Byford Rail Extension

Response to Submissions

June 2020

EPA Assessment 2261

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Document Information

Document Name	
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1. Introduction

1.1. Aim and purpose of this document

The Public Transport Authority of Western Australia (PTA) prepared an Environmental Review Document (ERD) which was available for public review on the Environmental Protection Authority's (EPA) website for a period of two weeks from 3 May 2021 to 17 May 2021.

A total 63 submission responses, including 58 responses to government agencies and five responses to public submitters are addressed in this Response to Submissions (RTS) report. The purpose of this document is to respond to individual submissions provided through the public review process. The responses provided within this report will assist the EPA in their assessment of the Proposal.

The EPA will take the ERD and submissions received into account in preparing an assessment report recommending whether or not the Proposal should be implemented and, if recommending approval, any conditions that should apply. The EPA's report will be made public and is subject to appeal.

1.2. Submissions received

The submissions received during the two week public review period are detailed below and addressed in Tables 1 -3. The following government agencies and members of the public provided a submission:

- EPA Services Directorate,
- Department of Planning, Lands and Heritage (DPLH),
- Department of Agriculture, Water and the Environment (DAWE),
- Department of Biodiversity, Conservation and Attractions (DBCA),
- City of Armadale,
- City of Armadale Bushcare & Environment Advisory Group,
- Shire of Serpentine-Jarrahdale,
- Wildflower Society of Western Australia,
- Armadale Gosnells Landcare Inc.,
- One individual (anonymous submitter).

This RTS report summarises the submissions, the PTA's responses to the issues raised, comments made and provides the necessary information that was identified in the submissions.

2. Response to submissions

The EPA Services Directorate collated all submissions and produced a consolidated summary to the PTA. The PTA's response to each submission is provided within Tables 1-3 below.

The issues raised and comments provided in the submissions are generally related to the following key environmental factors:

- Flora and Vegetation,
- Terrestrial Fauna,
- Inland Waters,
- Social Surroundings, and
- Terrestrial Environmental Quality.

Additional comments were provided on other environmental aspects including cumulative environmental impacts and offsets.

The PTA's responses to the EPA Services Directorate consolidated summary of agency submissions are provided in Table 2. Responses to the DBCA submissions are provided in Table 3, public submissions are provided in Table 4 and additional DAWE submissions are provided in Table 5.

In order to address some of the issues raised in the submissions, more comprehensive information is provided within this RTS Report in Attachments 1 – 4. Additional information that is prepared on the topics listed in Table 2 to Table 5 and included as attachments to this document is cross-referenced from the response tables as required.

Table 1 Additional information prepared to support PTA's responses to submissions

Attachment 1	*Eucalyptus x balanites* attachment
Attachment 2	Byford ERD Calculations
Attachment 3	Carters Freshwater Mussel Translocation Strategy
Attachment 4	Byford Flora and Vegetation Monitoring Measures

Table 2 Responses to comments from EPA Services

<table>
<tr><th>No</th><th>EPA Services comment</th><th>PTA's response</th></tr>
<tr><td colspan="3">Flora and Vegetation</td></tr>
<tr><td>1.</td><td>The calculation and potential significance of impact to Forrestfield and Guildford vegetation complexes require clarification and amendment. The ERD states that the proposal will have a direct impact on 1.66ha of Forrestfield vegetation complex and 0.07ha of Guildford complex (pg. 127). However, the ERD also states that the proposal will impact 15.98ha of native vegetation and Forrestfield and Guildford vegetation complexes are the only vegetation complexes mapped within the development envelope. The impact to the two vegetation complexes should therefore be a similar area to native vegetation area.

Clarification of the values presented for Forrestfield and Guildford vegetation complexes is required to assess the significance of the proposal as the two vegetation complexes are highly cleared on the Swan Coastal Plain.</td><td>The calculations have been amended and an updated table is provided showing the distribution of the Forrestfield and Guildford complexes within the City of Armadale and Shire of Serpentine Jarrahdale.
<table>
<tr><th>Vegetation complex</th><th>Scale</th><th>Pre-European extent (ha)</th><th>Current extent remaining (ha) (%)</th><th>Extent in DE (ha) (%)</th><th>Extent in Footprint (ha) (%)</th><th>Current extent remaining after Proposal implementation (ha) (%)</th></tr>
<tr><td>Forrestfield</td><td>Swan Coastal Plain</td><td>22,812.92</td><td>2,803.36 (12.29%)</td><td>18.99 (0.68%)</td><td>11.54 (0.41%)</td><td>2,791.82 (12.23%)</td></tr>
<tr><td></td><td>City of Armadale</td><td>1,937.18</td><td>89.70 (4.63%)</td><td>12.30 (13.71%)</td><td>6.83 (7.61%)</td><td>82.87 (4.28%)</td></tr>
<tr><td></td><td>Shire of Serpentine Jarrahdale</td><td>4,514.76</td><td>411.02 (9.10%)</td><td>6.69 (1.63%)</td><td>4.71 (1.15%)</td><td>406.31 (9.00%)</td></tr>
<tr><td>Guildford</td><td>Swan Coastal Plain</td><td>90,513.13</td><td>4,607.91 (5.09%)</td><td>7.48 (0.16%)</td><td>4.44 (0.10%)</td><td>4,603.47 (5.09%)</td></tr>
<tr><td></td><td>City of Armadale</td><td>1,436.09</td><td>25.65 (1.79%)</td><td>2.90 (11.31%)</td><td>2.40 (9.36%)</td><td>23.25 (1.62%)</td></tr>
<tr><td></td><td>Shire of Serpentine Jarrahdale</td><td>12,986.67</td><td>552.25 (4.25%)</td><td>4.58 (0.83%)</td><td>2.04 (0.37%))</td><td>550.21 (4.24%)</td></tr>
</table>
</td></tr>
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No	EPA Services comment	PTA's response
2.	Monitoring and remedial actions have not been included for evaluation. More detailed information on management measures, including monitoring would be required to provide more confidence in managing potential indirect impacts. Evidence of how the management actions provided in the ERD have been utilised in other proposals may be provided to demonstrate effectiveness for this proposal.	Monitoring across the Proposal stages will determine achievement of management measures and the EPA's objectives for flora and vegetation. Environmental monitoring measures include: • Weekly visual inspections for evidence of the condition of boundary demarcation and compliance with native vegetation clearing controls, unauthorised access or clearing attributable to the Proposal, vehicle, machinery, equipment, topsoil and mulch compliance with hygiene measures, the introduction and spread of weeds within the Development Envelope and the surrounds as well as the presence of weeds in rehabilitated areas • Biannual weed monitoring will be conducted by a suitably qualified person involving visual monitoring along the project boundary within a 20m indirect impacts buffer zone to monitor for new infestations or an increase in the extent of target species and report on what areas require treatment and appropriate work method. • A TEC SCP 3a condition monitoring program will be implemented to avoid impacts on terrestrial groundwater dependent ecosystems. Indirect impacts associated with the Proposal are described in Section 6.5.2 of the Byford ERD document. The PTA or its Construction Contractor will implement measures, including monitoring, to manage potential indirect impacts to flora and vegetation. Specific management measures are discussed in Tables 25 and 26 (of the ERD). Attachment 4 provides evidence of how management actions provided in the Byford Environmental Review Document have been utilised in other proposals by the Proponent. The PTA has previously prepared monitoring programs to detect indirect impacts for the Yanchep Rail Extension and the Thornlie-Cockburn Link which have been reviewed and approved by the EPA Services and the relevant land managers. A similar approach will be applied to the Byford project.
3.	Edge effects has been identified as a potential indirect impact to flora and vegetation. This is a particularly important consideration for SCP3a, as post-clearing there will be approximately 0.16ha of SCP3a remaining as a thin strip on the eastern side of the railway line. As above, please provide detailed information on how potential indirect impacts, particularly edge effects, will be managed. The remaining extent of SCP3a post-clearing will be exposed to a range of edge effects,	During detailed design, the PTA or its contractor will investigate opportunities to minimise clearing native vegetation where practicable. Where clearing cannot be avoided, the PTA propose the following management approach for the remaining SCP3a patch south of Thomas Road within the rail corridor: • Controlled access to the remaining SCP3a patch to reduce and restrict inadvertent movement of vehicles, plant and people in this area. This may include installation of temporary fencing, barriers and/or signage. • Weeds and dieback to be managed in accordance with the PTA's Dieback and Weed Control Procedure 7310-000-005. • Vegetation condition monitoring to be implemented during construction to monitor health of TEC SCP 3a patch.

No	EPA Services comment	PTA's response
	undermine integrity and long-term survival. Please demonstrate how this will be managed.	During operation the PTA will implement biannual weed monitoring and targeted spraying program . The aim of this management action is to minimise the introduction and/or spread of weeds within the Development Envelope and into areas of adjacent vegetation. The PTA will also implement the PTA Bushfire Management Strategy to reduce bushfire risk during Proposal operation. This patch of TEC is already exposed to a range of edge effects. The PTA will implement the above management actions to minimise indirect impacts from the Proposal on this SCP3a patch.
4.	Will there be a minimum separation of 50m or 100m between the proposal's bores and SCP3a occurrences? On p.139 it states, 'Applying the precautionary principal, as far as is practicable, the PTA will adopt a minimum separation of 100 m to ensure there are no drawdown impacts to occurrences of TEC SCP 3a within Lambert Lane Nature Reserve and Fletcher Park, and south of Thomas Road.' Further below it then states 'Indirect impacts from groundwater abstraction for construction of the Proposal on TEC SCP 3a occurrences (post-clearing) are not anticipated (Table 21). This is due to the separation distance of at least 50 m, and as far as practicable 100 m between the proposed construction water supply bores and TEC 3a occurrences.'	The PTA confirm that there will be a minimum separation distance of 50 m between TEC SCP 3a and the location of abstraction bores. As far as reasonably practicable, the PTA will try to locate abstraction bores at least 100 m from occurrences of TEC SCP 3a. However, it should be noted that construction water will be abstracted from the Leederville and Yarragadee Aquifers; deep semi-confined or confined aquifers. Abstraction from these aquifers will not impact on groundwater levels within in the superficial aquifer and is therefore unlikely to impact GDEs.
Terrestrial Fauna		
5.	The ERD states that the development will result in the permanent loss of 61.1ha of foraging habitat for Forest Red-tailed black cockatoo, including 8.65ha in moderate to high value, and 52.49 ha of low value foraging habitat. The low foraging habitat includes VSA1 (41.82ha), defined as grassland/paddock with scattered	VSA1 was assessed by Bamford (2021) as paddocks and grassland with scattered trees (a mix of native species such as Marri and Jarrah and non-native eucalypts and exotic species). Bamford (2021) noted that the value for fauna of different VSAs is not uniform and is dependent upon context. For this reason, VSA1 was included in the assessment, albeit assigned a low foraging value for forest red-tailed black cockatoo as this species is common locally. The PTA acknowledges that parts of VSA1 provide no foraging value for forest red-tailed black cockatoo (e.g. those parts that are paddock or grassland without foraging trees). However, this is generally accounted for by assigning VSA1 a low overall value (a score of 2 out of 10 was

No	EPA Services comment	PTA's response
	tees. It is noted from aerial imagery that this includes grassland with no foraging value to Forest Red-tailed black cockatoo. Please clarify and revise extent of Forest Red-tailed black cockatoo foraging habitat.	assigned by Bamford (2021) The PTA will review the offset required to counterbalance the significant residual impact to forest red-tailed black cockatoo habitat.
6.	The fauna management measures described in the ERD are appropriate for terrestrial fauna, however, the management focuses on post-construction activities (Table 37). Please provide management actions to reduce direct impacts to fauna during construction. For example, consideration of the requirement for pre-clearance surveys, fauna spotters and translocations or exclusion of quenda and rakali, on advice from DBCA, to avoid mortality of individuals during clearing.	A fauna specialist will be engaged to conduct a pre-clearing trapping and relocation program of ground-dwelling conservation significant fauna no more than seven days prior to clearing activities. Quenda or Rakali individuals observed in the footprint will be relocated by the fauna specialist to neighbouring suitable habitat or to locations confirmed in consultation with DBCA. The trapping and relocation of fauna will be undertaken in accordance with a licence as required by the Biodiversity Conservation Act 2016. A qualified fauna spotter will be on-site during clearing operations to supervise the dispersal or relocation of fauna species and to identify potential injured fauna. Directional clearing will be undertaken to allow fauna species present to move into adjacent areas. During black cockatoo breeding season (1 July to 31 December), appropriately qualified and licenced terrestrial fauna spotter(s) with experience in surveying for black cockatoos shall inspect all potential nesting trees with hollows within seven days prior to clearing of potential nesting trees. If any black cockatoos are found to be using hollows the tree and vegetation within a 10m buffer radius shall not be cleared until an appropriately qualified and licenced fauna spotter has verified the hollows are no longer being used by the black cockatoos. Open trenches will be inspected twice daily and any trapped fauna removed by an appropriately qualified person. Egress points and fauna refuges will be provided in open trenches at intervals not exceeding 50 metres.
Offsets		
7.	The amendment to Forest Red-tailed black cockatoo foraging habitat as raised in Item 1 under Terrestrial Fauna, will result in an amendment to offsets required to counterbalance the significant residual impact to Forest Red-tailed black cockatoo habitat. Please provide a revised offset calculation and justification for this impact.	VSA1 was rated by Bamford (2021) as low foraging value for forest red-tailed black cockatoos. The PTA will review the offsets required to counterbalance the significant residual impact to forest red-tailed black cockatoo habitat based on the low foraging value of VSA1.

Table 3 Responses to comments from Department of Biodiversity Conservation and Attractions

No	DBCA comment	PTA's response
Threatened Flora		
1.	*Eucalyptus x balanites (Critically Endangered)* The Construction and Environmental Management Plan (CEMP) should consider any potential impacts to the previously known single occurrence of Eucalyptus x balanites, which is further west from the plants shown in the ERD, near the oval and western edge of Fletcher Park.	The GHD (2021a) mapping contains a location error regarding *Eucalyptus x balanites*. One individual was recorded from the DBCA corporate record. Please refer to Attachment 1 for further information on location details of *Eucalyptus x balanites*. The PTA will apply the management measures outlined in the ERD to avoid and minimise indirect impacts to adjacent vegetation (including significant flora) from the Proposal. The Construction Contractor will develop and implement a CEMP, which will consider potential indirect impacts to the occurrences of *Eucalyptus x balanites*. As a minimum this will include measures to prevent any unauthorised clearing via an internal ground disturbance permit process, measures to prevent unauthorised access into non-approved areas and measures to prevent offsite discharges including dust.
2.	*Eucalyptus x balanites (Critically Endangered)* DBCA notes that the location of *Eucalyptus x balanites* shown in ERD figure 14B (page 109) is different from the DBCA corporate record. It appears that GHD (2021a) found two new plants and did not locate the known plant, which is on the western side of Fletcher Park, approximately 30m from the edge of the rail reserve, closer to potential impacts than the two plants recorded.	The GHD (2021a) mapping contains a location error regarding *Eucalyptus x balanites*. One individual was recorded from the DBCA corporate record. Please refer to Attachment 1 for further information on location details of *Eucalyptus x balanites*.
3.	*Diuris purdiei- (Endangered)* It is recommended that the extent of the *D. purdiei* habitat in the south of Fletcher Park be mapped and the potential impact to the species be assessed based on the amount of habitat likely to be impacted. If areas of suitable habitat are likely to be impacted by the proposal, an authorisation under Section 40 of the BC Act for inadvertent take will be required for soil stored seed and underground tubers.	The record of *Diuris purdiei* is located within GHD VT01 in the south of Fletcher Parker. The record is also located within an area mapped as FCT3a. The PTA consider the residual impact to clearing FCT3a significant and have prepared an offset strategy to counterbalance the significant residual impacts of the Proposal. While the PTA do not consider potential impacts to *D. purdiei* habitat in the south of Fletcher Park as a significant residual impact, habitat associated with this record is being offset through the offset to counterbalance impacts to FCT3a. The Construction Contractor will develop and implement a CEMP, which will consider potential indirect impacts to the record and associated habitat of *Diuris purdiei.* The PTA or its Construction Contractor will obtain authorisation under Section 40 of the BC Act for the inadvertent take for

No	DBCA comment	PTA's response
	D. purdiei is known from 19 populations over a range of 110km north-south x 60km east-west. Surveys have only identified plants at 3 of the 19 populations since 2005. It is possible that plants may no longer persist at all populations and the actual number of total plants is likely to be less than estimated. *D. purdiei* occurs in in seasonally damp areas and is susceptible to weed incursion, disease disturbance and changes to hydrology. The proposal has potential to exacerbate these impacts. The Construction Environmental Management Plan (CEMP) and detailed site planning should identify measures to avoid and mitigate risks against any adverse impacts on *D. purdiei*. The ERD describes that a previous record of *D. purdiei* in the south of Fletcher Park is present within the development envelope (page 117). *D. purdiei* only flowers after a hot summer or early autumn fire and is difficult to identify when not in flower. Targeted searches across the development envelope, including the previous record, during the flowering period did not record the species. The data point for the Fletcher Park record is 18m from the proposal footprint and comprises 9 plants, which were recorded in 2005 and described as occurring between the rail corridor ad private property. Whilst the exact location of each of the 9 plants is not known, the habitat for the population will be a polygon larger than the point record and may extend into the footprint of the railway works. Given there has been no recent fires, a targeted survey is unable to be completed and the impact to this population cannot be determined.	potential stored seed and underground tubers in topsoil to be stripped within the development envelope prior to the commencement of construction.

