper 6 – HAMU 16 East of Wharf and Koonadan Reserve. The Camellia foreshore to Rydalmere bridge and alignment amendment means that the project would avoid HAMU 03 37 & 13 Grand Avenue and HAMU 04 River Foreshore, which were also areas identified with the potential for State significant archaeology.

However, where harm to State significant archaeology cannot be avoided, the Research Design and Excavation Methodology will be implemented to ensure there is appropriate management informed by significance and relevant research questions (see mitigation measure NAH2). This will include adopting a management rating system that is scaled to ensure that the work undertaken is appropriate to the level of significance and archaeological potential. For example, where a HAMU has been assessed as MR3 (high potential for a State significant archaeological resource) in situ preservation must be considered, which may involve redesigning structures so that they do not impact the resource.

Using a risk matrix to manage potential finds

Issue description

Heritage NSW states that, given that the potential for a State significant archaeological resource is considered at least medium at the five identified HAMUs, the applicant is encouraged to start the preparation of a risk matrix now, to assist with planning for the management these potential finds.

In particular, Heritage NSW requests that the applicant consider how any such finds may affect the project timeline and budget through potential design modifications or salvage requirements.

Response

The Updated Historical Archaeological Assessment identifies four HAMUs with at least a medium potential for State significant archaeology. Further information is provided in section 6.5 of the Amendment Report.

A Research Design and Excavation Methodology has been prepared (see Appendix B of the Updated Historical Archaeological Assessment) to guide the management of archaeological resources during the next stages of the project. In accordance with mitigation measure NAH2, a management rating system will be adopted based on the approach provided in the Updated Historical Archaeological Assessment. The management rating system is effectively a risk management system, which is scaled to ensure that work undertaken is appropriate to the level of significance and archaeological potential. For example a 'nil' rating means that a HAMU has been assessed as not meeting the threshold of significance and works may progress, but with an archaeologist to be engaged on an on-call basis for any unexpected finds.

The completion of the testing would further clarify the significance, extent and integrity of deposits for those HAMUs of potential high significance (management rating MR3). This would enable Transport to determine the potential for any impacts on project timeline and budget associated with the need for potential design modifications or salvage requirements.

5.7.3 Maritime archaeology

Issue description

Heritage NSW states that the potential for maritime archaeological artefacts of State or local significance has been assessed as low, and the proposed mitigation measures are acceptable.

Response

The Updated Historical Archaeological Assessment has confirmed that the potential for maritime archaeological artefacts remains low.

5.8 NSW Land and Housing Corporation (LAHC)

5.8.1 Land use and property impacts

Replacement of lost dwellings

Issue description

LAHC is supportive of the project. However, to enable LAHC to deliver the NSW Government's vision for social housing and to capitalise on the opportunity that the project presents, LAHC is proposing that the current R2 zoning in Rydalmere and Ermington be changed to R4 along the corridor to enable future higher density developments and more housing and opportunities.

LAHC notes that this would replace the lost stock and promote opportunity for increased housing stock through smart high-density developments, which bring about network-wide efficiencies, improved clustering of economic activities, and deliver place making benefits as described in Transport's Future Transport Strategy. The proposed uplift in zoning further supports Transport's key strategic direction of Supporting Growth Through Smarter Planning to create successful places for communities.

Response

Transport notes LAHC's comments about the opportunities that future changes to zoning may present. Transport recognises that improved urban accessibility is a significant driver for economic activity and growth in cities and can provide planning authorities an opportunity to review planning controls.

Parramatta Light Rail (including the project) will deliver an integrated light rail service that meets the needs of population and employment growth expected throughout the Greater Parramatta and the Olympic Peninsula area.

As described in Chapters 3 (Strategic context and need) and 13 (Land use and property) of the EIS, the project would support existing land uses and additional housing growth in the proposed urban renewal and development areas along the alignment.

The project would benefit future land uses as it would provide improved public transport capacity to service proposed urban renewal and development areas, which would result in the opportunity for increased residential densities consistent with future land use planning strategies and instruments. This is consistent with the objectives of Parramatta Light Rail (see sections 1.3 and 24.1.3 of the EIS) including the city shaping objective, which is 'A catalyst for shaping new growth – activate underutilised land and provide transport capacity needed to support sustainable population and employment growth'.

The project does not include a proposal to change any existing land use zoning. Any change in land use zoning would need to be progressed by LAHC with the relevant planning authorities in accordance with the requirements of the EP&A Act.

Residual land

Issue description

LAHC states that, where partial acquisition has been identified on LAHC sites, there is no available detailed information to advise on the extent of acquisition required. This has made it difficult for LAHC to assess the extent of the impact to our properties and tenants. LAHC would appreciate further details as to what partial acquisition of LAHC properties means and how effective the affected properties will be after acquisition.

LAHC requests that Transport commit to working with LAHC throughout all stages of the project, including detailed design and construction stages, to ensure the proposal achieves the best possible outcomes for all parties.

Response

Transport commenced early engagement with LAHC during the EIS exhibition period to ensure it was aware of the project's land requirements, including the acquisition that may be needed to meet these requirements, and to provide information and support. While LAHC manages the relationships with its tenants, Transport provided information to assist LAHC in discussions with tenants of properties identified as affected by the project's land requirements. Transport representatives also attended meetings with tenants undertaken by LAHC on release of the EIS.

As described in Chapter 13 (Land use and property) of the EIS, and in accordance with mitigation measure LP1, the design will continue to be refined to minimise land requirements and potential impacts on land uses and properties as far as reasonably practicable. The amount of land that needs to be acquired to meet the project's land requirements would be confirmed once the project is approved and is subject to acquisition negotiations. Consultation with landowners/landholders (including LAHC) will be ongoing to confirm feasible and reasonable measures to minimise property impacts.

In addition, and in accordance with mitigation measure LP8, Transport will seek to secure agreements with affected landowners/landholders, to guide property-level design requirements and the management of construction on, or immediately adjacent to, private properties. Property adjustment plans will be prepared in consultation with impacted landowners/landholders. The plans will define the works required to properties affected by acquisition and those requiring adjustments as a result of the project.

5.8.2 Noise and vibration

Construction noise

Issue description

LAHC states that the EIS highlighted potential impacts on LAHC properties due to construction noise and vibration. Despite the various mitigation strategies proposed to address these issues in the EIS, LAHC is still concerned that the construction noise would significantly disrupt the amenity and well-being of our tenants for a significant period of time. Are the proposed mitigation measures effective and supported by relevant case studies? Will Transport be compensating affected tenants as a result of the hardship that they have to endure during this period? If so, what does this look like?

Response

Transport acknowledges that construction has the potential to affect the communities in which it is undertaken and that amenity impacts can affect people's quality of life, health and wellbeing.

In accordance with the SEARs, a comprehensive range of specialist technical assessments was undertaken to consider the potential amenity impacts of the project on the community, including noise and vibration, transport and traffic, air quality and visual impacts. These individual potential impacts have been acknowledged, integrated and assessed by the social impact assessment (Technical Paper 7) and the results are summarised in Chapter 14 (Socio-economic impacts) of the EIS.

Section 14.6 of the EIS describes the approach to managing amenity impacts on the community. The section notes that comprehensive and appropriate communication and consultation with the community and other key stakeholders plays a key role in managing the potential for impacts during construction and operation and is critical to the successful delivery of the project. Consistent with, and in accordance with mitigation measure SE1, the Community Communication Strategy provided in Appendix D of this report will be implemented to guide the management and delivery of community and stakeholder engagement in the lead up to, and during, construction and ensure that opportunities for input are provided and feedback from the community is encouraged.

The *Interim Construction Noise Guideline* (NSW EPA, 2009) and *Draft Construction Noise Guideline* (NSW EPA, 2020) acknowledges that, due to the nature of construction projects in urban areas, it is inevitable that there would be noise impacts near construction sites. During construction there would be noise impacts on some receivers during certain times, including potentially during evening and night time periods, and during certain construction activities. However, exceedances of noise management levels would typically be temporary and construction noise would change as activities change and work progresses.