No	DBCA comment	PTA's response
4.	*Johnsonii cygnorum subspecies pubescens (Priority 2)* DBCA suggests that the known Perth Airport population of *Johnsonii cygnorum subspecies pubescens* is not considered in the calculations for the total known population of the species. *Johnsonii cygnorum subspecies pubescens* is known from 10 locations over a range of 70 km north-south by 20km east-west. The total number of plants for this species is unknown, as plant counts only exist for a few locations. Within the study area, a total of eight plants were located. The two nearest occurrences are approximately 5km and 7.5km to the south, with an unknown number of plants found at these occurrences. The BRE proposal will result in the taking of three plants and is likely to indirectly impact a further two plants. This is a 62% impact on known plants within the development envelope. DBCA notes in Appendix B that five of the locations within the development envelope are new records and additional populations have been identified along Tonkin Highway. If very few plants persist in the region, the occurrence within the proposal area may be of regional significance. It is only when compared to the 2,201 plants in Perth Airport, where the taking of 5 plants could be considered as unlikely to be significant to the species. As the Perth Airport is Commonwealth land, DBCA considers it unlikely that the Perth Airport population, which is not listed under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), will be retained, given the future development proposed in the approved Perth Airport Master Plan.	Population information on *Johnsonia pubescens* subsp. *cygnorum* was requested from DBCA in February 2021 in order to estimate potential regional impacts on the subspecies as a result of the Proposal. A total population estimate of 2,201 was provided by DBCA to PTA in March 2021. It is understood that this total includes specimens that have been recorded in bushland at Perth Airport. In their submission, the DBCA states that the species is known to occur at ten locations in the region. However, according to GHD (2021) there are 18 records within the region where the species has been recorded representing 14 populations. Two of these populations occur on DBCA managed land (Woodman Environmental, 2021). A biological survey for the Tonkin Highway Grade Separated Interchanges (TGSI) Project (Woodman Environmental, 2021) recorded many occurrences of *Johnsonia pubescens* subsp. *cygnorum*. The species was recorded at 227 locations in the survey area (164 in the TGSI project development envelope and 63 outside of the development envelope). Woodman Environmental (2021) recorded 282 specimens in the survey area. An additional four individuals were recorded in the TGSI development envelope by GHD (2021). GHD (2021) recorded six locations (eight individuals) in the BRE survey area. Five of the locations (seven specimens) represent new records. The updated population estimate is 2,494 being comprised of the 2,201 individuals estimated by the DBCA, 286 specimens recorded in the TGSI survey area and the seven new records in the BRE survey area. With additional surveys further populations could be recorded in the Perth region (GHD, 2021). The BRE proposal will directly impact three specimens and potentially indirectly impact two specimens representing 0.20% of the current estimated population. However, accurate population estimates are not available as counts for individual specimens have not been completed at all known populations. The potential cumulative impact to the species is estimated to be 1,123 specimens. This is comprised of impacts attributable to the following projects: • Five specimens for the BRE proposal (three to be directly impacted and two specimens indirectly impacted), • 119 specimens impacted by the TGSI project, and • Up to 999 specimens impacted on Perth Airport land (429 for the Airport West Project and up to 570 individuals for the New Runway Project). This assumes complete loss of the species in these project areas.

No	DBCA comment	PTA's response
		The impact attributable to the BRE project is insignificant in comparison to the scale of potential impacts attributed to the Perth Airport projects. The loss of the five specimens represents 0.44% of the predicted cumulative loss. PTA considers the impact of the Proposal on *J. pubescens* subsp. *cygnorum* is not significant as the predicted impacts represent a very small number of individual specimens. The specimens impacted are not considered an outlier population or at the edge of the species range. The loss of this small number of plants will not result in a significant loss of genetic material for the species.
5.	*Threatened Ecological Communities* Refer to DBCA Byford Rail ERD Comments Redacted DBCA has reviewed Appendix B Flora and Vegetation Assessment GHD March 2021(Appendix B), and Section 6, Flora and Vegetation in the ERD and has identified discrepancies in the data used to assign the floristic community type (FCT) for the quadrats shown in Table 13 of Appendix B. This is likely caused by the accepted methodology for determining FCT's be undertaken in reverse, as discussed below, which isn't in accordance with standard practice.	The PTA contends that the FCT analysis conducted by GHD is correct. In response to the statement "The vegetation units as described require re-evaluation, to provide a vegetation map, inclusive of quadrat locations, that aligns with the FCTs, following the recommended assignments of FCTs based on quadrat data and not on pre-determined vegetation units.", PTA does not believe the vegetation units need to be re-evaluated. GHD undertook FCT analysis independently of the vegetation type assessment. Field botanists determined the vegetation types using a variety of methods: a combination of aerial photography, field data/observations and previous vegetation mapping). The report provides a summary of the vegetation types (Table 11, GHD 2021). Senior botanists undertook quadrat based FCT analysis in a separate process. The Senior botanist used collected quadrat data, then compared and analysed against two available datasets, the Gibson et al. (1994) dataset (referred to as the Gibson Dataset) and the Keighery et al. (2012) dataset (accessed through NatureMap (DBCA 2021), referred to as the Keighery Dataset) using appropriate statistical techniques and parameters (PATN). GHD then tabulated both quadrat (Table 13) and vegetation type (Table 12) to demonstrate where FCTs are present and where multiple FCTs are present within the one vegetation type. In this assessment, multiple FCTs were not deemed to occur within a single vegetation type. PTA acknowledges the FCT alignment presented by DBCA in Table 1 of their submission. However, the GHD FCT alignment is justified when a review of all results from the analysis (SSI and dendrograms) and collected field data is considered. As stated throughout the report, the analyses are based on the presence/absence of species only, and it is expected the analyses may be limited in differentiating between similar FCT types such as SCP 3a, 3b and 3c. In this assessment, due to the degraded nature of the vegetation, there were limited quadrats able to be sampled in Good or better condition.

No	DBCA comment	PTA's response
		The results of the analysis reflect this, with a portion of the quadrats determined to be inconclusive. In light of these limitations and based on analysis results, as well as habitats, key species, existing DBCA database mapping and recovery plans, and previous studies (i.e. AECOM 2020) FCTs were assigned. GHD quadrats BRE01, BRE02, BRE05 are all located in the eastern portion of Fletcher Park, with BRE07 located in the rail corridor. The DBCA TECPEC dataset indicates the vegetation is FCT 3a. Other surveys have mapped FCT3a in the rail reserve in Lambert Lane Nature Reserve and Fletcher Park area (AECOM 2020). Field observations indicated the vegetation has similar characteristics to FCT 3a. The GHD FCT analysis results were variable and did not show a strong alignment any specific FCT. Therefore, GHD do not consider there is enough evidence to dispute the current assignment as FCT3a to the vegetation in Fletcher Park. GHD quadrat BRE07 is within the area mapped as SCP 3a by the DBCA (Interim Recovery Plan/TECPEC dataset). The FCT analysis produced variable results and low similarities for this quadrat. Given the FCT results and existing information from DBCA, this quadrat was assigned to FCT 3a. Assigning this FCT3b would appear to be to be at variance with existing publicly available data produced by DBCA. GHD BRE17 is located within the rail corridor, south of Thomas Road. This quadrat was rated Degraded in condition and the FCT results were variable with the similarities matrices and dendrograms producing different results. In this instance field observations were given a greater weighting than the analysis results (due to variability). While the similarity shows the greatest similarity to one quadrat of SCP3c, other results indicate different FCTs. Using other methods, such as reviewing species lists for this area indicates no clear FCT alignment. This quadrat is an example of limitations of statistical analyses, particularly when assessing degraded vegetation. In the Consultant's opinion this quadrat determination is inconclusive. BRE_19 is located within the rail corridor, south of Thomas Road. This quadrat was challenging to assign due to small size of intact vegetation present and ongoing maintenance activities (including managing overstorey vegetation). In this instance field observations had a greater weighting than the analysis results. The vegetation was similar in composition to BRE16 (on the western side of the railway) and had similar landform features and soils. It contained key indicator species for SCP3 communities (i.e. both SCP3a and 3c). Reviewing species lists for areas on both the western and eastern side of the railway showed no discernible difference. It is acknowledged, south of this area SCP3c is mapped on the eastern side of the railway and SCP3s is mapped on the western side of the railway. Based on the mixed, analysis results and in the absence further evidence at this location, it was the Consultant's opinion that the area represented SCP3a.

No	DBCA comment	PTA's response
6.	Regionally Significant Vegetation DBCA understands that the Department of Planning, Lands and Heritage, in accordance with State Planning Policy 2.8 (Bushland Policy for the Perth Metropolitan Region), will provide advice in relation to the direct and indirect impacts from the proposal to the regionally significant vegetation contained within Bush Forever site 264 (Lambert Lane Bushland, Wungong), Bush Forever site 266 (Wungong Brook) and Bush Forever site 350 (Byford to Serpentine Rail/Road Reserves and Adjacent Bushland).	The PTA have identified five potential Bush Forever sites for offsets within the **Draft Offset Strategy (Appendix R)**. The Department of Planning, Land and Heritage (DPLH) has reviewed the potential offsets and provided comments that acknowledge PTA's intent to offset Bush Forever with protection of alternative Bush Forever sites. As per DPLH's request, further discussion with the DPLH will take place to decide which site would be the most appropriate as an offset to ensure it aligns with the *State Planning Policy 2.8 – Bushland Policy for the Perth Metropolitan Region* (SPP 2.8).
Terrestrial Fauna		
7.	Any inadvertent take of fauna listed as threatened under the BC Act will require an authorisation to take under Section 40 of the BC Act. A number of surveys were undertaken to support the preparation of the ERD, the Byford Rail Extension Assessment of Possible Black Cockatoo Breeding Hollows (Kirby 2021), Byford Rail Extension Consolidated Fauna Assessment 2021 (GHD 2021b), Byford Rail Extension Fauna Spring Survey 2020 (Bamford Consulting 2021), and the Metronet – Byford Rail Extension Part One Flora and Fauna Assessment (AECOM 2020b). It is expected that the management of native terrestrial fauna species during the implementation of the proposal will be further addressed in the Construction Environmental Management Plan and associated plans.	A fauna specialist will be engaged to conduct a pre-clearing trapping and relocation program of ground-dwelling conservation significant fauna no more than seven days prior to clearing activities. The trapping and relocation of fauna will be undertaken in accordance with a licence as required by the *Biodiversity Conservation Act 2016*. A qualified fauna spotter will be on-site during clearing operations to supervise the dispersal or relocation of fauna species and to identify potential injured fauna. The trapping and relocation of significant vertebrate fauna by the fauna specialist will be undertaken in accordance with a licence to take fauna under Section 40 of the *Biodiversity Conservation Act 2016*. All required licences and authorisations will be completed prior to the commencement of construction. The PTA or its Construction Contractor will prepare a Construction EMP prior to commencement of construction. The CEMP will address all significant construction related risks, including those to fauna. Directional clearing will be undertaken to allow fauna species present to move into adjacent areas. During black cockatoo breeding season (1 July to 31 December), appropriately qualified and licenced terrestrial fauna spotter(s) with experience in surveying for black cockatoos shall inspect all potential nesting trees with hollows within seven days prior to clearing of potential nesting trees. If any black

No	DBCA comment	PTA's response
		cockatoos are found to be using hollows the tree and vegetation within a 10m buffer radius shall not be cleared until an appropriately qualified and licenced fauna spotter has verified the hollows are no longer being used by the black cockatoos. Open trenches will be inspected twice daily and any trapped fauna removed by an appropriately qualified person. Egress points and fauna refuges will be provided in open trenches at intervals not exceeding 50 metres.
8.	*Black Cockatoo habitat* The ERD (page 157 and 193) identifies a significant residual impact in the permanent loss of significant fauna habitat comprising • 8.65 ha of foraging habitat for Baudin's cockatoo classified entirely as moderate value foraging habitat • 19.3 ha of foraging habitat for Carnaby's cockatoo comprised of 8.65 ha of moderate value foraging habitat and 10.67 ha of low value foraging habitat • 61.1 ha of foraging habitat for Forest Red-tailed Black Cockatoo comprised of 8.65 ha of moderate to high value foraging habitat and 52.49 ha of low value foraging habitat • Loss of up to 139 potential Black Cockatoo breeding trees with a diameter at breast height equal or greater than 500mm (300mm for Wandoo), 131 (94.4%) with no hollows, and eight (5.8%) with hollows not suitable for black cockatoos. The PTA propose to offset the residual impacts of the proposal on Black Cockatoo species at Lowlands Nature Reserve, the established METRONET offset site (see comments in Proposed Offset Section).	The Development Envelope and Footprint for the Proposal have been designed to minimise the extent of clearing of fauna habitat. PTA will further investigate avoiding areas of fauna habitat during the detailed design phase, where practicable. PTA will offset the significant residual impacts of the Proposal at Lowlands Nature Reserve, the established METRONET offset site. The PTA considers that through implementation of the mitigation hierarchy, application of the management actions, and implementation of offsets to compensate for significant residual impacts, the Terrestrial Fauna environmental factor can be managed during the construction and operation of the Proposal to meet the EPA's objective to *protect terrestrial fauna so that biological diversity and ecological integrity are maintained*.