Transport is committed to avoiding or minimising noise and vibration impacts from construction projects under its control. Mitigation measures have been developed with the aim of minimising or mitigating (as far as practicable) the identified construction noise and vibration impacts. In particular:

- The standard management and mitigation measures defined by the *Construction Noise and Vibration Strategy* (Transport for NSW, 2019a) will be implemented for construction works with the potential to generate noise and vibration impacts, as defined by the noise and vibration management plan prepared as part of the CEMP in accordance with mitigation measure NV5.
- Location and activity-specific construction noise and vibration impact assessments will be undertaken in accordance with mitigation measure NV6, based on a more detailed understanding of construction methods, including the size and type of construction equipment, duration and timing; and detailed reviews of local receivers, as required.
- Additional mitigation would be implemented in accordance with the project-specific management and mitigation measures (see Appendix B (Updated mitigation measures) of this report) where noise levels are predicted to exceed the noise management levels, as described in section 10.4.2 of the EIS.

Once all reasonable and feasible mitigation measures have been applied, residual noise impacts would be mitigated by applying the additional mitigation measures identified in the *Construction Noise and Vibration Strategy*, including alternative accommodation and respite offers. Further information regarding how construction noise impacts will be managed is provided in the clarification in section 4.3.1 of this report.

As described in section 3.7.7 of Technical Paper 3 (Noise and Vibration) (and section 3.8.7 of the Updated Noise and Vibration Report), the proposed mitigation measures were informed by consultation and feedback from community members received prior to construction of Parramatta Light Rail Stage 1 and from consultation with community members prior to exhibition of the EIS for Parramatta Light Rail Stage 2. Section 3.4.5 of Technical Paper 3 describes the justification and effectiveness of the proposed at-source and in-transmission mitigation measures. The mitigation measures provided are considered reasonable and feasible, and have been identified as an outcome of the noise and vibration assessment based on best practice, relevant standards and guidelines, and Transport's experience managing the delivery of rail projects.

Once all reasonable and feasible mitigation measures have been applied, residual noise impacts would be mitigated by applying the additional mitigation measures identified in the *Construction Noise and Vibration Strategy*.

Where acquisition is required, compensation would be determined in accordance with the statutory obligations under the *Land Acquisition (Just Terms Compensation) Act 1991.* The Act does not provide for compensation for indirect impacts such as noise. However, the project would incorporate environmental management and design features to ensure that potential impacts are managed and mitigated as far as practicable, as described in Chapter 23 (Approach to environmental management and mitigation) of the EIS.

Operational noise

Issue description

LAHC states that the SEARs require quantitative assessment of the predicted effectiveness of mitigation measures, including case studies, where relevant from other light rail projects, to adequately manage identified impacts. LAHC considers that the EIS has not adequately addressed the SEARs in this regard.

LAHC would appreciate further information on what mitigation measures are proposed to address operational impacts, what they entail, how effective they are and how they are proposed to be implemented. It is unacceptable for the tenants' well-being and enjoyment of their properties to be continually disrupted due to mitigation measures that are not well planned out.

LAHC is of the view that regular meetings between Transport and the affected tenants should be scheduled. LAHC has an obligation to our tenants to ensure that the provided housing is safe and secure and it is not acceptable for LAHC to be put in a position where we are left to deal with the tenants' complaints and objections relating to the Stage 2 project due to lack of communication and engagement from Transport for NSW.

Response

Transport acknowledges the potential for noise impacts during operation. Technical Paper 3 (Noise and Vibration) included an operational noise and vibration assessment, which was summarised in section 10.5 of the EIS. As described in section 4.2.1 of this report, the noise and vibration assessment has been updated to consider the amended project and the results are summarised in section 6.3 of the Amendment Report.

The updated assessment found that:

- Operation of light rail services along the section of track constructed as part of the project would not generate airborne noise levels that exceed the airborne noise trigger levels for existing residential receivers.
- The relevant trigger levels for groundborne noise impacts are predicted to be exceeded at about 129 residential receivers that are immediately adjacent to the alignment at Rydalmere, Ermington, Melrose Park and Wentworth Point.

A quantitative assessment of the predicted effectiveness of potential measures to minimise the identified operational noise and vibration impacts was undertaken as part of the noise and vibration assessment in accordance with the SEARs. Options considered included (in order of preference):

1. Reducing the noise at the source
2. Reducing the noise in transmission (between source and receiver)
3. Reducing the noise at the receiver.

Control measures in transmission, such as noise barriers for operational impacts, were not considered as most of the track form would be embedded rail allowing pedestrian and vehicle access across the tracks. The installation of an operational noise barrier parallel to the embedded track would affect pedestrian and vehicle access across the track.

The results of the assessment are described in section 4.6.1 of Technical Paper 3. The assessment considered the effectiveness of measures including at-property treatments, track form measures, light rail vehicle design, and maintenance measures to minimise impacts from airborne noise, groundborne noise and fixed facilities during operation. The assessment informed the selection of mitigation measures for the project, which are provided in Appendix B (Updated mitigation measures) of this report.

Case studies regarding the effectiveness of mitigation on other light rail projects are informed by compliance monitoring undertaken during operation. As described in section 4.6.1 of Technical Paper 3, a review of the operational noise and vibration compliance reports for the City and South East Light Rail was undertaken to inform the assumptions used in the noise model for the project and to help assess the effectiveness of the proposed mitigation measures. In addition, compliance noise monitoring would also be undertaken once Parramatta Light Rail Stage 1 commences operation to confirm the effectiveness of mitigation measures implemented for Stage 1 and help inform the suitability of mitigation measures for the project.

During further design development, and in accordance with mitigation measure NV1, an operational noise and vibration review of the developed design will be undertaken to review the potential for operational impacts and confirm the mitigation measures that would be incorporated in the design. The review will include:

- reviewing compliance monitoring for Parramatta Light Rail Stage 1
- surveying relevant buildings to determine appropriate façade noise reduction performances
- a road traffic noise assessment for the reconfiguration of South and Boronia streets conducted in accordance with the *Road Noise Criteria Guideline* (Transport for NSW, 2022c) and the *Road Noise Mitigation Guideline* (Transport for NSW, 2022d)
- consideration of feedback from, and preferences of, directly affected landowners/landholders including LAHC and LAHC tenants.

5.8.3 Program of works

Tenant relocation and acquisition of LAHC properties

Issue description

LAHC states that the relocation process for affected tenants takes a while as they will need to be matched to suitable alternative housing. LAHC notes the EIS has indicated commencement of construction around 2025 and operation of the first passenger services in 2030/31. To enable LAHC to fully assess impact to our properties and manage tenants' expectations, LAHC would appreciate information on anticipated acquisition and commencement of construction for the applicable stages affecting LAHC properties.

Response

The Transport project team began early engagement with LAHC in November 2022 to provide advanced notice of the project's estimated land requirements and initial support. This engagement is ongoing to ensure LAHC has adequate information, support and notice to assist tenants. This engagement meets the timeframes and requirements in accordance with the *Property Acquisition (Just Terms Compensation) Act 1991* and the property acquisition process described in section 13.4.2 of the EIS.

Transport acknowledges the issues raised by LAHC in relation to the relocation process for LAHC tenants and is committed to keeping LAHC informed of project timeframes and requirements, and to providing appropriate information to tenants as required.

5.9 Sydney Olympic Park Authority

The following sections summarise the key issues raised in Sydney Olympic Park Authority's submission cover letter and supporting ecology, biodiversity and heritage comments (submission Attachment B).

The submission also included a spreadsheet providing detailed comments on the EIS (submission Attachment A). Responses to issues raised in the spreadsheet have been provided to Sydney Olympic Park Authority separately.

5.9.1 Addressing site-specific issues

Issue description

Sydney Olympic Park Authority states that it strongly supports the Parramatta Light Rail Stage 2 project. Whilst highly supportive of the project, there is opportunity for the EIS to more comprehensively address a number of site-specific issues related to Sydney Olympic Park as an important ecological site and event precinct.

Sydney Olympic Park Authority would welcome further assessment in relation to traffic and transport, ecology, remediated lands and the precinct's event requirements, especially in relation to the Sydney Royal Easter Show.

Response

The EIS and supporting technical papers were prepared in accordance with the requirements of the EP&A Act, the EP&A Regulation and the SEARs, as well as relevant issue-specific assessment guidelines and policies. Details of how these requirements have been met are provided in Appendix A (SEARs compliance table) of the EIS.

The EIS and technical papers were reviewed by the Department of Planning and Environment and other relevant NSW Government agencies to confirm that they adequately addressed the SEARs prior to being finalised and placed on public exhibition. NSW Government agencies were also invited to provide advice during the public exhibition period. Responses to the issues raised in this advice are provided in this chapter.

The assessment presented in the EIS (as summarised in the EIS portal and virtual room) is based on a reference design and indicative construction methodology, and is considered sufficient to assess the environmental impacts, and inform the risks and issues potentially associated with the project. The further development of measures and design responses to respond to the identified issues and risks is a matter for design development and construction planning, which would be undertaken in accordance with the updated mitigation measures (see Appendix B of this report) and the conditions of approval. This is consistent with current practice for major project assessments in NSW and elsewhere.

Transport is committed to collaborating with, and coordinating design development and delivery of the project in consultation with, Sydney Olympic Park Authority and the Royal Agricultural Society of NSW as key stakeholders for works in Sydney Olympic Park and Sydney Showground. Further details and responses to specific issues outlined in the submission are provided in the following sections. In addition, responses to the issues raised in the submission from the Royal Agricultural Society of NSW are provided in section 7.3 of this report.

Mitigation measure LP2 has been amended to confirm the commitment for ongoing consultation with key stakeholders (including Sydney Olympic Park Authority) to ensure that the project is integrated with adjoining and proposed developments, including that subject to the *Parklands Plan of Management 2010* (Sydney Olympic Park Authority, 2010), the *Sydney Olympic Park Master Plan 2030* (SOPA, 2018) including the *Sydney Olympic Park Master Plan 2030 Interim Metro Review* (SOPA, 2022a), and the *Sydney Olympic Park Vision and Strategy 2050* (SOPA, 2022b). In accordance with mitigation measure LP2, this will include identifying measures and design responses to manage the interface between the project and adjoining land uses and properties as far as reasonably practicable.

5.9.2 Sydney Olympic Park Authority Act provisions for the parklands

Sydney Olympic Park Authority Act 2001 and the Parklands Plan of Management 2010

Issue description

Sydney Olympic Park Authority states that the statutory context (Chapter 4) and land acquisition (Chapter 13) does not consider the provisions of the *Sydney Olympic Park Authority Act 2001* (the SOPA Act) with respect to the parklands of Sydney Olympic Park. The legislated obligations of the parklands under the SOPA Act or provisions of the Parklands Plan of Management are not addressed in the EIS.

Section 31 of the SOPA Act prohibits the compulsory acquisition of the parklands except by Act of Parliament. The SOPA Act provides for entering into leases, licences and easements for land within the parklands in accordance with Section 32 of the SOPA Act and the Parklands Plan of Management 2010 (the Plan of Management). Construction of the project within the parklands may be considered under these provisions.

Sydney Olympic Park Authority states that a Parklands Approval Permit must be obtained in accordance with certain requirements (as detailed in the submission).

Response

Transport acknowledges that the SOPA Act requires Sydney Olympic Park Authority to manage the Millennium Parklands in accordance with the Parklands Plan of Management 2010 (the Plan of Management) with the power to grant limited interests in land in relation to the parklands, provided that Ministerial approval is obtained.

Transport has committed to work with Sydney Olympic Park Authority to formalise development agreements based on the executed term sheet that agrees on the permanent land tenure for the project within the Millennium Parklands. The development agreements would be consistent with the statutory requirements of the SOPA Act.

The term sheet and the development agreements provide that Sydney Olympic Park Authority would rely on section 32 of the SOPA Act to grant Transport construction licences (during the construction period) and easements (during the operation period) over part of the Millennium Parklands, subject to Ministerial approval.

The term sheet agreed that Sydney Olympic Park Authority and Transport will work collaboratively and that Sydney Olympic Park Authority will use its best endeavours to facilitate any steps or actions required to permit the grant to Transport of these rights contemplated to be formalised by the development agreement:

Transport and Sydney Olympic Park Authority will continue to work collaboratively together to ensure that the development agreements being finalised comply with the SOPA Act.

Offsetting impacted land within the Millennium Parklands

Issue description

Sydney Olympic Park Authority states that the EIS dismisses the loss of public open space and conservation lands in Sydney Olympic Park in terms of percentage loss, rather than considering the role the affected lands play in wider parklands values and functioning for wildlife and visitors and the provisions of the Parklands Plan of Management. No on-site offsets, compensatory habitats or compensatory recreational facilities are currently proposed.

Sydney Olympic Park Authority states that the project includes loss of and impacts on environmental conservation lands and recreational lands within the parklands, which is inconsistent with the legislated objectives of the SOPA Act relevant to the parklands. Local offsetting for loss and impacts on these lands is required to maintain consistency with the objectives of the SOPA Act and recommended consent conditions are provided in this regard.

Sydney Olympic Park Authority requests that a compensation plan for parklands conservation and recreation lands affected by the project be developed in consultation with Sydney Olympic Park Authority.

Response

Transport acknowledges that the project would affect areas of environmental conservation and recreational lands within the Millennium Parklands. Transport is committed to minimising and offsetting the direct impacts of the project's land requirements on these areas. In accordance with mitigation measure LP1, Transport commits to refining the design during design development to minimise land requirements and potential impacts on land uses and properties as far as reasonably practicable.

The project has sought to improve the quality of open space directly affected by the project and provide a net increase in the area of open space along the project alignment, including active transport links, open space and recreation facilities. This would cater for a broad range of recreation activities and support local biodiversity and waterway health. It is also noted, that in identifying opportunities to provide new open space and offset the project's impacts, the project has balanced this with minimising private land acquisition and impacts on biodiversity.

Mitigation measure SE7 has been amended to confirm Transport's commitment to offsetting the direct impacts of the project's land requirements on open space (parks and reserves), in consultation with relevant councils and Sydney Olympic Park Authority, through the provision of a net increase in open space, including active transport infrastructure and improved open spaces and recreation facilities. Where permissible under the conditions of approval for the project, Transport for NSW would seek to offset biodiversity and tree impacts in the Sydney Olympic Park locality in consultation and agreement with Sydney Olympic Park Authority.

To mitigate direct impacts on habitat values and trees in Sydney Olympic Park, Transport commits to finalising biodiversity offsets, undertaking habitat restoration, and offsetting the loss of trees. In particular, the following will be undertaken:

- Impacts on threatened species listed by the BC Act and/or the EPBC Act would be offset as described in section 16.6.3 of the EIS. In accordance with mitigation measure BD2, biodiversity offsets will be finalised in accordance with the NSW Biodiversity Offsets Scheme and the NSW Assessment Bilateral Agreement under the EPBC Act.
- In accordance with mitigation measure BD2, offsets required under the FM Act will be finalised in consultation with DPI Fisheries. As described in the responses in section 5.2.4, Transport is investigating options for on-ground works to offset biodiversity liabilities under the FM Act.

- In accordance with mitigation measure BD2, offsets required under the BC Act will be finalised in consultation with NSW Department of Planning and Environment (Environment, Energy and Science Directorate). This could include the provision of compensatory habitat within Sydney Olympic Park if and where it is feasible and complies with the NSW Biodiversity Offsets Scheme.
- Mitigation measure BD5 requires that the planting of feed trees for the Grey-headed Flying-fox is considered to improve habitat values, with a particular focus on locally indigenous winter-flowering species, such as Forest Red Gum (*Eucalyptus tereticornis*), Spotted Gum (*Corymbia maculata*) and Broad-leaved Paperbark (*Melaleuca quinquenervia*).
- Mitigation measure BD14 (as amended) commits to developing and implementing a habitat restoration and revegetation plan as a key part of the project's overall rehabilitation strategy and to developing the plan in consultation with Sydney Olympic Park Authority.
- In accordance with mitigation measure LV6, a tree offset strategy will be developed to offset the loss of trees and achieve a net increase in tree number and canopy. Further information on the proposed approach to managing the project's impact on trees is provided in the clarification in section 4.3.3 of this report.