No	DBCA comment	PTA's response
9.	*Aquatic Fauna* DBCA notes in the ERD that the mitigation measures to protect the Carter's Freshwater mussel will include relocation. A Ministerial Authorisation under Section 40 of the BC Act to take threatened fauna will be required for the proposed relocation of Carter's Freshwater Mussel. The desktop assessments identified five fish species as potentially occurring within the development envelope, one of which, the Pouched Lamprey (P3) is a conservation significant species. The ERD (page 174) states field surveys only recorded one species, the introduced Mosquito fish *Gambusia holbrooki* in Wungong Brook., The Fauna Assessment, (Bamford 2020) describes that the introduced Mosquitofish was observed during the site visit, and that fauna observations in the field survey were opportunistic.	An application to take Threatened fauna under Section 40 of the BC Act will be submitted to the DBCA prior to translocating the Carter's Freshwater Mussel. A Translocation Procedure has been drafted (refer to Attachment 3). This procedure will be refined and submitted with the Section 40 application prior to construction activities occurring at Wungong Brook. Desktop assessments conducted by AECOM and Bamford Consulting identified five fish species as potentially occurring within the Development Envelope and its surrounds. The field survey, undertaken by Bamford Consulting, observed the introduced Mosquitofish *Gambusia holbrooki* in Wungong Brook.
Inland Waters		
10.	*Wetlands* While DBCA's Wetlands Section has completed a broad assessment of the ERD document and Wetland Assessment, further review of the proposed changes to the Geomorphic wetland mapping, and the detailed management of wetland impacts is required. Further assessment of some wetland evaluations described in the ERD may require verification by DBCA's Wetlands Section.	PTA acknowledges that DBCA may provide further wetland assessment advice and will address any further DBCA queries relating to the wetland assessment as required.
11.	Stream Environment and Water undertook a Byford Rail Extension: Wetland Assessment (January 2021) (Appendix J) to inform and support environmental assessments for the project. The ERD describes that the development footprint overlaps seven wetlands	PTA acknowledge that the calculations included in the ERD are based on recommended changes to the Geomorphic wetland mapping that are yet to be verified by DBCA . The Wetland Assessment completed by Stream (2021a) followed the evaluation procedures detailed in *A methodology for the evaluation of wetlands on the Swan Coastal Plain, Western Australia* (DBCA

No	DBCA comment	PTA's response
	included in the Geomorphic Wetlands of the Swan Coastal Plain dataset (GWSP) and will directly impact approximately 55.5 ha of wetlands of which 3.5 hectares is Conservation Category wetland (CCW) and 51.9 ha is Multiple Use wetland (MUW) category (page 262 and 269). The ERD notes (page 278) that Stream 2021a (Appendix J) recommends that 0.9ha of CCW should be changed to MUW, and as result a total of 2.6ha of CCW would be impacted." This calculation is dependent on the reclassification of portions of wetlands and needs clarifying, as a reclassification process for this has not yet been undertaken.	2017a). Where changes were recommended to management categories of wetlands (or sections of wetlands) they were based on the outcomes of the desktop and field assessment following the assessment methodology detailed in DBCA (2017a). Details of the assessment results including field data sheets for assessment sites and site photographs are provided in Stream (2021a). The three wetlands referred to in the ERD on page 278 as recommended to be changed from Conservation to Multiple Use management category were assessed as retaining limited wetland values. Details of the assessment for each wetland, including their evaluation based on desktop and field assessment results are provided in the Stream (2021a) report. Even though the degraded 0.9 ha portion of the CCW wetland has not been reclassified to MUW PTA contends impacts to this 0.9 ha portion should not be considered a significant residual impact.
12.	It is DBCA's understanding that the licencing process under Section 5C of the *Rights in Water and Irrigation Act 1914* will require operating strategies that address the environmental issues relating to abstraction of groundwater for construction activities in proximity of Groundwater Dependant Ecosystems including Lambert Lane Nature Reserve, and that bores will be placed at least 50 metres, and where possible 100 metres away from sensitive receptors (page 275).	PTA will be required to submit a 26D licence to construct any groundwater abstraction wells and 5C Licence applications to abstract groundwater or dewater an excavation beyond certain volumes. The 5C licence will include operating strategies. Construction water will be sourced from the Leederville or Yarragadee aquifers subject to approval under the RIWI Act. These aquifers are deep semi-confined or confined aquifers. Temporary abstraction from these aquifers will not impact groundwater levels in the shallow superficial aquifer.
13.	*Wungong Brook* Wungong Brook is within the catchment area of the Swan Canning River system as defined in the *Swan and Canning Rivers Management Act 2006* (SCRM Act). The objectives of SCRM Act include the management of activities that affect the ecological and community benefits and amenity of the Swan and Canning rivers. The Wungong Brook is part of the Southern River Catchment which flows into the	PTA will be required to prepare a Development Approval application for works that impact the SCRM Development Control Area. The Development Approval application will be submitted to DBCA for review and comment. DBCA's conditions will become binding on the Project. The PTA will prepare a Construction EMP prior to commencement of construction. The CEMP will address all significant construction related risks, including those related to the proposed activities at Wungong Brook .

No	DBCA comment	PTA's response
	Canning River. Activities within the catchment have the potential to impact on the river system. It is noted that an overarching CEMP will be developed and implemented to address the management of key environmental factors. DBCA considers that the preparation of specific management plans, including a management plan regarding impacts on Wungong Brook and associated vegetation would mitigate the impacts to the relevant environmental factors. (refer to additional in the Environmental Management Plans Section detail below). A Water Quality Improvement Plan has been prepared for the Southern River Catchment which aims to draw together activities that contribute to improved water quality outcomes, including developing projects based on partnerships with local government, community and shared stakeholders. The Armadale Gosnells Landcare Group (AGLG) is very active in this area and should be consulted in regard to impacts and appropriate rehabilitation.	
14.	*Wungong Brook* In the vicinity of the proposed crossing there is relatively intact overstorey including mature marri (*Corymbia calophylla*) and flooded gum (*Eucalyptus rudis*). Clearing of riparian vegetation associated with Wungong Brook would contribute to localised degradation of the Brook, through loss of vegetation cover. Weed management and replanting with native species would be supported. The Rivers and Estuaries Branch of DBCA can be contacted for further detail regarding the condition of the brook and known weed species.	PTA acknowledges the SCRM DCA and will seek approval under that legislation once detailed design is available. Any requirements with respect to loss of vegetation and re-instatement works will be incorporated into the management plan to the satisfaction of DBCA.

No	DBCA comment	PTA's response
15.	*Wungong Brook* It is also recommended that site specific stormwater management plans be prepared to demonstrate that the potential hydrological impacts to high value wetlands and the Wungong Brook during and post-construction will be adequately managed.	Detailed design will include preparation of a stormwater design which utilises water sensitive urban design principles to minimise hydrological impacts to wetlands and other surface water features such as the Wungong Brook. The stormwater design will preserve surface water flows that cross the rail corridor and incorporate pollution control measures to ensure water quality is not adversely impacted.
Management Plans		
16.	"It is understood that the CEMP is an overarching framework document that will be prepared to address management of key environmental factors, largely using management-based provisions. It is expected that the CEMP will be referred to DBCA for comment on the proposed management of construction in areas containing TEC's and wetlands, the crossing of Wungong Brook, and nearby creeklines and adjoining Lambert Lane Nature Reserve. Environmental management plans (EMP) relevant to specific environmental values impacted by the development, should be prepared to build on the actions outlined in the CEMP and ensure that management actions adequately consider the ecological and hydrological functions of these important environments. The following specific EMPs should be prepared in consultation with DBCA: Wungong Brook– a management plan is required to provide detailed information about the design and construction methodology for the proposed crossing of Wungong Brook and nearby creeklines, and including the removal of the pylon. Mitigation measures should be included that address:	The PTA's contractor will prepare a Construction EMP to outline how environmental impacts will be managed during the construction phase of the project. Specific environmental issues such as construction in areas containing TECs, wetlands, Wungong Brook and other drainage lines, Lambert Lane/Fletcher Park, Carter's Freshwater Mussel, etc. will be addressed in more detail within Environmental management sub-plans or via the incorporation of procedures. The Construction EMP, or excerpts from the document can be provided to DBCA for review. As the project will be situated within an existing operating rail reserve the PTA does not consider any additional impacts on wetlands resulting from the project significant enough to warrant a stand-alone Wetlands Management Plan. The PTA will consult with DBCA during the development of the CEMP on measures to protect high value wetlands. PTA acknowledges that a Development Approval for works that impact the SCRM Development Control Area at Wungong Brook will be required. The Development Approval application will be submitted to DBCA for review and approval. This will include environmental management measures to address these DBCA comments for Wungong Brook. DBCA's approval conditions will become binding on the Project.

No	DBCA comment	PTA's response
	• impacts to altered river flow and ecological function, including impacts to natural • water flows and any indirect impacts on the Brook and associated vegetation; • control of sediments entering the brook or being disturbed within the brook, bank • protection and erosion control measures; • Proposed water quality monitoring; • clearing of riparian vegetation; • proposed revegetation and weed control; • management of stormwater and floodwaters; • fill requirements; • impacts from noise and vibration; • impacts from water abstraction and dewatering; and • visual impact. • management of the Carters Fresh Water Mussel, relocations, and reporting arrangements. Management should be in accordance with relevant guidelines and best management practices in consultation with DBCA. • consideration of requirements for fish survey in the area potentially impacted by the proposed works. Wetlands – to ensure that impacts to high value wetlands are identified and mitigated during both the construction and operation of the rail line, a wetland management plan should be prepared, which would include the wetland vegetation on Lambert Lane	

No	DBCA comment	PTA's response
	Nature Reserve. Detailed measures to mitigate hydrological impacts, protect and maintain riparian and wetland dependant vegetation and monitor changes to flora, fauna and hydrology during and post- construction should be included in the plan. Identification and management of any changes to the hydrology of wetlands as a result of the construction of additional hardstand areas, disruption to natural flows and hydrological catchments as a result of the project, which are not currently addressed in the CEMP, could be included in this plan."	
Offsets		
17.	The ERD describes that the proposal will cause the following unavoidable significant residual impacts: • Permanent loss of significant vegetation, comprising: 2.83 ha of Corymbia calophylla - Kingia australis woodlands on heavy soils (SCP 3a) TEC- 1.54 ha of native vegetation associated with Bush Forever Site Nos. 264, 266 and 350. • Permanent loss of significant fauna habitat comprising: o 8.65 ha of foraging habitat for Baudin's cockatoo classified entirely as moderate value foraging habitat o 19.3 ha of foraging habitat for Carnaby's cockatoo comprised of 8.65 ha of moderate value foraging habitat and 10.67 ha of low value foraging habitat o 61.1 ha of foraging habitat for Forest Red-tailed Black Cockatoo comprised of 8.65 ha of moderate to high value	Acknowledged. If there are changes to the significant residual impacts the PTA will amend the offsets required to counterbalance the impacts in the final offset strategy.

No	DBCA comment	PTA's response
	foraging habitat and 52.49 ha of low value foraging habitat o Loss of up to 139 potential Black Cockatoo breeding trees, 131 (94.4%) with no hollows, and eight (5.8%) with hollows not suitable for black cockatoos. Loss of 2.6 ha of Conservation Category Wetland that retains conservation values.	
18.	DBCA vegetation association mapping indicates that the Lowlands Nature Reserve contains vegetation suitable as foraging habitat for all three black cockatoo species. There is likely to be sufficient foraging resource within Lowlands Nature Reserve to meet the target for the Byford Rail offset proposal outlined in the draft Offset Strategy.	Acknowledged. If there are changes to the significant residual impacts the PTA will amend the offsets required to counterbalance the impacts in the final offset strategy.
19.	DBCA further notes that Lowlands Nature Reserve also contains a record of the priority 2 flora species *Johnsonii cygnorum* subspecies *pubescens*. Therefore, in finalising the development of the Offset Strategy it is likely to be possible to modify, or add to, the proposed management offset actions at Lowlands Nature Reserve to provide a conservation benefit to this species and its habitat.	The impact assessment did not identify a significant residual impact to *Johnsonia pubescens* subspecies *cygnorum* and therefore the PTA do not propose to offset this Priority 2 flora species. The PTA are funding on-ground management of Lowlands in its entirety. Therefore, these management actions will result in a conservation benefit to *Johnsonia pubescens* subspecies *cygnorum* through weed and pest animal control.

No	DBCA comment	PTA's response
20.	The DOS outlines that the preferred offset for SCP3a is to locate new occurrences of the TEC for acquisition and inclusion in the conservation estate, conservation management and revegetation, but that this option is unlikely to be feasible due to the difficulty in locating new occurrences in suitable condition, on properties that are available for acquisition, and are suitable to be included in the conservation estate. The PTA have engaged a consultant to conduct a reconnaissance survey in an attempt to identify unrecorded occurrences of SCP3a. DBCA agrees that, where possible, an offset that secures new occurrences that are in good condition and likely to persist in the long term is the preferred option.	Acknowledged. The reconnaissance survey is on-going and the PTA will discuss the findings and outcomes with the DBCA.
21.	In the absence of additional occurrences being found, the DOS describes that supplementing management actions with some revegetation on existing protected occurrences of SCP3a is likely to provide the best environmental outcome for the ecological community, which, with management, will prevent degradation and/or maintain or improve the condition of existing occurrences of SCP3a, ensuring the larger patches persist in the long-term. The PTA has identified multiple sites as being potentially suitable for additional management to offset SCP3a, with. Lambert Lane Nature Reserve, Watkins Road Nature Reserve, Brickwood Reserve, Fletcher Park and Rapids Road Bushland selected for consideration in the Draft Offset Strategy. The PTA has consulted DBCA to discuss offset options for the SCP3a TEC. DBCA expects that the PTA will liaise further with the DBCA on the development of any offset actions that are proposed	Acknowledged. The PTA will continue to liaise with the DBCA on the development of any offset actions for the SCP3a TEC.

No	DBCA comment	PTA's response
	to occur on DBCA managed lands or delivered in part or whole by the DBCA before finalising the offset strategy., and that DBCA will have the opportunity to provide Further advice on the proposed offsets can be provided by DBCA to ensure that the final offset strategy adequately compensates the residual impact on the SCP3a TEC, prior to final project approval by decision making authorities.	

Table 4 Responses to public submissions

No	Submitter	Submission and/or issue	PTA's response
Flora and Vegetation			
1.	Armadale Gosnells Landcare Inc	Armadale Gosnells Landcare Inc members have concerns with possible earthworks/construction impacts on the large community of Purdy's Donkey Orchid which are on the southern extension of Fletcher Park near Eleventh Road. Members requested as many opportunities as possible to have majority of the Xanthorrhoeas translocated from the railway reserve as there are many that will need to be removed.	The PTA will engage with stakeholders, such as Armadale Gosnells Landcare Inc. and the City of Armadale Bushcare & Environment Advisory Group, to review the location where *Diuris purdiei* has previously been recorded. Opportunities to reduce potential impacts at this location will be undertaken during detailed project planning. The proposal footprint establishes the areas where rail infrastructure and construction will be located. Construction activities and access will not be permitted outside of the Footprint . The PTA's contractor will be required to prepare and implement a Construction Environmental Management Plan, outlining how construction environmental impacts will be managed and limited to the proposal footprint. Sensitive environmental locations can be identified within the Construction Environmental Management Plan to alert workers where specific controls may be required.
			The PTA will require its contractor to identify opportunities to minimise clearing where possible. Where clearing is unavoidable, the contractor will identify opportunities for salvaging plants suitable for translocation (such as *Xanthorrhoea* grass trees).
2.	ANON-RM38-37UZ-3	The submitter has the following concerns: • the protection of the *Diuris purdei* site within Fletcher Park, Wungong. The submitter noted that the project includes the construction of a bridge at the present level crossing on Eleventh Road. The disturbance envelope is located close to it and any construction work associated with the bridge will need to be carefully monitored to ensure that there is no threat to the population's continued existence.	Wherever possible, individuals of *Xanthorrhoea* and *Kingia* located within the proposed footprint will be used by the contractor for revegetation purposes, provided no risk of dieback spread is identified. PTA will not attempt to relocate individuals of *Xanthorrhoea* to other sites as post-transplanting maintenance will be required to prevent 'transplant shock' and promote recovery of the plants. The transplanting process also has the potential of spreading dieback and noxious weeds to other areas. Clearing activities will be confined to a defined footprint that is dictated by the project design and any unnecessary clearing within the development envelope will not be undertaken. PTA intends to minimise clearing as far as practicable.