The term sheet and the development agreements (between Transport and Sydney Olympic Park Authority as described in the above response) provide that Transport will be conducting works (through Transport contractors) on behalf of Sydney Olympic Park Authority, which will vest in Sydney Olympic Park Authority. These works may include:

- adjustments to Sydney Olympic Park Authority existing assets which are necessary as a consequence of the construction of the infrastructure; or
- new assets or adjustments to Sydney Olympic Park Authority's existing assets (including betterment) which are requested by Sydney Olympic Park Authority.

Transport will confirm the scope of the Category 2 Works on Sydney Olympic Park Authority land in consultation with Sydney Olympic Park Authority during design development.

5.9.3 Parklands visitor impacts

Integration with affected parklands, rehabilitation and request for concept designs

Issue description

Sydney Olympic Park Authority states that the light rail alignment (referred to in the agency advice as the track) and associated infrastructure will introduce new patterns of, and opportunities for, public use of affected parts of the parklands. This will necessitate adjustments to existing pathways, service roads, infrastructure and services. The EIS includes concept designs for affected parklands on the northern side of the Parramatta River but does not provide plans for the affected parklands of Sydney Olympic Park, and there has been little detailed discussion of this with Sydney Olympic Park Authority to date.

Affected areas of the parklands include those detailed in the agency advice. Sydney Olympic Park Authority requests that these areas need to be addressed in concept plans and rehabilitation works.

Response

Section 6.8.2 of the EIS presents concept plans for areas of new or improved public open space proposed by Transport as part of the project including at Ken Newman Park and the proposed open space at the Atkins Road stop. At parks where the presence of the project has the potential to result in a substantial effect on existing amenity and impacts on the use of the space, the concept plans highlight opportunities to achieve broader scale improvements. Such improvements are proposed in areas that are not environmentally sensitive and are unconstrained by existing infrastructure.

The alignment through open space areas within Sydney Olympic Park follows the path of an existing transmission line easement and the perimeter of a private development, before running along the edge of an existing road corridor (Hill Road) to its intersection with Holker Busway. During design development, Transport has been particularly conscious of the numerous environmental and natural constraints that constitute the Sydney Olympic Park area, as well as the physical infrastructure in place to manage the precinct, which has resulted in a minimal project footprint to avoid unnecessary impacts.

Notwithstanding this, sections and sketches have been developed in consultation with Sydney Olympic Park Authority to show the proposed interface of the project with its surrounding context in Sydney Olympic Park at Footbridge Boulevard, Hill Road and the Holker Busway stops (provided in Chapters 10 and 11 of Technical Paper 1 (Design, Place and Movement)). In these three locations, Transport has sought to minimise the area of disturbance to reduce impacts, maintain or replace existing active transport links/connections as appropriate, and offset trees removed in accordance with the Transport's policies.

The proposed site of the traction power substation (area adjacent to the P5 car park) is also understood to be undergoing considerable transformation. Detailed placement and design of the substation would need to be closely integrated with Sydney Olympic Park Authority during future master planning for the site.

No parkland entry points, shared walking/cycling paths or service roads would be permanently removed as part of the project. The project includes provision of suitable, safe crossings of Hill Road and the light rail track, and connections into the parklands. Any alteration to entry points, service roads, walking/cycling paths and service roads that may be affected temporarily during construction would be developed in consultation with relevant stakeholders (including Sydney Olympic Park Authority) in accordance with mitigation measure SE5. Changes to access arrangements, if required, would be managed in accordance with the traffic and access management plan (required by mitigation measure TT8).

The urban design requirements would provide detailed urban design guidelines and key requirements for the project in Sydney Olympic Park to guide future design, procurement and delivery. Mitigation measure LV1 provides that the urban design requirements will be finalised in accordance with the vision, principles and outcomes in Technical Paper 1, and in consultation with key stakeholders (including Sydney Olympic Park Authority).

5.9.4 Expert herpetologist advice

Independent advice conclusion and recommendations

Issue description

Sydney Olympic Park Authority has obtained independent expert herpetologist advice on this assessment and the proposed mitigation measures, noting that this expertise was missing from the EIS assessments. The advice is provided in Attachment C of the submission. The advice concluded that:

> *The impacts identified in the EIS and associated technical papers are understated in some cases, not considered in others, and mitigation measures generalised to qualifying statements that show no firm intent to minimise impact to the viability of the species. Of the greatest concern are the clear inconsistencies in the project footprint between the EIS and Tech Paper 9 Biodiversity Development Assessment. We believe these inconsistencies require an update of the assessment of significance associated with the EPBC Act referral in relation to Matters of National Environmental Significance as they relate to biodiversity at Sydney Olympic Park.*

The independent advice recommended that the BDAR be updated to:

- confirm the correct physical footprint in relation to green and golden bell frog habitat at Sydney Olympic Park
- include the data that characterises the nature and extent of noise, vibration and lighting impacts on affected Green and Golden Bell Frog habitats during construction and operation
- have the data reviewed by an experienced specialist in the ecology of pond-breeding amphibians to assess impacts with particular consideration of frog ecology and population dynamics, and propose appropriate mitigative measures.

Response

Habitat footprint

As described in response to a similar issue raised by DPE Environment and Heritage Group in section 5.2.4 of this report, the EIS nominated and assessed a project site, which was defined as the area that would be directly disturbed by construction. The project site for the purposes of the EIS and associated specialist assessments was described in Chapter 2 (Location and setting) and shown in Figure 2.1 to Figure 2.6 of the EIS.

It is noted that the term project site is used in the Biodiversity Development Assessment Report (BDAR) to assess direct impacts. The term study area, which is the 'subject land' referenced in the *Biodiversity Assessment Method* (DPIE, 2020b), includes the wider investigation area that incorporated alternate alignments that was assessed in the BDAR.

Figures 3.1a to 3.1h in the BDAR map the survey effort and display a 'Project study area' layer in hatched yellow that is wider than the project site boundary (in red). However, this is not the area that was the focus of the assessment in the BDAR and was incorrectly labelled. The hatched yellow layer is the 'study area' nominated for the EPBC Act Referral, which was intentionally wider to capture the survey effort and allow for refinement of corridor options and the project site. In addition, the vegetation zones map (Figure 5.1) and species polygon map (Figure 6.3) in the BDAR show vegetation outside the project site for contextual purposes. However, this vegetation would not be directly impacted (cleared). Indirect impacts on adjacent vegetation and habitats are assessed by the BDAR, with additional offsets calculated for impacts from shading.

As there are no inconsistencies between the project site in the EIS and BDAR, it was not considered necessary to update the EPBC assessments of significance on that basis, however the assessments have been updated to reflect the proposed amendments which are outlined in section 4.1 of this report, and the associated update to the project site boundary.

In response to feedback from, and consultation with, Sydney Olympic Park Authority, Transport is proposing an amendment to the proposed works at the Hill Road bridge as outlined in section 4.1 of this report. This would involve removing the existing bridge and constructing a new bridge that would minimise direct impacts on Narawang Wetland. The amended alignment of the project and the Hill Road bridge (and amended project site) would avoid direct impacts on existing ponds that are an important habitat for the Green and Golden Bell Frog, Latham's Snipe and other local fauna. There would be only limited direct impact on constructed ponds within Narawang Wetland (at the culvert under Hill Road) and no direct impact on constructed breeding ponds near the Holker Busway.

As described in section 4.2.1 of this report, the BDAR has been updated to assess potential impacts on biodiversity based on direct disturbance of the amended project site (including changes at Hill Road). The results of this updated assessment are summarised in section 6.9 of the Amendment Report.

Data that characterises the nature and extent of impacts on Green and Golden Bell Frog

The potential for noise and lighting impacts during construction and operation are discussed in sections 9.4 and 9.5 of the updated BDAR. This includes consideration of potential noise impacts on the calling pattern of the Green and Golden Bell Frog. Further information is provided in the responses to issues raised about impacts on the Green and Golden Bell Frog by DPE Environment and Heritage Group in section 5.2.4 of this report.

Review of data

Technical Paper 9 and the updated BDAR (described in section 4.2.1 and 5.2.4 of this report), have been prepared and reviewed by ecologists who are accredited in the use of the *Biodiversity Assessment Method* and experienced in the assessment of impacts on, and the monitoring of Green and Golden Bell Frogs.