No	Submitter	Submission and/or issue	PTA's response
		• construction work along the section separating Fletcher Park from Lambert Lane Bush Forever site. The submitter asked for certainty that during earthworks the activities will not go beyond the development envelope i.e., into the Lambert Lane Reserve beyond the railway reserve. • the removal of balga and kingia plants. The submitter asked if there is a plan to have these removed for relocation. • the southern section of the Eleventh Road crossing and north of the bridge over Wungong Brook, where there is a stretch of about 200 metres or more on the eastern side which is rich in wildflowers. The submitter raised the concern of a local resident whose property backs onto the railway at this point and is concerned about the future of these plants. This section should not be disturbed and it is hoped that the construction of the second line will be on the western side of the existing rail line.	The PTA's contractor will be required to prepare and implement a Construction Environmental Management Plan, outlining how construction environmental impacts will be managed and limited to the proposal footprint. Sensitive environmental locations can be identified within the Construction Environmental Management Plan to alert workers where specific controls may be required.
3.	Wildflower Society of Western Australia	The Wildflower Society of Western Australia (WSWA) contend that sufficient avoidance and mitigation measures have not been proposed for the sections of the Byford Rail extension project that run through and adjacent to the SCP3a TEC. WSWA have demonstrated that the TEC can be completely avoided in the section adjacent to Lambert Lane NR and Fletcher Park, and likely also avoided in the other sections of the proposal that impact the TEC.	Several options were considered to determine the best design and route for the rail connection from Armadale to Byford. The preferred option primarily limits impact on key environmental factors by utilising the existing Australind passenger rail corridor from Armadale to Byford. The existing rail corridor has been in use for over 100 years and is mostly surrounded by a mix of rural, urban and residential development. In an effort to avoid and minimise impacts to the neighbouring environmental values and landscapes, the development envelope for the selected option has also been designed to include co-location of infrastructure. In accordance with the Perth and Peel @ 3.5million planning framework, the development

No	Submitter	Submission and/or issue	PTA's response
		These assertions were based on an example of minimisation the PTA previously achieved in a constrained environment, the Kwinana Freeway. WSWA contended that there is enough space in the existing rail reserve, between existing vegetation, to accommodate not only two rail lines but also principle shared path or maintenance track. WSWA added that further narrowing of the development envelope within this section and north of Byford station would also avoid Priority 2 flora *Johnsonia pubescens* subsp. *cygnorum* individuals. WSWA suggested that it is possible that individuals of this plant could be successfully translocated with the entire root system kept intact along with the surrounding soil. Given that there are parts of both Lambert Lane NR and Fletcher Park in degraded condition, there is an opportunity to rehabilitate some areas, possibly with the inclusion of translocated plants. WSWA content that this flora species should be avoided in the first instance, and if not possible, translocated.	envelope will support rail and other service infrastructure within a shared corridor. These services include electricity, gas, water and telecommunication. A number of constraints are associated with the footprint and include the following: 1. In order to comply with Australia Standards, the railway line must be located 10 m away from the existing high pressure gas pipeline and the toe of rail embankments must be located at least 6 m away; 2. Changes to the elevation of the railway track is governed by track geometry requirements and other technical requirement (such as 1/100 year flood levels and a requirement for a services zone below the track) that will require embarkments to be constructed in some areas; 3. Other railway infrastructure, including a main cable route (MCR) and poles for electrified overhead lines must be accommodated within the rail corridor. Therefore, further reduction of the footprint has the potential to affect the safe establishment and maintenance of rail infrastructure and other services within the footprint. Noting these constraints, opportunities to minimise impacts within the development envelope have been identified and areas follows: 1. The PSP may be used as a maintenance track in areas where the TEC occurs; 2. Track centres between the Up and Down mains may be reduced; 3. The use of retaining walls on the western side of the rail corridor to reduce embankment width ; 4. The width of the maintenance vehicle access track may be reduced from 4 m to 3 m in sensitive areas. The feasibility of these will be investigated in the detailed design phase of the project. The PTA does not support relocation of the three individuals of *Johnsonia pubescens* subsp. *cygnorum* (P2) due to inherent risks associated

No	Submitter	Submission and/or issue	PTA's response
			with transplantation including lack of evidence of feasible and appropriate transplanting techniques and post-transplanting maintenance to prevent 'transplant shock' and promote recovery. In addition, the relocation of these plants can also cause the spread of dieback and noxious weeds. For these reasons, PTA does not intend to transplant *Johnsonia pubescens* subsp. c*ygnorum* individuals located within the Footprint.
4.	City of Armadale	The City of Armadale requests the following to be applied to the Byford Rail Extension project: • The PTA's early articulation of intended vegetation/tree removal along with associated timeframes, in lieu of delays that may otherwise result from the finalisation of detailed engineering design. Early provision of a tree/vegetation removal plan is sought as a means of maintaining transparency, accountability and avoiding any unnecessary tree removal. • Implementation of the PTA's established tree/vegetation removal feedback process allowing the City's Environment Team to continue to provide feedback on upcoming stages of tree/ vegetation removal. Thus enabling the best environmental outcome and the City with the ability to communicate upcoming tree/vegetation removal works with key internal stakeholders.	The City of Armadale will be consulted regarding the trees to be removed and a timeframe for tree removal will be provided by PTA. PTA successfully established a consultation process with the City of Armadale regarding environmental impacts associated with the Denny Ave Level crossing Removal project. PTA will implement a similar process for the Byford Rail Extension proposal.
5.	Shire of Serpentine Jarrahdale	The Shire notes that 0.07 ha of native vegetation will be cleared in its local government area. The Shire notes it further reduces the 'less than 5%' of the Guildford complex in the local government area. It is recommended that the risk mitigation and	The offset strategy as per Table 25 is a draft offset strategy. The PTA will implement the final offset strategy approved by the EPA and DAWE. The PTA will monitor and manage drawdown and surrounding vegetation condition through: • Monitoring requirements established under a RIWI Act 5C licence

No	Submitter	Submission and/or issue	PTA's response
		offset strategy be as per Table 25 in the ERD be implemented to minimise this impact. The Shire notes that the abstraction of water at Byford station will not affect TEC SCP 3a due to the distance from the bores. The Shire expects that this will be confirmed and addressed when the necessary applications are made for the bores. The Shire also notes that there is a possibility of the dewatering required at Wungong to build the bridge may influence the flora in the area. The Shire expects that the drawdown of water in this area will be monitored and managed to ensure that the impact is minimised.	• A water operating strategy, where required. • Implementation of a TEC SCP 3a condition monitoring program to avoid impacts on terrestrial GDEs It should be noted that construction water will be sourced from bores drawing water from the Leederville and Yarragadee Aquifers. Temporary abstraction of water from these deep semi-confined and confined aquifers will not impact upon groundwater levels within the shallow superficial aquifer or impact groundwater dependent ecosystems.
6.	Shire of Serpentine Jarrahdale	*Bush forever (Section 6.4.4 on p86)* The current degraded status of Bush Forever No. 350 that is situated north of current Australind station is noted. An assessment should be done before and after development and any further impact should be repaired as best practicable.	Indirect impacts associated with the Proposal are described in Section 6.5.2 of the Byford ERD document. The PTA or its Construction Contractor will implement measures, including monitoring, to manage potential indirect impacts to flora and vegetation. Specific management measures are discussed in Tables 25 and 26 (of the ERD). Attachment 4 provides evidence of how management actions provided in the Byford Environmental Review Document have been utilised in other proposals by the Proponent. The PTA has previously prepared monitoring programs to detect indirect impacts for the Yanchep Rail Extension and the Thornlie-Cockburn Link which have been reviewed and approved by the EPA Services and the relevant land managers. A similar approach will be applied to the Byford project.
7.	Shire of Serpentine Jarrahdale	*Vegetation condition and Conservation significant vegetation (Section 6.4.7 on p97 and 6.4.8 on p103)* The condition of the remaining vegetation within the development area being either degraded or completely degraded is noted. The Shire requests	Acknowledged. The PTA will manage the potential direct and indirect impacts to flora and vegetation values by implementing mitigation measures described in Table 25 of the Environmental Review Document. These mitigation measures include avoiding areas of vegetation and flora where possible, minimising vegetation clearing, and rehabilitating areas cleared for

No	Submitter	Submission and/or issue	PTA's response
		that specific attention be given to preserving or upgrading the areas marked as 'Good' or 'Degraded' as much as possible especially in the rail corridor between Thomas road and Larsen road and the Wungong brook area. It is further noted that the development corridor does have significant Vegetation and Flora especially just north of Larsen road.	the Proposal not required for permanent infrastructure or management access.
8.	Shire of Serpentine Jarrahdale	*Assessment of impact of flora (Section 6.6 on p126)* Of particular concern is the direct and indirect impacts on TEC SCP 3a. The further indirect impacts on Bush Forever site No. 350 are also noted. The development should pay specific attention to preserving as much of this as possible, wherever possible. It is also expected that at a minimum this loss will be offset elsewhere in the Shire as indicated in Section 12.	Acknowledged. The PTA will manage the potential direct and indirect impacts to flora and vegetation values by implementing mitigation measures described in Table 25 of the Environmental Review Document. These mitigation measures include minimising the extent of clearing and impacts on TEC SCP3a and Bush Forever site No. 350. The PTA will offset significant residual impacts in accordance with EPA and DAWE requirements. Where possible these offsets will be located in close proximity to the impacts.
9.	Shire of Serpentine Jarrahdale	*Dieback (Section 6.6.4 on p135)* It is noted that there is not an expectation that dieback will affect TEC SCP 3a in the rail corridor more than it is currently due to proximity of access tracks currently in use.	Acknowledged. The PTA will manage the potential direct and indirect impacts to flora and vegetation values by implementing mitigation measures described in Table 25 of the Environmental Review Document. These mitigation measures include minimising the introduction and spread of Dieback in the Development Envelope.
Terrestrial Fauna			
10.	Shire of Serpentine Jarrahdale	*Eucalypt woodland to forest (VSA4) - Figure 17 (p166), Table 29 (p169) and associated text with specific reference to VSA 4* The Shire notes with concern that VSA4 contains Marri trees which potentially provides habitat to especially the Carnaby's black cockatoo and potential breeding trees and roosting habitat as per	PTA has implemented, and will continue to apply, mitigation measures to ensure that the Proposal's detailed design avoids the clearing of fauna habitat where possible, particularly that of moderate or better quality such as VSA 4 which provides habitat for black cockatoo species.

No	Submitter	Submission and/or issue	PTA's response
		Figure 20(p198). It also provides foraging habitat for Carnaby's, Baudin's and Forest Red-tailed Cockatoos as per Figure 18 (p190). The Shire also notes the potential impacts on Black cockatoos as per Section 7.6 (p206) and more specifically that no night roosting sites will be removed.	The Footprint has been designed to minimise the extent of clearing of fauna habitats by utilising the existing Armadale and Australind rail corridor, and the PTA shall further investigate avoiding areas of fauna habitat.
11.	Shire of Serpentine Jarrahdale	*Carter's Freshwater Mussel (p200)* The Shire notes that the Wungong brook does provide significant habitat for these mussels. It is expected that the impact on the mussels be minimised through the mitigation measures (p210 and p211).	The Proponent acknowledges that Wungong Brook provides suitable habitat for Carter's Freshwater Mussel. Therefore, mitigation measures will be implemented to avoid and minimise impacts to Carter's Freshwater Mussel habitat wherever possible. This includes avoiding direct disturbance of the stream bed through the use of span bridges. The PTA will implement mitigation measures discussed in Section 7.8 of the Environmental Review Document to minimise erosion, sedimentation and other potential impacts to the habitat. These measures will be implemented through a Construction Environmental Management Plan that will follow DWER guidance such as *Infrastructure corridors near sensitive water resources*.
12.	Shire of Serpentine Jarrahdale	The Shire will have the expectation that the mitigation measures indicated in Section 7.8 Mitigation (p217) are implemented and that all implementation will be sufficiently monitored to minimise the impact of the development on existing fauna.	PTA's contractor will prepare a Construction Environmental Management Plan prior to the commencement of construction. The CEMP will include mitigation measures indicated in the Environmental Review Document, and address all significant construction related risks, including those to fauna. The CEMP will include details of monitoring activities that will be implemented during the construction.
Inland Waters			
13.	Shire of Serpentine Jarrahdale	The Shire notes the temporary impact on Wungong brook and the mitigation measures to minimise this impact. The Shire would require that the details of the methodology for scouring sedimentation be shared during the detailed design phase.	The PTA acknowledges the Shire of Serpentine Jarrahdale's concerns. An approval from DBCA will be required to undertake work in the Development Control Area. This process will include confirmation of construction methodology and appropriate environmental measures. The PTA will consult with the Shire of Serpentine Jarrahdale to advise them of the measures that will be implemented to prevent scouring and sedimentation at the Wungong Brook crossing.

No	Submitter	Submission and/or issue	PTA's response
14.	Shire of Serpentine Jarrahdale	*Local and Regional Hydrological Regime (Section 8.7 p241)* The characteristics of the surface water and groundwater are noted. The Shire would expect that the existing hydrology be returned to as near as possible to an undisturbed state as possible.	The proponent acknowledges the Shire's expectation that the existing surface and groundwater hydrology will be returned to as close to the pre-disturbance state as possible. Impacts to the hydrological regime will be minimised through the application of water sensitive urban design principles through the detailed design phase of the project. The aim is to maintain existing hydrological flows as close to pre-construction conditions as possible. The Construction Environmental Management Plan will be implemented and the appropriate management practices outlined in Section 7.8 of the ERD will be implemented to ensure that impacts to hydrology are minimised.
15.	Shire of Serpentine Jarrahdale	*The Wetlands (Section 8.7.3 p261)* Notes two wetlands in the Wungong brook area and the value of these wetlands due to the presence of freshwater mussels. The Shire also notes that there will be construction dewatering and re-injection in this area. It is expected that due to these mussels being of national significance that the mitigation measures will be implemented, and the affected environmental asset be carefully monitored.	The Proponent notes the Shire of Serpentine Jarrahdale's observations. The impact to the Carter's Freshwater Mussell will be minimised through the implementation of the Project CEMP and the hydrology management measures outlined in Section 7.8 of the ERD. A monitoring program will be implemented during construction to detect adverse changes to water quality. If necessary, remedial measures will be implemented to mitigate adverse changes to water quality that are attributable to construction activities. Individual mussels within the project footprint will be translocated to nearby areas of suitable habitat. Approval to translocate the mussels will be obtained in accordance with the requirements of the *Biodiversity Conservation Act 2016*. A procedure outlining the management of the translocation is presented in Attachment 3.) will be followed.
16.	Shire of Serpentine Jarrahdale	*Abstraction for construction supply (p274)* It is noted that abstraction will happen at the Byford station and that the withdrawal will be minimised by switching off pumps when not required. The Shire would propose that this aspect be carefully monitored, perhaps in partnership with the Shire.	The PTA acknowledges the Shire's concerns regarding the management of groundwater abstraction. Abstracting groundwater for construction purposes will require approval under the *Rights in Water and Irrigation Act 1914*. A Water Operating Strategy is likely to be required. This will outline the measures to be implemented to ensure that abstraction is appropriately managed including monitoring provisions.
17.	Shire of Serpentine Jarrahdale	*Mitigation (Section 8.11 p280)* The Shire expects that the mitigation measures as per this section will be implemented and monitored to ensure that the impact is minimised.	The Proponent acknowledges the Shire of Serpentine Jarrahdale's expectations that mitigation measures will be implemented and monitored to ensure that impacts are minimised. The mitigation measures within the ERD will form a component of the Construction Contractor's contractual obligation and is therefore required to be implemented.
Social Surroundings			

No	Submitter	Submission and/or issue	PTA's response
18.	Shire of Serpentine Jarrahdale	*Noise and vibration* The impact on the whole corridor will require noise walls to screen sensitive receptors especially in the Thomas road to Larsen road corridor and the impact of the station at Byford will require sustained engagement and consultation with residents. It is noted that assigned noise levels in rural areas are often an inaccurate measure for how quiet especially night time noise is. Accordingly, increase in noise above actual current noise levels may be perceived far greater, than if the area was subject to the level of assigned noise. This should be considered and the project adjusted to reflect reasonable management of noise. *Visual amenity* The Shire acknowledged the development of the rail line and station and the associated noise walls will have a visual impact on the area. The impact of the construction of rail infrastructure and visual impact of the noise walls will need to be addressed by the mitigation measures as per Table 62. To mitigate this, the Shire suggest that the contactors/PTA continues with sustained engagement and consultation with residents.	Background noise levels were considered. Table 55 of the ERD shows measured baseline noise levels and several residential locations within the Proposal area. As indicated in the ERD, depending of the level of exceedance, a combination of noise walls and rail web dampers will be implemented to achieve compliance with SPP 5.4. In addition to engineering mitigation measures, prior to the approval of the final design, PTA will consult community stakeholders who have specific concerns over noise and/or vibration impact. A Noise and Vibration Management Plan will be developed and will address noise mitigation measures (e.g noise walls) where required. Construction noise emissions will be managed in accordance with Environmental Protection (Noise) Regulations 1987. PTA will consult with residents on a regular basis throughout the design and construction phases and will address issues regarding vibration, noise and visual amenity via the project communication team. PTA will continue to engage in ongoing communications with the Shire and residents regarding visual amenity . The mitigation measures outlined in Table 62 will be implemented during the Project.
Matters of National Environmental Significance (MNES)			
19.	Shire of Serpentine Jarrahdale	*MNES (Section 11 p330)* The Shire notes the impact on the Matters of National Environmental Significance (MNES) listed below. As these matters are regulated under specific environmental legislation the Shire expects that the mitigation measures to minimise	The Shire of Serpentine Jarrahdale is correct, the MNES will be managed in accordance with the requirements of the relevant legislation. The environmental management commitments contained in the ERD will form a component of the contractor's contractual obligation.

No	Submitter	Submission and/or issue	PTA's response
		the impacts on these items be implemented and monitored as required by the legislation. • Threatened Ecological communities (Section 11.3 p333) • Listed Flora Species (Section 11.4 p338) • Listed Fauna Species (Section 11.5 p345) • Migratory Species (Section 11.6 p360)	
Offsets			
20.	ANON-RM38-37UB-B	The submitter was concerned with the offset strategy presented by PTA (Appendix R) and contended that the proposed offset locations are already vested with the Shire of Serpentine-Jarrahdale or the Department of Biodiversity, Conservation and Attractions, in particular Lowlands Estate and Brickwood Reserve, which are already protected. The submitter noted that the proposed offsets appear to result in a net loss of native vegetation, not a gain and that the purpose of offsets was to increase and protect native vegetation by purchasing land that is freehold or land that is not already classified as a reserve.	<u>Lowlands</u> Both the Commonwealth and State Environmental Offsets policies allow for advanced offsets. Advanced offsets occur when a proponent acquires and/or establishes an offset prior to the action being undertaken. Lowlands is an advance offset site. • The State purchased Lowlands as a land acquisition offset. This was the first step in the process of establishing the offset. • Land acquisition offsets protect environmental values by improving security of tenure, hence the State classifying Lowlands as a Class A reserve. This was the second step in the process of establishing the offset. • Land acquisition offsets require the proponent to consider the on-going costs of maintaining the offset for the long term. The State allocated Lowlands to the PTA (the proponent) to offset impacts from METRONET projects. The PTA is funding the DBCA to perform on-ground management actions at Lowlands for seven years. On-ground management at Lowlands commenced on 1 January 2021. This was the third step in the process of establishing the offset. • The PTA are using portions of Lowlands for METRONET projects. • Through the purchase and classification as an A class reserve, the Lowlands offset increased the amount of native vegetation protected and conserved in perpetuity.

No	Submitter	Submission and/or issue	PTA's response
			<u>SCP FCT 3a offset sites</u> The PTA are looking for privately owned, unallocated crown land or freehold site(s) that contain native vegetation similar to that being impacted that can be acquired and/or moved in secure conservation tenure as an offset for the Proposal. The PTA are also investigating the feasibility of rehabilitating areas already containing SCP FCT 3a and/or of restoring an FCT-type 3 community to increase native vegetation. However, in the event either of these options are not available or do not counterbalance the significant residual impacts, the PTA will fund management of existing occurrences of SCP FCT 3a, specifically where management of the occurrence is not active, but more reactive/ad-hoc maintenance. The management actions implemented will aim to protect large occurrences of SCP FCT 3a within reserves vested to the LGA or DBCA by addressing threatening processes, for example weeds and unauthorised access. The on-ground management offset will prevent degradation in condition of the vegetation. The PTA propose to perform weed control at a SCP FCT 3a offset sites. Removal of weeds will allow the understorey species to regenerate, increasing the biodiversity, extent and condition of native vegetation at the site. The PTA also propose to include revegetation at some of the sites, where appropriate. While this may not replace the specific FCT type vegetation, it will increase the extent of native vegetation at the site, provide a buffer to the existing occurrence of SCP FCT 3a vegetation and provide for some natural regeneration at the site. Overall, the offset package will aim to avoid a net loss, and to the extent possible, provide a net gain in native vegetation.
21.	Armadale Gosnells Landcare Inc	Armadale Gosnells Landcare Inc raised that part of the Offset Strategy should include a management plan and funding for Lambert Lane Bushland as it contains numerous threatened plant communities.	Acknowledged. The PTA are considering using Lambert Lane Nature Reserve as an offset. Both the Commonwealth and State Environmental Offsets policies allow for advanced offsets. Advanced offsets occur when a proponent acquires and/or

No	Submitter	Submission and/or issue	PTA's response
		The question of Lowlands being utilised as an offset was raised as Armadale Gosnells Landcare Inc believe the State has already purchased the reserve.	establishes an offset site prior to an action being undertaken. The State purchased Lowlands from a private owner in 2014 as an offset for the Strategic Assessment of the Perth and Peel Region (SAPPR), which included the METRONET program. Therefore, Lowlands is an advanced offset site for METRONET. The PTA are funding on-ground management of Lowlands, which commenced in January 2021. As an advanced offset site, the PTA allocate portions of the Lowlands site as and when required to counterbalance impacts from METRONET projects.
22.	Wildflower Society of Western Australia	The various offset options canvassed in the Draft Offset Strategy (section 3.3, PTA 2021) appear reasonable, except for the omission that management and monitoring of any such offset must occur over the full period over which the offset benefit is calculated, namely, 20 years. It would be unacceptable if an offset involving management/rehabilitation/ revegetation were required and for it to be only managed/monitored/ rehabilitated for a much shorter duration, for example, five years.	Acknowledged. The PTA will continue to work with the land owner and/or proposed land manager and the regulators regarding appropriate management actions, offset period and monitoring on a site-by-site basis. By using the Lowlands site as an advanced offset the State has committed to protecting this site for at least 20 years.
		The offset package proposed for the residual impact on black cockatoo habitat unfortunately will likely guarantee a net loss of habitat. The package of using part of Lowlands Reserve as an offset assumes that revegetation will occur as an offset requirement for the loss of SCP3a TEC (page 56, PTA 2021). However, if, as we contend, that very little loss of the TEC should occur, then little or no revegetation will take place. Even if revegetation were to take place, it is assumed, but not specified, that such revegetation would contain commensurate numbers of habitat plants. This is presumptuous and an oversight.	The offset package for SCP3a TEC may include some revegetation of native vegetation. While this native revegetation would likely provide black cockatoo foraging habitat this will be above and beyond what is included in the black cockatoo habitat offset package. The PTA have not proposed any planting within the Lowlands offset site. Lowlands is extensively vegetated. The DBCA are performing on-ground management, including controlling pest fauna and weed control. This is likely to lead to natural regeneration of over and under storey species. By using the Lowlands site as an advanced offset the State has committed to protecting this large parcel of black cockatoo foraging habitat for at least 20 years. Both the Commonwealth and State Environmental Offsets policies allow for advanced offsets. Advanced offsets occur when a proponent acquires and/or establishes an offset prior to the action being undertaken.

No	Submitter	Submission and/or issue	PTA's response
		In the absence of a revegetation component, the offset is inadequate because it means that the black cockatoos will have reduced foraging habitat in the future, at a time when significant parcels of their foraging habitat have been removed or destroyed (e.g. parts of the northern pine plantations). This is a threatening process which the EPA should not allow. The remedy for this offset package is to mandate a revegetation component compensating for the foraging habitat loss.	The following actions have been taken to establish Lowlands an advance offset site: • The State purchased Lowlands as a land acquisition offset. This was the first step in the process of establishing the offset. • Land acquisition offsets protect environmental values by improving security of tenure, hence the State classifying Lowlands as a Class A reserve. This was the second step in the process of establishing the offset. • Land acquisition offsets require the proponent to consider the on-going costs of maintaining the offset for the long term. The State allocated Lowlands to the PTA (the proponent) to offset impacts from METRONET projects. The PTA is funding the DBCA to perform on-ground management actions at Lowlands for seven years. On-ground management at Lowlands commenced on 1 January 2021. This was the third step in the process of establishing the offset. • Through the purchase and classification as an A class reserve, the Lowlands offset increased the amount of native vegetation protected and conserved in perpetuity. The PTA is providing a net gain and adequate offset for black cockatoo foraging habitat at the Lowlands Nature Reserve site. The extent of the offset requirement will be determined by applying the Commonwealth offsets assessment guide (the calculator). The PTA do not therefore consider revegetation is necessary to offset the loss of foraging habitat as part of the offset package.
23.	City of Armadale	It is the City of Armadale's preference that where any of the residual environmental impacts are to originate within the City's LGA and are unavoidable, they are offset within close proximity in an effort to achieve the best possible net environmental outcome. As a result of this, the offsetting of impacts to TEC SCP3a (and more	Acknowledged. The PTA is seeking to locate offsets sites within as close proximity as possible and practicable to the environmental impacts. This is, however, dependent on suitable offset sites containing the same environmental values as those impacted being available and cost effective to acquire and/or implement.

No	Submitter	Submission and/or issue	PTA's response
		broadly Bushforever) within Fletcher Park and Lambert Lane Nature Reserve is supported by the City and its Bushcare and Environmental Working Group. The City of Armadale requests that the PTA's consideration of direct and indirect offsetting within close proximity is further extended to include impacts to Black Cockatoo habitat despite the PTA's existing advanced offset site; the Lowlands Nature Reserve (situated >16 km's from Fletcher Park and Lambert Lane Nature Reserve).	Acknowledged. The PTA will consider the application of Lambert Lane Nature Reserve as an offset. The PTA will continue to consult with the City of Armadale regarding the opportunity to provide offsets within Fletcher Park. The PTA will continue to consult with the City of Armadale regarding potential black cockatoo offsets within close proximity to the impact area, however DAWE and DWER (EPA Services branch) have accepted the Lowlands Nature Reserve as a suitable offset for black cockatoos.
24.	Shire Serpentine Jarrahdale	The Shire notes the potential offset sites in Serpentine Jarrahdale being the Watkins road nature reserve, the Brickwood reserve, the Rapids road bushland. The Shire does not object to these sites noting that they may require upgrading to provide suitable offsets. In addition to this however, the Shire recommends that offsets also be focused on the proposed living stream and multiple use corridor that extends to the west of the Byford Station, in addition to advanced native tree planting for access roads and parking areas. The Shire would like to be a partner in the assessment of suitable areas and the implementation of these offsets.	Acknowledged. As part of the offset package the PTA would provide funding for on-ground management to maintain and/or improve the condition of offset sites. The State and Commonwealth guidelines contain a framework for the provision of offsets. The PTA has noted the Shire's recommendation that offsets also be focused on the proposed living stream and multiple use corridor that extends to the west of the Byford Station, in addition to advanced native tree planting for access roads and parking areas. The PTA will assess the suitability of these projects based on the regulators' offset criterion. The PTA will continue to liaise with the Shire regarding potential offset options.
		Of particular concern is the direct and indirect impacts on TEC SCP 3a. The further indirect impacts on Bush Forever site No. 350 are also noted. The development should pay specific attention to preserving as much of this as possible, wherever possible. It is also expected that at a	Acknowledged. The PTA will offset significant residual impacts in accordance with EPA and DAWE requirements. Where possible these offsets will be located in close proximity to the impacts.

No	Submitter	Submission and/or issue	PTA's response
		minimum this loss will be offset elsewhere in the Shire as indicated in Section 12.	
		The Shire notes the potential offset sites in Serpentine Jarrahdale being the Watkins road nature reserve, the Brickwood reserve, the Rapids road bushland. The Shire does not object to these sites noting that they may require upgrading to provide suitable offsets. In addition to this however, the Shire recommends that offsets also be focused on the proposed living stream and multiple use corridor that extends to the west of the Byford Station, in addition to advanced native tree planting for access roads and parking areas. The Shire would like to be a partner in the assessment of suitable areas and the implementation of these offsets.	Acknowledged. As part of the offset package the PTA would provide funding for on-ground management to maintain and/or improve the condition of offset sites. The State and Commonwealth guidelines contain a framework for the provision of offsets. The PTA has noted the Shire's recommendation that offsets also be focused on the proposed living stream and multiple use corridor that extends to the west of the Byford Station, in addition to advanced native tree planting for access roads and parking areas. The PTA will assess the suitability of these projects based on the regulators offset criterion. The PTA will continue to liaise with the Shire regarding potential offset options.
		Focusses on habitat regeneration and environmental offset as close to the project area as possible. Specifically the current degraded land that adjoins Byford station location to the west will include opportunities for living stream, multiuse corridor and street tree planting.	As above, the PTA will continue to liaise with the Shire regarding potential offset options.
		It is recommended that the risk mitigation and offset strategy be as per Table 25 be implemented to minimise this impact.	The offset strategy as per Table 25 is a draft offset strategy. The PTA will implement the final offset strategy approved by the EPA and DAWE.
		SCP 3a suitable potential offset sites (Section 12.5 p385) – the potential offset sites in Serpentine Jarrahdale being the Watkins road nature reserve (p392), the Brickwood reserve (p395), the Rapids road bushland (p399) are noted. The Shire does not object to these sites noting that they may	The PTA will include funding to the land manager for on-ground management as part of the offset package for the potential offset sites within the Serpentine Jarrahdale area. The PTA will continue to liaise with the Shire regarding potential offset options.