Potential impacts on the Green and Bell Frog will be managed by implementing the biodiversity mitigation measures provided in Appendix B (Updated mitigation measures) of this report. In particular, and in accordance with new mitigation measure BD12, a Green and Golden Bell Frog management plan will be prepared by a qualified herpetologist, in consultation with Sydney Olympic Park Authority ecologists. Further information is provided in the responses in section 5.2.4 of this report.

Other issues raised

The independent advice (agency advice Attachment C) raised a number of concerns and provided a number of recommendations in relation to impacts on biodiversity (particularly the Green and Golden Bell Frog), which are similar to the issues raised by DPE Environment and Heritage Group. Responses to these issues are provided in section 5.2.4 of this report.

5.9.5 Contradictory information about project physical footprint within C2 conservation areas and qualifications attached to proposed mitigation measures

Project footprint and mitigation approaches

Issue description

Sydney Olympic Park Authority states that the EIS does not definitively identify the physical construction footprint or finished works footprint within C2 zoned Green and Golden Bell Frog habitat or estuarine habitat at Sydney Olympic Park, and contains contradictions in relation to the areas affected. The submission raises concerns about the proposed mitigation approaches, including:

- Biodiversity mitigation measures contain qualifiers providing no certainty that mitigation measures will be applied or that impacts will be avoided.
- The project footprint shown in EIS mapping indicates mapping Narawang Wetland Ponds N17 and N22. The BDAR and EPBC Assessment of Significance state that no breeding ponds will be removed. The physical footprint of the project with respect to frog habitat and particularly frog breeding ponds must be confirmed to provide for accurate ecological impact assessment.
- The EIS does not address impacts on Nuwi Wetland resulting from the alternate Hill Road bridge design, including additional offsetting requirements for mangroves and street trees.
- Should it not be practicable to conduct works to strengthen the Holker Busway bridge via scaffolding attached to the bridge, or the footprint required to install the external structural elements requires works within estuarine or frog habitats, the impact to mangroves and to Green and Golden Bell Frogs could be significant. The EIS does not identify or assess the footprint of the works, potential ecological impacts, or the criteria to be applied in determining practicality.

- The impact of the temporary removal and replacement of frog underpasses has not been considered in the BDAR, which states that no frog breeding ponds would be directly affected. Evaluation of potential direct and indirect impacts on frog movement and frog habitats requires further information regarding the scale and nature of works at Holker Street.

Response

Biodiversity mitigation measures

A response to this issue, which was also raised by DPE Environment and Heritage Group, is provided in section 5.2.4 under the heading 'Biodiversity mitigation measures'.

Project footprint, impacts on breeding ponds and alternate Hill Road bridge design

Responses to these issues are provided in section 5.2.4 in the responses to similar issues raised by DPE Environment and Heritage Group under the headings 'Footprint and extent of works' and 'Green and Golden Bell Frog – habitat impacts'.

Works to Holker Road bridge and impacts on frog underpasses and habitat

Technical Paper 9 (Biodiversity Development Assessment Report) assessed the potential impacts associated with strengthening the Holker Busway bridge based on the construction methodology summarised in Chapter 7 of the EIS (Project description – construction) and of the works being undertaken within the proposed construction footprint (project site). This included the proposed use of scaffolding to minimise impacts on biodiversity. No works are proposed to the frog underpass between Kronos Hill and Wentworth Common at Holker Busway.

As construction planning progresses, refinements to the methodology may be required, which would be subject to the consistency review process described in Chapter 23 of the EIS (Approach to environmental management and mitigation) and section 4.2.3 of this report. The project site represents a 'worst-case' footprint allowing for flexibility during design development and construction planning to refine the location of infrastructure and construction activities within this area, if required. Any impacts on areas of biodiversity significance outside the nominated project site boundary would be subject to additional assessment as described in section 23.3.2 of the EIS and the conditions of approval for the project.

5.9.6 Assessment of noise, light, vibration and disturbance impacts to fauna

Ecological impacts of lighting, including to Narawang Wetland and Kronos Hill habitats

Issue description

Sydney Olympic Park Authority states that the project will create new and exacerbated noise, light, vibration and disturbance impacts on Narawang Wetland and Kronos Hill habitats (adjacent to the Holker Busway) through removal of existing roadside screening trees at Narawang Wetland, construction noise, and operational impacts.

Sydney Olympic Park Authority states that new lighting is proposed along the alignment. For many of the habitats of Sydney Olympic Park which adjoin the alignment there is currently no lighting in a deliberate decision to protect dark habitats, or where vegetation currently shields habitats from light spill impacts. The project will remove some of these vegetative screens, exposing habitats to new light impacts.

Sydney Olympic Park Authority supports minimisation of light pollution in accordance with the National Light Pollution Guidelines. The qualification of 'implemented where reasonable and feasible' in the mitigation measure provides no certainty that lighting will be effectively managed in any of these areas.

Sydney Olympic Park Authority states that these impacts are dismissed in the EIS because the habitats are currently subject to a level of disturbance from traffic on Hill Road and Holker busway. New and different impacts attributable to the project are not quantified, assessed or considered in offset calculations. The proposed mitigation measures for noise and vibration are silent on managing impacts on ecological receivers.

Sydney Olympic Park Authority recommends that:

- A detailed quantitative assessment of likely noise, vibration and light impacts during construction and operation in C2 and C3-zoned habitats, including comparison against current levels, be provided. The assessment must account for removal of existing screening trees along Hill Road.
- Mitigation measures be provided that reflect the data provided and are endorsed by a suitably qualified ecologist experienced in landscape protection of green and golden bell frog populations.

Response

Lighting along the alignment, particularly at stops, is required to ensure safe operation of the project, and safety for customers and pedestrians. Potential indirect impacts associated with noise and lighting to fauna have been further addressed in the updated BDAR (as noted in section 5.2.4 in the response to a similar issue raised by DPE Environment and Heritage Group under the heading 'Light and noise'). This includes further discussion of noise impacts on the calling pattern of the Green and Golden Bell Frog.

There is expected to be only limited removal of screening vegetation from Narawang Wetland, with the majority of this vegetation retained.

The potential for noise and lighting impacts during construction and operation are discussed in sections 9.4 and 9.5 of the updated BDAR.

Mitigation measures BD7 (as amended) and LV7 provide commitments to minimising light pollution during operation, with reference to the *National Light Pollution Guidelines for Wildlife* (DOEE, 2020). To further minimise potential noise and lighting impacts, mitigation measure BD7, which provides that opportunities to minimise light pollution to ecologically sensitive areas will be investigated and implemented, has been amended to also refer to the minimisation of noise pollution. References to reasonable and feasible have also been removed from mitigation measure BD7 to make Transport's commitment to mitigate impacts clearer. In accordance with mitigation measure BD6, replacement planting will use locally indigenous species to buffer the light rail alignment adjacent to vegetated areas, including Newington Nature Reserve, and along Hill Road and the Holker Busway.

The Design Review Panel has also made recommendations with respect to lighting that would be considered during design development, for example minimising feature lighting on the bridge between Melrose Park and Wentworth Point.

Further information about how potential impacts on the Green and Golden Bell Frog will be minimised and managed is provided in the response in section 5.2.4 under the heading 'Green and Golden Bell Frog – mitigation and management'.

5.9.7 Wentworth Point bridge design

Impacts to fauna

Issue description

Sydney Olympic Park Authority states that the design of the Wentworth Point Bridge is yet to be determined, so impacts on fauna using the Parramatta River corridor cannot be fully assessed. Risk factors include collision, entanglement, light spill, noise, reflectivity, and electrocution in catenary wires.

Sydney Olympic Park Authority also states that risks posed to fauna using the Parramatta River corridor for movement or habitat can be avoided and/or minimised to some extent through ecologically-sensitive bridge design, and consent conditions should require this to be demonstrated. This should include a report detailing how ecological risks to migratory shorebirds, raptors, bats and waterbirds have been avoided and minimised in bridge design.

Response

Technical Paper 9 (BDAR) assessed the potential impacts of the bridges across the Parramatta River on biodiversity values, including clearing of vegetation and movement corridors. While the project is at the reference design stage, there is sufficient information on the proposed infrastructure to understand the potential risks associated with bridges (such as entanglement, light spill, noise, reflectivity, and electrocution).

Section 9.3.4 of the updated BDAR notes that construction of the bridges across the Parramatta River would reduce riparian connectivity through the removal of mangroves. The report also notes that there is likely to be some regrowth of mangroves following construction and it is unlikely that fauna movement would be permanently affected. Section 9.5 of the updated BDAR considers operational impacts, which include potential risks associated with the bridge such as overhead wiring, noise, lighting and shading. Species of concern with respect to overhead wiring are the White-bellied Sea-eagle, Eastern Osprey and migratory waders.

The identification of such risks has allowed for a range of mitigation measures to be developed to guide design development of the bridge to ensure these risks to fauna are minimised.

Further information, including the approach to managing the potential impacts identified, is provided in the responses in section 5.2.4, including under the headings 'Bridge shading impacts' and 'Impacts of Parramatta River and Haslam Creek crossings'.

5.9.8 Works affecting Nuwi Wetland

Impacts to Nuwi Wetland from new design

Issue description

A proposal to reduce ecological impacts on Narawang Wetland by relocating part of the project footprint to Nuwi Wetland has been discussed with Sydney Olympic Park Authority. Sydney Olympic Park Authority supports this proposal in principle, but notes that the EIS does not address impacts on Nuwi Wetland resulting from this new design, including additional offsetting requirements for mangroves and street trees.

Sydney Olympic Park Authority recommends that the response to submissions identifies any physical footprint proposed within Nuwi Wetland, includes an updated biodiversity assessment, and identifies any additional offsetting requirements and mitigation measures.

Response

The impacts to Nuwi Wetland associated with the amended design have been reviewed and assessed in the updated BDAR and summarised in section 6.9 of the Amendment Report. The change in impacts to vegetation have been included in the offset requirements, and the mitigation measures (as amended) are considered adequate to manage potential impacts to Nuwi Wetland.

Responses to these issues are provided in section 5.2.4 in the responses to similar issues raised by DPE Environment and Heritage Group under the headings 'Footprint and extent of works' and 'Green and Golden Bell Frog – habitat impacts'.

5.9.9 Timing of works

Impacts to fauna

Issue description

Sydney Olympic Park Authority requests that consent conditions address scheduling of works within or affecting wildlife habitats to avoid and minimise peak impacts. The mitigation measure that addresses impacts on breeding threatened fauna (BD10) needs augmenting to address additional species of threatened and non-threatened breeding fauna (Green and Golden Bell Frog, woodland birds), migratory shorebirds (nationally-significant population of Latham's Snipe), and additional known or future threatened fauna breeding sites.

Sydney Olympic Park Authority states that the White-bellied Sea-eagle nests in other locations, including in a mangrove tree on the northern side of the Parramatta River opposite Sydney Olympic Park, and may choose to do so in the future. Mitigation measures need to address the possibility of this species nesting in additional sites, in areas that may be impacted by construction works. Nesting and rearing of young typically occurs May-November.

Sydney Olympic Park Authority requests that measures as part of the out-of-hours work protocol (mitigation measure NV10) be considered for affected ecological receivers, along with avoiding such works at key times in breeding cycles.

Response

Mitigation measure BD9 (previously numbered BD10) which relates to minimising impacts on breeding has been amended to include references to migratory fauna and to specifically commit to measures being implemented for works at Hill Road adjacent to Narawang Wetland, Newington Nature Reserve Wetland and Kronos Hill (to minimise impacts on migratory waders and the Green and Golden Bell Frog during spring and summer).

Impacts will also be managed through the implementation of the biodiversity management plan (BD11) and the Green and Golden Bell Frog management plan (BD12).

Responses to similar issues raised by DPE Environment and Heritage Group are provided in section 5.2.4 under the heading 'Biodiversity mitigation measures'.

5.9.10 Overhead wiring

Ecological impacts of overhead wiring

Issue description

Sydney Olympic Park Authority states that Sydney Olympic Park and the Parramatta River are a hotspot for wildlife, which are at risk of collision or electrocution from new catenary wiring along the project alignment. Approximately three kilometres of the alignment runs through or immediately adjacent to the parklands; installation of wiring along the parklands alignment and over the Wentworth Point bridge poses a risk to flying fauna, and impacts the aesthetic qualities of the parklands by adding visual clutter to a natural setting.

Sydney Olympic Park Authority states that the EIS commits to the alignment being wire-free in the urban areas of Sydney Olympic Park to reduce visual clutter. No firm commitment is made to avoiding wiring in ecologically-sensitive or parklands areas to reduce visual clutter or ecological risk.

Sydney Olympic Park Authority also states that the risk of collision or electrocution to wildlife is dismissed due to 'the presence of existing overhead wiring and/or other built structures throughout the project site'. Juvenile sea-eagles are particularly vulnerable to collision with obstacles within the first few weeks of fledging; additional obstacles caused by new overhead wiring would pose additional risk to these birds.

Sydney Olympic Park Authority supports avoiding use of overhead wiring in the areas identified in mitigation measure BD4, but notes that the qualification of 'as far as practicable' provides no certainty that overhead wiring will be avoided in any of these areas and recommends this is more strongly worded (in accordance with the recommended consent condition) to avoid ecological risk and visual clutter in parklands areas, commensurate with the parklands setting, and that any decision to install overhead wiring in these locations is appropriately justified.

Response

The EIS commits to wire-free operation between the Jacaranda Square and Carter Street stops along Dawn Fraser Avenue, and to further investigation of opportunities for wire-free operation. The clarification in section 4.3.2 of this report provides further information about the options to power light rail vehicles (including wire-free power), constraints that influence the extent of wire-free sections which can be provided, and how the location of wire-free sections of the alignment would be confirmed during design development. Key stakeholders (including Sydney Olympic Park Authority and City of Parramatta Council) have been consulted regarding the prioritisation of additional wire-free sections. Opportunities to provide additional wire-free sections will be actively pursued through design development and following contractor engagement, in accordance with new mitigation measure LV3.

Responses to similar issues raised by DPE Environment and Heritage Group are provided in section 5.2.4 under the heading 'Overhead wiring and bat roosting on Parramatta River bridges'. This includes acknowledgement that while overhead wiring and buildings are an existing threat in the area, new wiring would increase the risk of collision for migratory birds and raptors. However, wiring used to power light rail vehicles (i.e. catenary wires) are not expected to pose a significant risk to Grey-headed Flying-foxes, as this is a single wire rather than two parallel wires, and so would not conduct electricity through a roosting individual. Microbats are much less susceptible to mortality from overhead wiring as they do not use wires for resting and are highly manoeuvrable fliers.

5.9.11 Construction Biodiversity Management Plan

Issue description

Sydney Olympic Park Authority states that the mitigation measure to prepare a biodiversity management plan (BD13) should be augmented to expand its scope (including the measures detailed in the agency advice) and adopted as a consent condition. This includes preparing the plan in consultation with Sydney Olympic Park.

Response

In accordance with mitigation measure BD11 (previously numbered BD13), a biodiversity management plan will be prepared prior to construction and implemented as part of the CEMP. The plan will include measures to protect biodiversity and minimise the potential for impacts during construction. The plan will include but not be limited to:

- measures to manage potential impacts on the Green and Golden Bell Frog
- measures to manage potential light, noise and vibration impacts on threatened and migratory fauna, such as the Green and Golden Bell Frog, within Sydney Olympic Park
- measures to manage biosecurity risks (including pathogens and weeds) in accordance with the *Biosecurity Act 2015*
- locations and requirements for pre-clearing surveys, including where clearing is required within Sydney Olympic Park and areas of mangrove, saltmarsh or other riparian vegetation
- an unexpected finds procedure

- hygiene controls in relation to chytrid fungus, cinnamon fungus (*Phytophthora cinnamomi*) and myrtle rust (*Pucciniales fungi*)
- locations and procedures for monitoring.

Mitigation measure BD11 commits to developing the management measures, including changes to measures to respond to monitoring outcomes, for works within Sydney Olympic Park and the Millennium Parklands in consultation with Sydney Olympic Park Authority.