No	Submitter	Submission and/or issue	PTA's response
		require upgrading to provide suitable offsets. In addition to this however, the Shire recommends that offsets also be focused on the proposed living stream and multiple use corridor that extends to the west of the Byford Station, in addition to advanced native tree planting for access roads and parking areas.	
		Black Cockatoo Offset Strategy (Section 12.6 p404) - the potential offset sites in Serpentine Jarrahdale being Lowlands Nature Reserve (p404) are noted. The Shire does not object to this site providing suitable offsets.	Acknowledged. The PTA will continue to liaise with the Shire regarding potential offset options.
		Wetland and Bush Forever offset strategy (Section 12.7 p410) - the potential offset sites in Serpentine Jarrahdale as per Table 88 are noted. The Shire does not object to these sites providing suitable offsets.	Acknowledged. The PTA will continue to liaise with the Shire regarding potential offset options.
		The Shire notes the Justification of Offsets (Section 12.9 p414) and the Assessment of the Draft Offset Strategy (Section 12.10 p425) and other than wishing to see further detail of the strategy do not object to the offset strategy. The Shire would like to be a partner in the assessment of suitable areas and the implementation of these offsets.	Acknowledged. The PTA will continue to partner with the Shire in the assessment of suitable areas and the implementation of these offsets.
25.	DPLH	"While the offset ratio is supported, this ratio generally applies to the acquisition of land to achieve a net environmental outcome. All the areas proposed for the offset sites are either State or Local Government owned, and, except for Punrack Road Bushland, are vested for Conservation. Given the proposed offset sites are	The PTA calculated impacts to Bush Forever as 1.54 ha of native vegetation and 2.59 ha of cleared area. This represents a loss of 1.54 ha of native vegetation in Excellent to Completely Degraded condition. The PTA will consider rehabilitation as part of an offset package and will discuss the proposed Bush Forever offset ratio with the DPLH.

No	Submitter	Submission and/or issue	PTA's response
		already protected, DPLH would recommend that rehabilitation, in addition to on-ground management would need to occur within the proposed offset locations. Ideally, there should be a net environmental gain within Bush Forever, in accordance with SPP 2.8 Appendix 4. Further discussion with DPLH regarding the proposed offset sites is required. "	
		With respect to Bush Forever, there have been five sites identified for offsets in the proposed Offset Strategy which have similar values to the area proposed to be cleared. All five sites are within Bush Forever areas. In principle, the offset sites are supported.	Acknowledged. The PTA will discuss the offset options with the DPLH.
		Further discussion with the Department to decide which would be the most appropriate site is recommended to ensure the offset aligns with State Planning Policy 2.8 – Bushland Policy for the Perth Metropolitan Region (SPP 2.8). On-ground revegetation would be supported to provide for an improved environmental outcome.	Acknowledged. The PTA will discuss the offset options with the DPLH.
		The PTA has identified the following offsets: On-ground management at Lowlands Nature Reserve (Bush Forever area 368) offset site including: • 70.01ha of Carnaby's cockatoo foraging habitat • 206.7ha of Forest Red-tailed Black cockatoo foraging habitat • 62.7ha of Baudin's cockatoo foraging habitat	Acknowledged. If there are changes to the significant residual impacts the PTA will amend the offsets required to counterbalance the impacts in the final offset strategy.

No	Submitter	Submission and/or issue	PTA's response
		• 417 Black Cockatoo potential breeding trees Lowlands Nature Reserve has been acquired by the State to offset impacts from METRONET proposals for the three Black Cockatoo species. *On-ground management and revegetation of existing occurrences of SCP3a* The PTA proposes to provide an offset of 3.08ha for Bush Forever, by applying a ratio of 2:1 in accordance with SPP 2.8 for very high conservation significant vegetation. The PTA proposes to offset the Bush Forever impacts with the SPC3a offset, of which all proposed offset sites are contained within Bush Forever areas. The PTA has proposed five potential offset sites where funding will be provided to maintain existing SCP3a occurrences, including weed control, dieback management, and fencing. 1. Lambert Nature Reserve (Bush Forever area 264) is vested with the Conservation Commission of WA, and is managed by the Department of Biodiversity, Conservation and Attractions (DBCA). Offset proposed is revegetation and on-ground management. 2. Watkins Road Nature Reserve (Bush Forever area 360) is vested with the Conservation Commission of WA and managed by DBCA. Proposed offset includes revegetation and on-ground management. 3. Brickwood Reserve (Bush Forever area 321) is partly vested to the Shire of Serpentine-Jarrahdale, a Baptist Age Care Home and a road reserve. Offset proposed is on-ground management.	

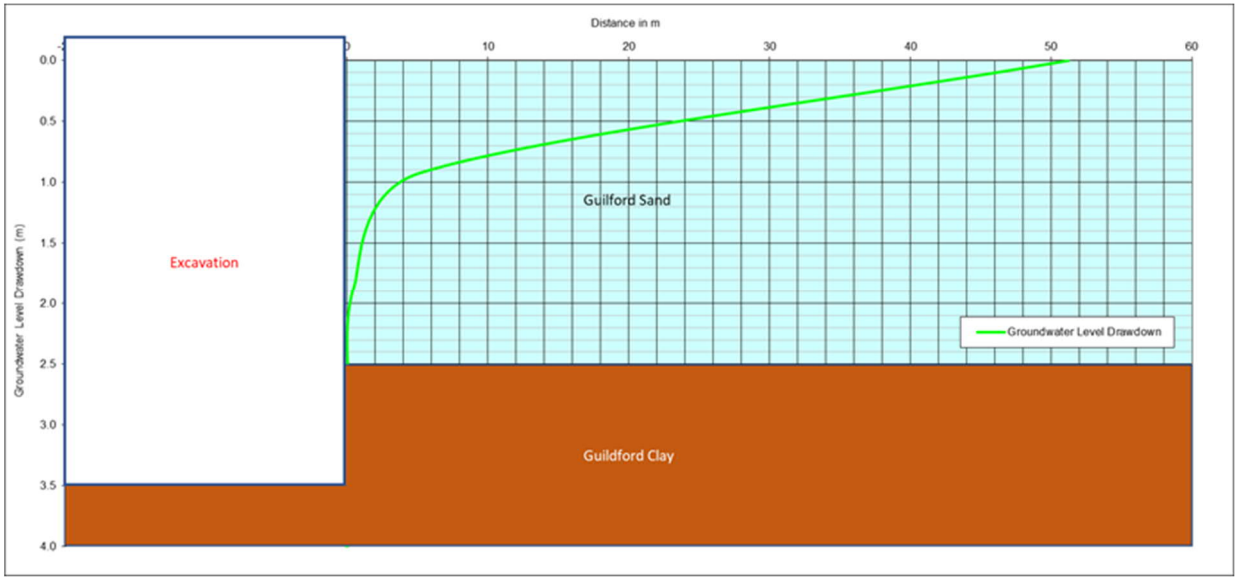
No	Submitter	Submission and/or issue	PTA's response
		4. Fletcher Park (Bush Forever area 264) is vested in the City of Armadale, and offset proposed includes revegetation and on-ground management. 5. Punrack Road/Rapids Road Bushland (Bush Forever area 74) is partly owned by the Western Australian Planning Commission and partly Unallocated Crown Land. Offset proposal is to change the tenure to Conservation, revegetation and on-ground management.	
		While the offset ratio is supported, this ratio generally applies to the acquisition of land to achieve a net environmental outcome. All the areas proposed for the offset sites are either State or Local Government owned, and, except for Punrack Road Bushland, are vested for Conservation. Given the proposed offset sites are already protected, DPLH would recommend that rehabilitation, in addition to on-ground management would need to occur within the proposed offset locations. Ideally, there should be a net environmental gain within Bush Forever, in accordance with SPP 2.8 Appendix 4. Further discussion with DPLH regarding the proposed offset sites is required.	Acknowledged. If there are changes to the significant residual impacts the PTA will amend the offsets required to counterbalance the impacts in the final offset strategy. The PTA calculated impacts to Bush Forever as 1.54 ha of native vegetation and 2.59 ha of cleared area. This represents a loss of 1.54 ha of native vegetation in Excellent to Completely Degraded condition. The PTA will consider rehabilitation as part of an offset package and will discuss the proposed Bush Forever offset ratio with the DPLH.
Holistic Impact Assessment			
26.	Shire Serpentine Jarrahdale	*Holistic Impacts (Section 13 p427)* The Shire would suggest that the mitigation measures addressing the key linkages as envisaged in Table 94 (p429) are the minimum measures that should be implemented and even so	PTA will continue to work with the Shire of Serpentine Jarrahdale throughout the project design and delivery phases. Opportunities for collaboration will be explored and where beneficial will be implemented. Ongoing evaluation of mitigation measures will occur during the implementation of the Project.

No	Submitter	Submission and/or issue	PTA's response
		these will not fully address the inevitable impact of the development on the environment. For this reason, the Shire would like to propose a formal partnership arrangement through a Memorandum of Understanding to enable our organisations and contractors to work together to understand and address any potential variations to the proposed mitigation measures	
27.	Shire Serpentine Jarrahdale	*Cumulative Impacts (Section 13.1 p434)* The Shire notes the cumulative impacts of the various developments in the area and requests that any construction be strictly monitored to ensure the minimum disturbance of the environment.	PTA acknowledges the Shire's request. PTA will continue to investigate opportunities for avoiding environmental impacts where practicable through detailed design and construction methods/management. PTA's contractor will be required to prepare and implement a Construction Environmental Management Plan outlining how construction impacts will be managed. The Construction Environmental Management Plan will include on-going monitoring and reporting.
General			
28.	ANON-RM38-37UB-B	There are a lot of large documents to read and understand in the 2 week period. I request that the submission period be increased by at least another 3 weeks.	The two-week review period is set by the EPA. It is not possible for the submission period to be extended.
29.	Shire of Serpentine Jarrahdale	The Shire: • Regrets the loss of habitat and the impact on the fauna and flora in the immediate vicinity of the development. • Implores the PTA to ensure that the mitigation measures are followed and that the impact on the environment will be kept to a minimum through the mitigation measures and any other measures that will assist in protecting the environment.	The PTA acknowledges the Shire of Serpentine Jarrahdale's concerns regarding impacts to the environment and is committed to ensuring that the impacts to the environmental values associated with the Project are minimised, as much as is practicable, through appropriate mitigation and management measures. The environmental management commitments contained in the ERD will form a component of the contractor's contractual obligation.

No	Submitter	Submission and/or issue	PTA's response
		Expects strict compliance with all legislation regarding the protection of the environment.	
30.	DPLH	"The following figures differ throughout the document, and clarification is sought as in relation to calculations: • In Table 2 Key Proposal Characteristics (pg iv) of the ERD it states clearing up to 15.99ha, however section 6.6.1 of the ERD (pg 127) states that the proposal will result in the clearing of up to 15.98ha, and Table 20 (pg 128) states 16ha • In Table 3 Summary of potential impacts, proposed mitigation and outcomes (pg ix) of the ERD states 1.54ha of Bush Forever impacted, whereas the Offset Strategy (Appendix R, pg 1) states 1.5ha • In Table 3 Summary of potential impacts, proposed mitigation and outcomes (pg xi) of the ERD states 8.65ha of impacts on Baudin's cockatoo foraging habitat, but the Offset Strategy (Appendix R, pg 1) it states 8.7ha will be impacted. • In Table 13 Bush Forever sites (pg 88) of the ERD, it states that the extent of the Footprint is 4.1ha, but the calculations come to 4.13ha It is important that the calculations are accurate and consistent as offset ratios are based on these figures. "	The correct value for the amount of native vegetation within the Footprint, to two decimal places, is 15.98 ha. Table 20 in the ERD has been updated with the correct value. The discrepancies between the ERD and Draft Offset Strategy (Appendix R) result from rounding to one decimal place in the Draft Offset Strategy (Appendix R). However, the PTA applies the ratio to two decimal places to determine the offset extent. The Draft Offset Strategy (Appendix R) has been updated to account for residual impacts to two decimal places for Baudin's Black Cockatoo and Bush Forever sites, as per Table 84 in the Environmental Review Document. The total extent of Bush Forever (including cleared areas and remnant native vegetation) has been rounded to one decimal place in Table 13 of the Environmental Review Document. Table 13 has been updated to reflect two decimal places. Within the Environmental Review Document, the extent of native vegetation within Bush Forever sites that intersects with the Footprint, has been calculated to two decimal places. (See Attachment 2 – Byford ERD Calculations for updated tables)

Table 5 DAWE - Further information requirements for Byford Rail Extension EPBC (2020/8764)

No	Information required	PTA's response
Terrestrial Fauna		
1.	*Translocation* To mitigate impacts to Carter's Freshwater mussel from the proposed Wungong Brook dewatering, the proponent proposes to translocate individuals of this species. However, the Department notes that there is very little detail within the ERD on how the translocation would be implemented. The Department considers that this information needs to be provided as part of the ERD to allow for an accurate assessment of the significance of impacts to this species. The Department recommends a translocation management plan to be prepared and submitted for review.	A preliminary strategy for the translocation of Carter's freshwater mussel has been prepared and is included as Attachment 3. The PTA acknowledges that approval under the *Biodiversity Conservation Act 2016* will be required for potential disturbance to Carter's freshwater mussel prior to works commencing at Wungong Brook. It is anticipated that translocation will be permanent in order to minimise unnecessary handling of mussels. As a preference, translocated mussels will be released up stream of the proposed works where suitable habitat was identified in the targeted fauna survey (Stream 2021). Over time, it is expected that natural dispersal will occur and the species will return to the Wungong Brook crossing. Details of monitoring will be outlined when seeking approval under the *Biodiversity Conservation Act 2016*.
Inland Waters		
2.	*Groundwater Drawdown Modelling* i) The Department notes that preliminary investigations undertaken by the proponent show that groundwater drawdown will extend up to a 50 m radius from the dewatering area at Wungong Brook (Appendix K to ERD, p. 32). However, the modelling does not appear to have been provided within the ERD documentation.	Modelling that was undertaken is described in Section 11.3.1.2.1 Dewatering at Wungong Brook" The modelling that was undertaken used an analytical approach to characterise the rate of dewatering for each footing for a two-week period, and extent and magnitude of drawdown. This approach was undertaken to inform the ERD of the risk of drawdown on Wungong Brook and potential nearby groundwater users. An output from the model that was not included in Appendix K of the ERD is shown below (from the pers. comm. reference made on page 273) to illustrate how the model was setup, the result and how it relates to dewatering the local hydrogeological setting. The model assumes the water table starts 2.5m into the sand unit (light blue). The green line shows the amount the water table is expected to be drawn down by dewatering with distance away from the excavation.

No	Information required	PTA's response
	ii) For greater certainty in predictions, groundwater modelling should be provided, including calibration results between observations and historical groundwater levels, a sensitivity analysis, and an uncertainty analysis.	 Temporary dewatering requirements for the project will be revised once detailed design has been completed and the construction requirements are further advanced. Risks relating to dewatering the alluvial sand at Wungong Brook are defined by the aquifer (thickness, extent, and permeability) and the depth and duration of dewatering. These constraints were assessed analytically (using a 2D model) rather than numerically (using a 3D model) because: • longer term seasonal fluctuations are not significant • transient changes in the rates and drawdown were not required to assess the risk. We only needed to know the worst-case condition. The modelled conditions assumed worst-case conditions: • The upper-most 2.5m of alluvial sand is fully saturated and overlies Guildford Formation clay of low permeability. The ERD (page 271) references dewatering 1m into the clay below the measured saturated thickness of 0.5m based on information from bore MW01. • Dewatering at the footing will drain the entire assumed 2.5m of sand aquifer for two weeks (for each footing). Dewatering 1m into the clay will be very localised because it has a very low permeability.

No	Information required	PTA's response
		• The aquifer is of uniform thickness and of infinite extent, meaning there are no constraints to how far drawdown can propagate. • No aquifer re-injection was applied. Re-injection of dewater would minimise the drawdown magnitude and extent. The site information indicates the saturated thickness is expected to be non-uniform i.e. becomes thinner away from the bridge site as illustrated on Figure 37. Depending on the time of the year, the alluvial sand where the footings are located is likely to be virtually dry. This means the aquifer would typically be less saturated than assumed and of limited extent. Because these conditions were not known precisely, worst case conditions were used. Page 273 of the ERD explained the magnitude of drawdown at 40 to 50m from the proposed footings are less than about one-tenth (0.2m) of the normal water table seasonal fluctuation (2m). Because the dewatering rate, and extent and duration of the drawdown, even under worst case conditions, were small and localised, the risk to local GDEs and potential nearby groundwater users in the context of natural variability was considered to be very low.
3.	*Impacts on groundwater dependent ecosystems (GDEs)* i) The Department considers that the proponent has broadly identified, described, analysed, and assessed most impacts on groundwater quality and quantity that may potentially result from construction and operation activities. However, potential impacts of groundwater drawdown on GDEs require further consideration. ii) The Department notes that both the *Corymbia calophylla - Kingia australis* woodlands on heavy soils of the Swan Coastal Plain Threatened Ecological Community (SCP3a TEC) and the Banksia Woodlands of the Swan Coastal Plain Threatened Ecological Community (Banksia Woodlands TEC) are highly	***i. Potential impacts to groundwater dependent ecosystems*** PTA consider that the potential impacts to groundwater dependent ecosystems associated with the Proposal are minimal. Groundwater abstraction for construction and dust suppression are considered unlikely to result in impacts to groundwater dependent ecosystems as: - Groundwater abstraction will be temporary - Abstraction will be from the deeper Leederville and/or Yarragadee aquifers and not the shallow superficial aquifer which ecosystems are potentially accessing (to meet their water requirements) - Abstraction wells for construction water will be located at least 50 metres, and where possible 100 metres away from sensitive receptors further reducing the likelihood of groundwater drawdown impacts. Further discussion of the potential for impact and the degree of groundwater dependency of threatened ecological communities present within and adjoining the proposal area is provided below. ***ii. Groundwater dependency of TECs*** The assessment of groundwater dependency was based on the risk assessment for potential impact to groundwater dependent ecosystems developed by Froend et al (2004) for the Department of Water and Environmental Regulation as part of the assessment of potential impacts on GDEs on the Gnangara Mound on the Swan Coastal Plain. The methodology is consistent with the current methodology used by

No	Information required	PTA's response
	dependent on groundwater and therefore vulnerable to changes in groundwater levels. Any direct impact on these TECs would also likely be propagated to Black Cockatoos, which rely on these vegetation communities for both foraging and breeding.	DWER for the assessment of the potential risk of impact from groundwater drawdown on dependent ecosystems. The risk assessment used the current depth to groundwater to provide an indication of potential groundwater dependence (of ecosystems). The risk assessment developed by Froend et al (2004) was based on the outcomes of studies into GDEs on the Swan Coastal Plain where the Proposal is situated. Much of the assessment of the response of groundwater dependent ecosystems to changes in groundwater levels on the Swan Coastal Plain is based on the long term changes of vegetation in wetland and Banksia Woodland communities and targeted eco-physiological investigations. The assertion (in the comment provided by DAWE) that Banksia Woodlands are highly groundwater dependent is only partially correct.
	iii) In particular, the Department is concerned that the groundwater level data collected since December 2020 may not be sufficient to reflect the natural variability of groundwater levels given these levels are estimated to be at their highest from September to October. The proponent's conclusion that the SCP3a TEC and wetland within Lambert Lane Nature Reserve have little dependency on groundwater, based on the fact that two bores in this location were dry in December and January, requires reassessment.	The framework of Froend et al (2004) identifies that the greatest dependency on groundwater and sensitivity or risk of impact to groundwater dependent ecosystems (from changes in groundwater levels) occurs where current or pre-existing groundwater levels are shallow. On the Swan Coastal Plain where the Proposal is located the greatest risk occurs where current groundwater levels are 0-3m and 3-6 m below ground surface. The risk of potential impact and dependence of ecosystems on groundwater decreases with increasing depth to groundwater. Four categories (maximum depth to groundwater 0-3m, 3-6m, 6-10m and >10m below ground level) were developed based on the results of eco-physiological studies which demonstrated that the utilisation and dependence on groundwater by phreatophytic *Banksia* species decreased with increasing depth to groundwater (Zencich et al. 2002). Utilisation and dependence on groundwater varied with position in the landscape (and depth to groundwater) and season. *Banksia attenuata* occurring at sites where the depth to groundwater was deepest (30m) were not utilising groundwater to meet their water requirements and were utilising soil water (Zencich et al 2002).
	iv) The Department supports the recommendation for further groundwater and surface water monitoring (Appendix L to ERD, p. 4), and considers that this should be undertaken for at least two years prior to commencing construction in order to capture the seasonal and temporal variation, and to confirm the extent of groundwater dependence in Fletcher Park, Lambert Lane Nature Reserve and Wungong Brook.	Similarly, dampland communities (TEC community SCP3a is an example of a dampland vegetation community) are considered by Froend et al (2004) as an example of ecosystems with proportional dependence on groundwater. The degree of groundwater dependence and risk of impact from changes in groundwater level is considered to decrease as depth to groundwater increases (Froend et al 2004). ***iii. Determination of depth to groundwater*** The ERD provides details of the current depth to groundwater. Groundwater levels for the BRE Proposal have been established using:
	v) The Department also considers that the proponent should undertake an isotope	• BRE groundwater level monitoring data. • Historical groundwater level data reported by Rockwater (1995) based on observations between measurements recorded in 1995 and 2020. • Groundwater level data from the DWER managed dataset.

No	Information required	PTA's response
	study (e.g. as described in Doody *et al.* 2019[1], p. 35), or use other methods, to confirm the level of groundwater dependence within these areas.	Further details of the investigation into groundwater are provided in Golder (2021). Groundwater levels (contours) for the Proposal Area and adjoining areas are shown in the ERD in figure 33. As stated above these were developed taking into account recent and historical monitoring results. The conclusions drawn on the likely groundwater dependency of the ecosystems within Lambert Lane Nature Reserve are based on groundwater data from recent monitoring and the Golder (2021) report. The groundwater at the time of sampling (late 2020) was greater than 8 m for Lambert Lane and around 11-12 m below ground level for Fletcher Park. These groundwater depths are comparable with those derived from the groundwater contours and incorporate results from a larger dataset. The conclusion regarding likely groundwater dependency was based on the current depth to groundwater at 8 m below ground level and the inferred dependency of wetland ecosystems with a maximum depth to groundwater based on the categories described by Froend et al (2004). That is, in the 6-10 m category where risk of impact from changes in groundwater level is lower than for ecosystems where the maximum depth to groundwater is shallow (0-3 m below ground level). ***iv. Request for additional groundwater and surface water monitoring*** Groundwater and surface water characteristics within the BRE proposal area have been determined using data collected from the site as well as long-term datasets managed by the DWER. The long-term datasets provide insight into seasonal and temporal variations. As outlined in the ERD (p. 242), the three surface water monitoring locations established by PTA complement the existing network of eight sites monitored by the DWER. Regional groundwater data show seasonal fluctuations of between 1.5 m and 2.5 m with seasonal high groundwater levels occurring around October and seasonal low levels occurring around May. Davison (1995) reported that seasonal variation of around 3 m is not uncommon in clayey soils of the Guildford Formation near the Darling Scarp. Historical maximum groundwater levels for the BRE Proposal have been established using: • BRE groundwater level monitoring data. • Historical groundwater level data reported by Rockwater (1995) based on observations between measurements recorded in 1995 and 2020. • Groundwater level data from the DWER managed dataset. The PTA will continue to monitor groundwater and surface water in the BRE proposal area prior to the commencement of construction. The continued monitoring will build upon the data collected to date. This data will inform detailed project design and establish a comprehensive baseline data set for water quality and groundwater level information specific to the project area.

No	Information required	PTA's response
		v. Request for additional studies Given the likely low level of risk of impact and information available from other sources, isotopic sampling is not considered necessary and may not be suitable in this situation. Isotopic sampling relies on differences in fractionation of naturally occurring isotopes in water. Samples are taken from potential water sources and samples from vegetation are 'matched' against potential water sources based on isotopic signature. The technique doesn't always work well for shallow unconfined aquifers where evaporation (directly from aquifer through capillary rise) results in fractionation of groundwater and a similar isotopic signature to surface and soil water. PTA consider that given the short-term nature of groundwater use and commitment to locate abstraction bores at least 50 metres, and where possible 100 metres away from sensitive receptors (note potential groundwater abstraction locations are provided in Figure 35 and 36 of the ERD), which will further mitigate the potential impact from drawdown additional studies are not warranted.
4.	*Surface Waters* i) The Department notes that the flows in Wungong Brook are currently artificially maintained by releases from Wungong Dam, and considers that the proponent has not clearly identified, described and assessed the potential impacts on Wungong Brook flood levels, and upstream and downstream flood levels from the associated bridge/crossing.	As illustrated in Figure 37, and described on Page 281 (Assessment of impacts - operation), the design of the proposed bridge crossing is the result of engagement with traditional owners and will remove: • all impediments to surface water flows • the partial obstacle currently affecting flood levels • any source of impact on the quality of surface water at the bridge crossing. By proposing a design that allows Wungong Brook to flow unimpeded i.e. equal to or better than before the existing bridge was constructed, no impacts on flood levels from the proposed bridge will occur.
	ii) The proponent has stated that the proposed Wungong Brook bridge '*will be designed to ensure that flows and velocities do not adversely impact existing waterways, wetlands and nearby properties up to a 1% AEP event*' (ERD, p. 285). However, the flood modelling report does not appear to have been provided. The only reference	Flood modelling was undertaken as part of the conceptual level designs in the report referenced in the ERD as WSP 2020b. The PTA's engineering and geotechnical consultant WSP performed hydrology and hydraulic analyses using Drains software employing XP-RAFTS algorithms and 2019 rainfall data from Australian Rainfall & Runoff web portal. The assessment was focussed on identifying conceptual designs that conform to drainage capacity and flood immunity requirements in the PTAs *Code of Practice Narrow Gauge Main Line Track and Civil Infrastructures*.

No	Information required	PTA's response
	to surface water flows is regarding the bridge design and maintaining current conditions for Carter's Freshwater Mussel and fish in a 1% AEP event (ERD, p. 359).	The flood analyses calculated catchment discharge rates to inform designs of crossings including Wungong Brook. The basis of design required flows from up to and including 1% AEP events to pass unimpeded and no closer than 0.5m beneath the railway line. The flood study on the proposed bridge at Wungong Brook concluded: • The proposed bridge reduces the flood level for a 1% AEP by 0.73m - from 40.96 to 40.23m AHD. • The existing clearance for a 1% AEP event is 0.74m whereas the proposed bridge design will leave a larger clearance of 1.65m The increase in flood level clearance and reduction in flood level height show the proposed bridge is expected to result in a similar or better outcome in terms of levels and velocities than the current bridge. The slightly lower velocity is achieved by having a wider cross-sectional area compared to the existing bridge.
5.	*Wetlands* The Department identified inconsistencies in both the number and name of wetlands in the documentation provided, particularly in relation to information provided in section 8.7.3, section 8.8.4 and Table 46 of the ERD, and Table 2 of Appendix J to the ERD.	There are some minor discrepancies between the wetlands included in the wetland assessment (Appendix J) of the ERD and those discussed in the inland water section (section 8). This is due to differences in the survey area of the wetland assessment and the development envelope of the Proposal. One wetland UFI15117 was included in Table 2 of Appendix J but does not occur within the development envelope and was not included in the ERD. In addition, two wetlands, UFI14507 and UFI12155, were included in Table 46 of the ERD, but not assessed as part of the wetland assessment included in Appendix J. Both wetlands occur outside of the Development Envelope and will not be impacted by the Proposal.
6.	*Acid Sulfate Soils (ASS)* i) The Department notes that some areas of the development envelope, particularly near surface water features, are considered by the proponent to be at a low to medium risk of ASS to a depth of 3 m (Appendix K to ERD, p. 12). Furthermore, samples collected in the development envelope confirmed the presence of ASS in three locations in the upper 5 m of soil.	Most of the BRE project area is mapped as 'no known risk of ASS occurring'. Areas mapped as 'low to moderate risk of ASS occurring within 3 m of the natural surface' are associated with surface water features. A preliminary ASS assessment was conducted by Golder (2020) as part of the groundwater monitoring well installation. The assessment involved ASS testing (field and laboratory analysis) at selected locations. The results from the assessment confirmed ASS at three test locations: monitoring well (MW) 01 near Wungong Brook – at 4m depth, MW 03 near Byron Road at 1.5m depth and MW 04 south of Lambert Lane at 1.5m, 4.5m and 5m depths). The potential to disturb ASS materials during construction is limited to the following activities: • Dewatering to temporarily lower groundwater levels; • Abstracting groundwater for use during construction; and • Direct excavation of ASS materials.

No	Information required	PTA's response
	ii) The Department considers that mobilisation of ASS materials will detrimentally effect GDEs and aquatic ecosystems in the area. For example, the Banksia Woodlands TEC may be susceptible to death or decline due to increased acidity and soluble aluminium concentrations. iii) While the proponent states that they will manage any ASS material in accordance with CEMP and DWER guidelines, the impacts of this material potentially entering surface water or groundwater, including impacts on GDEs and aquatic ecosystems, have not been specified in the ERD. Additionally, specific management methods have not been described. The Department considers that these should be provided.	The above potential disturbance pathways are discussed below. **Dewatering** Agonis (2021) consider that dewatering is required at the Wungong Brook crossing for the construction of the single span rail and PSP bridges. The preliminary design for the bridges requires a temporary lowering of groundwater up to 1.5 m from the maximum groundwater level. This depth has been estimated assuming that excavations for the bridge pile caps will be 0.5 m below maximum groundwater level. A 1 m lowering of the groundwater level beneath the excavation is needed to achieve adequate compaction. This will result in the temporary and localised reduction in groundwater levels of 1.5 m at this location. Once detailed design for the rail and PSP bridges has been completed, the above assumptions will be re-visited to determine if additional ASS investigations at this location is required. If a further investigation is needed, this will be conducted in accordance with the DWER's guidelines *Identification and investigation of acid sulfate soils and acidic landscapes* (DER, 2015). If the site investigations confirm that ASS material will be disturbed at this location, the PTA or its contractor will prepare and implement an ASS Management Plan outlining the approach to handling and treatment of ASS materials and dewatering effluent. Management and monitoring will be conducted in accordance with DWER guidelines *Treatment and management of soils and water in acid sulfate soil landscapes* (DER, 2015). Conventional construction ASS management methods will be applied and may include staging of disturbance to minimise the time that ASS are exposed to the atmosphere, bunding to collect runoff during earthworks, stockpile management for excavated soils, monitoring, and treatment of soils with the appropriate amount of neutralising material to counter the soils actual and potential acidity. Monitoring of dewatering effluent will be conducted in accordance with DWER guidelines. Neutralising will be completed where results indicate that treatment is required. Monitoring of dewatering effluent before and after treatment will be completed. Groundwater monitoring will also be conducted in accordance with DWER guidelines during and after the completion of dewatering activities to assess the impacts of dewatering on groundwater. Implementing the above approach will reduce the risk of adverse impacts to groundwater and surface water quality at Wungong Brook and therefore reduce the risk of causing a significant impact on Carter's Freshwater mussel. Based on the current concept design, dewatering is not required at any other locations. This assumption will be reviewed during the detailed design phase. **Groundwater Abstraction** Temporary abstraction of groundwater will be required to supply water for dust suppression and for ground compaction during construction. Two general locations for abstraction bores are proposed, these are in the vicinity of Eleventh Road and Byford Station. Subject to approvals under the *Rights in Water and*