With respect to the specific suggestions in the recommended consent conditions detailed in the agency advice, many of these are standard management plan details that would be included as the plan is developed. Others are captured by the requirement (in accordance with mitigation measure BD11) for the biodiversity management plan to be prepared in accordance with the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (Roads and Traffic Authority (RTA), 2011) and the *Policy and guidelines for fish habitat conservation and management (update 2013)* (DPI, 2013); and/or captured by existing mitigation measures (for example, a commitment to undertaking pre-clearing surveys and staged vegetation removal is provided by mitigation measure BD13).

BD13 has been amended to also reference Guide 9 (Fauna handling) to ensure appropriate relocation of fauna, and to require that pre-clearing surveys of vegetated land within Sydney Olympic Park will be conducted in accordance with the *Sydney Olympic Park Biodiversity Strategy and Management Plan* (SOPA, 2022c), in particular Section 3 (Frog habitat clearance) of Environmental Procedure 3 (Works in and near habitats).

Further information about the proposed approach to minimising potential impacts on the Green and Golden Bell Frog is provided in the responses in sections 5.2.4 and 5.9.4 of this report.

5.9.12 Site rehabilitation and landscaping

Issue description

Sydney Olympic Park Authority requests that landscape plans and plant species palettes for Wentworth Point and Sydney Olympic Park be consistent with planting plans for Sydney Olympic Park and be endorsed by Sydney Olympic Park Authority.

Sydney Olympic Park Authority also requests that the 'tree offset strategy' for Sydney Olympic Park is developed in consultation with Sydney Olympic Park Authority.

Response

Landscape plans and planting details

A response to a similar issue raised by DPE Environment and Heritage Group is provided in section 5.2.4 under the heading 'Site landscaping and use of native provenance species'.

Tree offset strategy

Mitigation measure LV6 commits to developing a tree offset strategy to offset the loss of trees and achieve a net increase in tree number and canopy. LV6 has been amended to confirm that the tree offset strategy will be prepared in accordance with the *Biodiversity Policy* (Transport for NSW, 2022a) and the *Tree and hollow replacement guidelines* (Transport for NSW, 2022b). The tree offset strategy will identify the tree replacement ratios that will apply to offset the removal of trees with reference to these guidelines.

Replacement trees would comprise a mix of endemic, native and exotic trees to give appropriate streetscape, heritage and biodiversity outcomes (including in areas of environmental sensitivity). Mitigation measure LV6 (as amended) provides that the tree offset strategy will be developed, and locations of replacement trees confirmed, in consultation and/or partnership with key stakeholders, including Sydney Olympic Park Authority.

Further information on Transport's proposed approach to managing the impacts on trees is provided in the clarification in section 4.3.3 of this report.

5.9.13 Newington Nature Reserve

Drainage works to promote viability of affected estuarine communities and reduce mosquito breeding

Issue description

Sydney Olympic Park Authority manages Newington Nature Reserve on behalf of the National Parks and Wildlife Service. The EIS identifies impacts of shadowing to mangrove and saltmarsh communities and increased flood levels of between 10 to 50 millimetres, which may have ecological impacts on estuarine communities.

Sydney Olympic Park Authority states that Newington Nature Reserve wetland is a significant breeding site for the saltwater mosquito *Aedes vigilax*. Increased flooding of the wetland is likely to increase the area of suitable breeding habitat in the upper saltmarsh, and exacerbate mosquito numbers emanating from the wetland, affecting the mosquito treatment regime.

Sydney Olympic Park Authority requests that the offset funding for impacts in this area is directed to drainage works within the wetland of Newington Nature Reserve to promote the long-term viability of the estuarine communities directly affected by the project and rehabilitate mosquito breeding hotspots.

Response

Section 5.2.2 of Technical Paper 10 (Hydrology, Flooding and Water Quality) notes that that the potential increase in flood levels would be limited to 50 millimetres during the one per cent AEP flood event and would extend into the Newington Nature Reserve. However, these events are rare and occur for short periods of time. These issues would continue to be considered during development of the flood management strategy in accordance with mitigation measure W1, as noted in the response in section 5.9.14.

Section 11.2 of the updated BDAR defines the requirements for offsetting impacts on marine vegetation. This has been updated to address DPI Fisheries' preference for rehabilitation of riparian land over monetary offsets. Transport is investigating options for on-ground works to offset biodiversity liabilities under the FM Act. This includes investigating projects in Newington Nature Reserve and the Badu Mangroves in Bicentennial Park, or other areas within Parramatta River estuary.

The habitat restoration and revegetation plan, prepared in accordance with mitigation measure BD14, will define measures for the active revegetation of mangroves at the proposed bridges over the Parramatta River, taking into account future shading impacts.

5.9.14 Flooding

Flooding management strategy required to inform biodiversity assessment

Issue description

Sydney Olympic Park Authority states that mitigation measure W1 proposes that a flood management strategy will be prepared in consultation with Sydney Olympic Park Authority. The EPBC Assessment of Significance concludes that the project will have a significant impact on the Green and Golden Bell Frog due to factors including potential spread of the noxious fish *Gambusia holbrooki* into currently fish-free breeding ponds as a result of changes to flooding regimes. The assessment notes that the flood management strategy would help to limit the potential for movement of *Gambusia holbrooki* into breeding ponds where it does not currently occur.

Sydney Olympic Park Authority states that no mitigation or management response to increased spread of noxious fish *Gambusia holbrooki* into currently fish-free breeding ponds is currently proposed, and increased Gambusia risk to Green and Golden Bell Frog is not considered in calculation of offset credits.

Response

The flood management objectives aim to limit the increase in inundation on public land to 50 millimetres or less during a one per cent AEP flood event (further information on the flood management objectives is provided as a clarification in section 4.3.5 of this report). Flood modelling undertaken for the project indicates only incremental changes to water levels within Narawang Wetland and to ponds and wetland areas (see Technical Paper 10 (Hydrology, Flooding and Water Quality) and the Supplementary Flooding Report (prepared as described in section 4.2.2 of this report)).

However, Technical Paper 9 (BDAR) and the updated BDAR notes the predation of native fauna by the noxious fish *Gambusia holbrooki* as a key threatening process, and acknowledges that the project has the potential to spread *Gambusia holbrooki* into currently fish-free breeding ponds as a result of any changes to flooding regimes. This could impact breeding within these ponds, as this fish species feeds on frog eggs and tadpoles, reducing suitability of some ponds for breeding. This finding was also included as part of the EPBC Act assessment of significance for the Green and Golden Bell Frog in Appendix G of Technical Paper 9. It is also noted that existing flooding regimes result in movement of *Gambusia holbrooki* between breeding ponds, and that this noxious species is actively managed by Sydney Olympic Park Authority.

In accordance with mitigation measure W1 (as amended) the flood management strategy, which will be prepared based on updated flood modelling to inform design development, will identify design responses and management measures in consultation with key stakeholders (including Sydney Olympic Park Authority) to minimise flooding impacts on flood sensitive areas and infrastructure within Sydney Olympic Park. This would help to limit the potential for movement of *Gambusia holbrooki* into breeding ponds where it does not currently occur. Further information on the approach to managing potential flood impacts is provided in section 5.2.1 of this report.

Offsets for the amended project have been calculated in accordance with the Biodiversity Assessment Methodology and are provided in the updated BDAR.

5.9.15 Stormwater drainage works

Impacts on stormwater systems at Sydney Olympic Park

Issue description

Sydney Olympic Park Authority states that all stormwater systems at Sydney Olympic Park flow to small freshwater waterbodies that are aquatic threatened species habitats, prior to discharging to the Parramatta River system. It is imperative that these sensitive receiving waters are protected from pollution during construction and operation.

Sydney Olympic Park Authority states that the stormwater diagram in the EIS (Figure 17.4) that has been used in MUSIC modelling is incorrect as it misidentifies the boundaries and discharge points of several sub-catchments within Sydney Olympic Park as detailed in the submission.

Sydney Olympic Park Authority requests that the water quality treatment measures noted in mitigation measure W3 be based on an accurate understanding of Sydney Olympic Park's stormwater network. It is inappropriate to discharge construction stormwater or groundwater to some of these receiving waters due to their small size, shallow nature and/or ecological sensitivity.

Sydney Olympic Park Authority also requests that the response to submissions should include a revised stormwater assessment and mitigation measures that is based on an accurate understanding of Sydney Olympic Park's sub-catchments and receiving waters.

Response

Stormwater diagram accuracy

Transport understands and acknowledges the sensitive ecological environments and regimes that exist within areas of Sydney Olympic Park. The image shown in Figure 17.4 of the EIS is not intended to show existing stormwater catchments or discharge points. The image shows the water catchments that feed into the proposed new project infrastructure and indicative discharge points.

Water quality treatment measures during construction

Mitigation measure W3 relates to water quality during operation and is not intended to address how construction water will be managed, treated and discharged. The management of water quality during construction will be defined by the soil and water management plan, which will be developed and implemented as part of the CEMP in accordance with mitigation measure W9.

Operational water quality controls

A detailed drainage design would be developed following award of a construction contract. The design would be based on updated information from Sydney Olympic Park Authority and other asset owners, and would inform the potential location of water quality treatment devices.

Mitigation measure W3 references consideration of project-specific water quality objectives in identifying potential treatment methods/controls and no update is considered necessary. As there is no new or additional design or catchment information available at this stage of the design process, there would be little value in undertaking a revised stormwater assessment. However, it is noted that mitigation measure W2 commits to designing drainage and flood management infrastructure with regard to relevant drainage design requirements and guidelines. During design development, where it is identified that the existing stormwater network does not have the capacity to manage the stormwater volumes generated as a result of the project, appropriate modifications will be undertaken in consultation with the relevant asset owner. Required modifications will be confirmed in accordance with the flood management strategy (prepared in accordance with mitigation measure W1).

5.9.16 Heritage

State Abattoir building heritage impacts

Issue description

Sydney Olympic Park Authority states that the EIS identifies that vibration impacts on the Abattoir buildings may be above screening level for cosmetic damage, and that wire-free track is proposed adjacent to these buildings to reduce visual impact to the curtilage by reducing clutter.

Sydney Olympic Park Authority requests that mitigation measure NAH11 (potential vibration impacts on built heritage items) be adopted as a consent condition, and wire-free track should be installed adjacent to the State Abattoir heritage precinct to minimise visual impact.

Response

Section 7.1.4 of Technical Paper 5 (Statement of Heritage Impact – Built Heritage) assesses the potential impacts on the State Abattoir locality and heritage conservation area and identifies the potential for minor and visual impacts.

In accordance with mitigation measure NAH11, Transport commits to managing potential vibration impacts on items of heritage significance (including the Abattoir buildings) in accordance with the *Construction Noise and Vibration Strategy* (Transport for NSW, 2019a) and mitigation measures NV13 to NV15. Further information on these measures is provided in Appendix B (Updated mitigation measures).

As described in section 6.7.4 of the EIS, wire-free power supply is proposed for the alignment along Dawn Fraser Avenue between the Jacaranda Square and Carter Street stops, which is adjacent to the State Abattoir heritage locality and heritage conservation area.

5.9.17 EIS proposed mitigation measures

Adopting biodiversity measures as consent conditions

Issue description

Sydney Olympic Park Authority requests that all biodiversity mitigative measures proposed in the EIS be adopted as consent conditions, with amendments as proposed in the submission (to measures BD4, BD7, BD8, BD10, BD13).

Response

Transport's commitments to avoid and minimise the potential impacts of the project, including impacts on biodiversity, were defined by the mitigation measures provided in chapters in Part C of the EIS, and consolidated in Appendix K (Consolidated mitigation measures). The mitigation measures (including those for biodiversity) have been reviewed and some changes have been made to:

- make additional commitments to respond to issues raised in the submissions
- modify the wording in some instances so that the intent of the measure is clearer
- respond to the findings of the updated assessments described in section 4.2.1 of this report, including the updated BDAR.

The changes made to the mitigation measures listed in the submission are shown in Appendix B (Updated mitigation measures) of this report, and described in responses in the following sections:

- BD4 overhead wiring (see section 5.9.10)
- BD7 light and noise pollution (see section 5.9.6)
- BD8 microbat friendly roost features and nest boxes (see section 5.9.7)
- BD9 (previously numbered BD10) avoiding impacts during breeding season (see section 5.9.9)
- BD11 (previously numbered BD13) biodiversity management plan (see section 5.9.11).

The consent conditions for the project (if approved) are a matter for Department of Planning and Environment.

5.9.18 Operating plan

Management of ecological risks during operation

Issue description

Sydney Olympic Park Authority requests that, prior to commencement of operations, an operational plan be prepared that addresses management of operational ecological risks – including maintenance, cleaning, lighting, noise including from public address system and tram operation. The plan should be co-written or endorsed by a suitably qualified ecologist who demonstrates extensive experience and success with landscape protection of green and golden bell frog populations, and endorsed by Sydney Olympic Park Authority for activities within Sydney Olympic Park.

Response

As described in section 23.1.2 of the EIS, an operational environmental management system would be prepared to detail how the performance outcomes, issues identified through ongoing risk analysis, commitments and mitigation measures for the project would be applied.

In accordance with new mitigation measure BD17, the operational environmental management system would define measures to manage potential operational risks to biodiversity in the Millennium Parklands (including maintenance, cleaning, lighting and protection of the Green and Golden Bell Frog populations) in consultation with Sydney Olympic Park Authority.

With respect to the proposed public address system, as described in section 6.10.5 of the EIS, the system would be used only in the event of an emergency and would be designed to minimise impacts on the amenity of the surrounding community. Regular service information would not be provided by the public address system.

5.9.19 EIS factual errors

Errors in relation to key ecological matters

Issue description

Sydney Olympic Park Authority states that the EIS contains factual errors in relation to the following key ecological matters:

- The number of Latham's Snipe occupying Narawang Wetland exceeds the threshold for a Commonwealth-significant population - annual surveys conducted by Sydney Olympic Park Authority have recorded up to 22 individuals within Narawang Wetland, and additional birds spread across other parts of the Park.
- Indirect impacts of increased lighting, noise and disturbance to Green and Golden Bell Frog, Latham's Snipe or waterbirds within Narawang Wetland, including due to removal of screening vegetation, are not considered.
- The White-bellied Sea-eagle has also been recorded nesting in mangroves on the northern bank of the Parramatta River opposite Sydney Olympic Park.
- Green and Golden Bell Frog breeding indicators have been recorded in breeding ponds close to Hill Road and Holker Street in these ponds within the past three years – their ecological value should not be dismissed due to their proximity to roads.
- The Curlew Sandpiper, Eastern Curlew and Sharp-tailed Sandpiper are regularly recorded.

Response

Number of Latham's Snipe occupying Narawang Wetland

Technical Paper 9 (BDAR) acknowledges that an important population of Latham's Snipe has been recorded in the Sydney Olympic Park area. Table 7.2 in Technical Paper 9 notes that over 22 Latham's Snipe had been recorded in the area. Discrepancies elsewhere in the report have been addressed in the updated BDAR.

Indirect impacts associated with lighting and noise

A response to this issue is provided in section 5.9.6.

Nesting locations of the White-bellied Sea-eagle

Technical Paper 9 identifies the nest tree in Newington Nature Reserve. The discussion of roosting and foraging habitat is provided in Table 6.3 of the updated BDAR, which notes that the species is regularly recorded foraging along the Parramatta River and roosting in mangroves at Ermington and Melrose Park. No nests were observed in mangroves at Melrose Park in or near the project site during surveys.

Green and Golden Bell Frog breeding ponds

Technical Paper 9 notes that large populations of the Green and Golden Bell Frog now breed in constructed ponds in the Sydney Olympic Park area (see for example Table 8.2 in Technical Paper 9). Further information in relation to issues raised about the breeding ponds is provided in the responses in section 5.9.4 of this report.

Curlew Sandpiper, Eastern Curlew and Sharp-tailed Sandpiper records

Technical Paper 9 includes an assessment of potential impacts on migratory waders, which included these species. Species records published in Birdata and eBird were investigated to provide an indication of the relative abundance of the different species in the area.