No	Information required	PTA's response
		Irrigation Act 1914, groundwater will be abstracted from deeper semi-confined and confined aquifers (i.e. the Leederville or Yarragadee). Abstraction from these aquifers will not impact upon groundwater levels in the superficial aquifer and therefore do not represent a risk to disturbing ASS at these locations. The superficial aquifer is not a viable source of groundwater due to the low permeability of the superficial formation which will only yield low volumes of groundwater. **Excavation** ASS, where present, generally occurs at depths below groundwater. Therefore, the risk of exposing or disturbing ASS during excavation is restricted to those locations where excavation will occur at or below groundwater. The BRE has been designed to minimise the need for the excavation and removal of large amounts of material where possible. The railway will mostly be at existing ground level or raised using imported fill with limited cut below existing ground level. The extent of cut will be relatively minor after topsoil stripping and stockpiling. The depth to groundwater varies along the Development Envelope. However, it is generally below the proposed excavation depths. Therefore, there is minimal risk of encountering ASS material during excavation. Excavation below the maximum groundwater level may be required near Wungong Brook for the construction of the pile caps for the rail and PSP bridges. The management of ASS at Wungong Brook has been outlined above under dewatering. **Conclusion** Based on the above information, the risk of disturbing ASS during construction is predominantly contained to the Wungong Brook crossing. This risk will be closely managed during construction. The risk at other locations is considered low, as there is no requirement for dewatering and planned excavation is limited to surficial soils. The potential to disturb ASS during construction will be revisited by PTA during detailed design. Where necessary, additional field investigations will be conducted and if required, an ASS and Dewatering Management Plan will be prepared in accordance with DWER guidelines. ASS and dewatering are routinely managed during major construction projects without causing adverse impacts to the environment.
7.	*Water contamination/chemical alteration* i) Three sites overlapping the development envelope have been	i. **Management of Potentially Contaminated Materials**

No	Information required	PTA's response
	identified as "possibly contaminated" and one site is awaiting classification (Appendix K to the ERD, p. 24). The proponent has stated that they will undertake appropriate measures if contaminated material needs to be disturbed in one of these areas. The Department requests the proponent provide details about these specific mitigation measures in the ERD.	Specific mitigation measures cannot be provided at this stage, as management strategies will be specific to the type and extent of contamination (if present) and the construction requirements of the final design for the BRE. Contamination risk is being investigated and managed in accordance with the requirements of the *Contaminated Sites Act 2003* and DWER guidelines. This involves a series of sequential steps that commences with a Preliminary Site Investigation (PSI) to identify areas of potential concern, followed by a Sampling and Quality Analysis Plan (SAQP) to outline a sampling and analysis regime for areas of potential concern. The SAQP is implemented and the results reported in a Detailed Site Investigation, and where required, a remediation action plan is prepared to outline the steps required to remediate areas of contamination within the context of the BRE proposal. The sequential investigation and reporting process outlined above accounts for the potential risks to sensitive receptors including human health and the environment. Possible impacts to matters of national environmental significance are included within the definition of environment. The PTA will require the appointed contractor to prepare a Construction Environmental Management Plan (CEMP). CEMPs for METRONET projects under construction have included measures to manage unexpected finds encountered during construction. **ii. Mobilisation of Contaminated Groundwater (Dewatering Abstraction)** The ERD outlines three locations where dewatering or groundwater abstraction may occur. These include: • Wungong Brook rail/PSP bridges (dewatering); • Eleventh Road (groundwater abstraction for construction water); • Byford Station (groundwater abstraction for construction water). The above sites are not located near the potentially contaminated sites referenced in Appendix K of the ERD. Therefore, there is no risk of mobilising potentially contaminated groundwater. Groundwater contamination, if present, would be found within the superficial aquifer (i.e. the shallowest groundwater aquifer). Dewatering is most likely to occur near Wungong Brook. Monitoring of water quality has not recorded evidence of contamination at this location. Groundwater abstraction for construction water will be sourced from deeper confined aquifers (Leederville or Yarragadee Aquifers) near Eleventh Road and Byford Station. As these aquifers are confined there is minimal risk of the potentially contaminated sites impacting the groundwater within these aquifers.
	ii) Although the proponent states that these areas are unlikely to be disturbed during construction, the Department considers that contaminated groundwater could be mobilised during abstraction or dewatering.	
	iii) The Department therefore considers that the proponent should undertake a detailed model for abstraction and dewatering to ensure that potentially contaminated groundwater is not mobilised, and identify how the impact of any mobilisation would be mitigated.	
	iv) The proponent notes that groundwater abstracted at Wungong Brook bridge may be re-injected via shallow re-injection bores or an infiltration basin downstream from the site (ERD, p. 273). The Department notes that elevated concentrations of nitrate and nitrite were identified in groundwater at Wungong Brook bridge but not in surface water (ERD, Table 45). Infiltration of abstracted groundwater could result in	

No	Information required	PTA's response
	elevated concentrations of nitrate and nitrite in surface water if the groundwater is left to infiltrate through a basin. This could in turn impact EPBC listed species and communities. Therefore, the proponent should specify how this will be monitored and managed.	**iii. Detailed Groundwater Modelling** Construction water will be sourced from deep semi-confined and confined aquifers (Leederville and Yarragadee Aquifers), not from the shallow groundwater system (i.e. the superficial aquifer). Matters of national environmental significance (such as threatened ecological communities, Carter's Freshwater Mussel, etc.) do not access or rely upon groundwater within these deeper aquifers. They are more likely to access groundwater from the shallow superficial aquifer, surface water features or direct rainfall. Therefore, abstraction of groundwater from the deeper aquifers will not impact on matters of national environmental significance. Agonis (2021) determined that temporary dewatering would only be required at the Wungong Brook during the construction of the footings for the rail and PSP bridges. A temporary lowering of groundwater by up to 1.5 m from the maximum groundwater levels has been predicted. Assuming a dewatering rate of 5 litres/second and accounting for the soil properties at this location, it is predicted that groundwater drawdown will be in the range of 0.2 m at 50 m from the dewatering location. The predicted lowering of groundwater levels will be temporary for the duration of the bridge footing construction and represents approximately one-tenth of the seasonal groundwater variation. The required dewatering is not expected to have a significant impact upon matters of national environmental significance. As outlined in the ERD, the PTA will translocate Carter's freshwater mussel from this location and undertake monitoring of groundwater and surface water. The DWER is responsible for administering dewatering licences. The PTA or its contractor will obtain approval to conduct dewatering in accordance with the *RIWI Act 1914*. If required, groundwater modelling will be completed for this process, once detailed design for the bridges has been completed. **iv. Wungong Brook Groundwater Abstraction** The ERD indicates that dewatering effluent associated with the construction of the rail and PSP bridges will be either re-infiltrated nearby to the shallow aquifer, or used as a source of construction water. It appears that the submitter has interpreted that dewatering effluent will be discharged to the surface water. The PTA confirms that this is not the proposed method of disposal. The PTA will ensure that dewatering effluent is infiltrated to groundwater via re-injection bores or infiltration basins. This method commonly used in construction projects and is a preferred method of disposal as it returns water to the shallow aquifer (i.e. from where it was abstracted). As explained in the ERD, at various times of the year, groundwater from the superficial aquifer discharges to the Wungong Brook. The fact that nitrate and nitrite levels are lower in the surface water of Wungong Brook, is likely attributable to the artificial release of water from Wungong Dam, further upstream which impacts on surface water quality in the Brook.

No	Information required	PTA's response
		To minimise the risk of adversely impacting Carter's freshwater mussel at this location, PTA will translocate individuals to nearby areas with suitable habitat.
Offsets		
8.	*Corymbia calophylla - Kingia australis woodlands on heavy soils of the Swan Coastal Plain Threatened Ecological Community (SCP3a TEC) Offset Strategy*	Acknowledged. The PTA are continuing to pursue the option of locating new occurrences of the SCP3a TEC, and where possible securing the land, as an offset. This is dependent on the existing land owner, existing and potential land tenure, potential land owner and manager.
	i) The Department agrees with the proponent's preferred offset option of locating and securing new occurrences of the SCP3a TEC and encourages the proponent to continue to pursue this option.	Acknowledged. If the PTA are unable to acquire privately owned land containing large, good quality patches of the SCP3a TEC the PTA will consider alternative offset options.
		Acknowledged. The PTA will look to providing an offset package containing a combination of offset sites and measures, including active management to improve vegetation condition and revegetation to provide a buffer for the occurrence of the TEC.
	ii) The Department is also aware of the very limited options currently available to the proponent for acquisition of privately owned land containing large, good quality patches of the SCP3a TEC, and therefore welcomes the consideration given to alternative offset options.	Acknowledged. The PTA will continue to liaise with the DBCA and/or LGA to ensure proposed on-ground management actions for sites already under some form of conservation covenant and management are additional to what is currently in place and include a long-term and detailed set of specific management actions with proposed outcomes, monitoring activities, timeframes and budget.
		Acknowledged. The PTA will liaise with DAWE regarding the application of the Department's offsets calculator tool.
	iii) In that regard, the Department agrees with the principles set in the proponent's *Draft Offset Strategy* and understands that a combination of offset sites and measures, including active management and possibly also restoration through revegetation, may be required to fully counterbalance the residual significant impacts of clearing 2.83 ha (out of 194 ha remaining) of the SCP3a TEC.	Acknowledged. The final offset package will include a monetary contribution towards long-term management of offset sites.
	iv) The Department notes, however, that all of the proposed offset sites (with the	

No	Information required	PTA's response
	exception of the highly degraded Fletcher Park area) identified by the proponent in their *Draft Offset Strategy* are already under some form of conservation covenant and management, and that any final offset proposal needs to be additional to what is currently in place and, more importantly, include a long-term and detailed set of specific management actions with proposed outcomes, monitoring activities, timeframes and budget. v) Whilst the tenure of proposed offset sites are somewhat accounted for by the Risk of Loss (ROL) parameter when calculating the quantum of required offsets using the Department's offsets calculator tool, there is also an underlying assumption in the calculation that the proposed offset site(s) would ultimately be purchased and secured under a conservation covenant for the duration of the impact or longer (effectively in perpetuity in the case of clearing). vi) Given the above, the Department is unlikely to take the 'net present value' output of the offset calculation for the sites under conservation covenant considered by the proponent in their *Draft Offset Strategy* at face value. The Department has an expectation, should the chosen offset sites be already under a conservation covenant, that a final	

No	Information required	PTA's response
	offset proposal would include a monetary contribution towards long-term and ongoing management that is compatible with what would normally be required in circumstances involving acquisition of private land, and additional to any existing arrangements at the site, so that a conservation gain can be achieved in accordance with the Department's Offset Policy.	
9.	*Corymbia calophylla - Kingia australis woodlands on heavy soils of the Swan Coastal Plain Threatened Ecological Community (SCP3a TEC) Offset calculator parameters* In assigning a score for the condition of the 2.83 ha patch of SCP3a TEC to be cleared by the proposed action area, the proponent has rounded down the weighted average of the vegetation quality score from 6.72 to 6, on the basis that the patch occurs along a narrow strip within an existing rail reserve. The Department does not consider this to be a reasonable basis and recommends the score quality be set to 7.	The PTA will review the score for the condition of the impacted 2.83 ha of SCP3a TEC and provide a revised score and justification in the final offset strategy after consultation with DAWE.
10.	*Black Cockatoos Offset strategy* i) The Department encourages advanced offsets, where practical, and therefore is supportive of the proponent's proposal to use the Lowlands Nature Reserve area to offset significant residual impacts of the proposed action on Black Cockatoos.	Acknowledged. The Lowlands Nature Reserve is an advanced offset site. The ERD states there will be a significant residual impact of a loss of up to 139 potential Black Cockatoo breeding trees, 131 (94.4%) with no hollows, and eight (5.8%) with hollows not suitable for black cockatoos. The PTA therefore do not propose to offset hollows, given there is no impact to suitable hollows within the Proposal. The eight hollows that were not suitable for black cockatoos were either too small (four hollows) or at the incorrect angle (four hollows). These hollows are very unlikely to form a suitable hollow in the future. The PTA considered the potential conservation outcome from installing artificial hollows within the proposed action area and determined that the installation of artificial hollows in or around the proposed action area is unlikely to provide a conservation gain.

No	Information required	PTA's response
	ii) However, given the significance of the proposed action site for foraging and breeding of Black Cockatoo species and the fact that a significant number (131) of potential breeding trees (8 of which containing unsuitable hollows) are proposed to be cleared, the Department also encourages the proponent to consider installing artificial hollows within the proposed action area, if there is evidence to suggest that a conservation gain could be obtained from such a measure.	Black cockatoo's only tend to use artificial hollows where they are already trying to breed and there is a shortage of natural hollows (black cockatoo recovery team & Mike Bamford, pers. comm.). Carnaby's cockatoo will readily use artificial nest boxes if they are using the area for breeding (GHD 2021). Forest red-tail black cockatoos generally don't use artificial nest boxes (GHD 2021) however there are recorded instances of forest red-tailed black cockatoo's using nest boxes in some locations (Bamford, pers. comm., Kirby pers. comm.). There is no evidence that breeding is occurring within the proposed action area. Carnaby's cockatoo is a non-breeding visitor to the proposed action area (GHD 2021 citing Kirkby pers. comm.). The nearest known breeding site is 6 km east in the Wungong Catchment (WA Museum unpublished data). The nearest confirmed breeding site for forest red-tailed black cockatoo's is 2 km to the east in the Bedfordale area (GHD 2021). There are no records of Baudin's cockatoo breeding on the Swan Coastal Plain (GHD 2021 citing Kirkby pers. comm.). The nearest known breeding site is 12 km east in Bungendore Park. Two artificial nest boxes are located in Fletcher Park, however there is no evidence to date that suggests black cockatoos are using the nest boxes for breeding (Bamford 2021 and Kirby 2021). The PTA contacted Kirkby to understand why the nest boxes are not being utilised in Fletcher Park. Kirkby advised Carnaby's cockatoo readily use nest boxes but there is no evidence they have used the nest boxes in Fletcher Park. Forest red-tail black cockatoos are likely to breed in the area but do not tend to use artificial nest boxes (Kirkby pers. comm. 31 May 2021). The PTA were advised by both the black cockatoo recovery team and Kirkby that considerable thought needs to be taken before installing artificial nest boxes. The black cockatoo recovery team indicated that they avoid installing artificial nest boxes in highly cleared or developed areas due to lack of foraging habitat for nestlings.
11.	*Black Cockatoos Offset calculator parameters* The Department generally considers that any area actually or potentially supporting a listed threatened species automatically has a quality score of at least 4. The proponent should therefore re-do the offset calculations for Carnaby's and Forest Red-tailed black cockatoos considering a habitat quality score of 4.	Noted. The PTA will review the quality score for the impacted Carnaby's and forest red-tailed black cockatoo foraging habitat and provide a revised score and justification in the final offset strategy after consultation with DAWE.

3. Attachments

Attachment 1 – Location details of *Eucalyptus x balanites*

Letter from GHD providing location details of *Eucalyptus x balanites*.

999 Hay Street, Level 10
Perth, Western Australia 6000
Australia
www.ghd.com

Your ref: Byford Rail Extension
Our ref: 12532927

08 June 2021

John Morrell
Public Transport Authority
Public Transport Centre
West Parade Perth WA 6000

Byford Rail Extension – Flora and Vegetation

Dear John

It has come to our attention that the location of flora species *Eucalyptus x balanites* presented in Byford Rail Extension, Flora and Vegetation Assessment (GHD 2021) was incorrectly mapped and discussed in the text (Figure 8, Appendix A and Section 4.6.1 respectively). GHD has re-checked the locations and data and confirm that one individual of *Eucalyptus x balanites* was recorded at the same location as the existing Department of Biodiversity, Conservation and Attractions (DBCA) corporate record. The location of this individual was recorded at 32° 10' 43.71" S, 116° 0' 33.78" E and is mapped in Figure 1.

Regards

Joel Collins
Team Leader - Ecology

+61 8 62228600
joel.collins@ghd.com

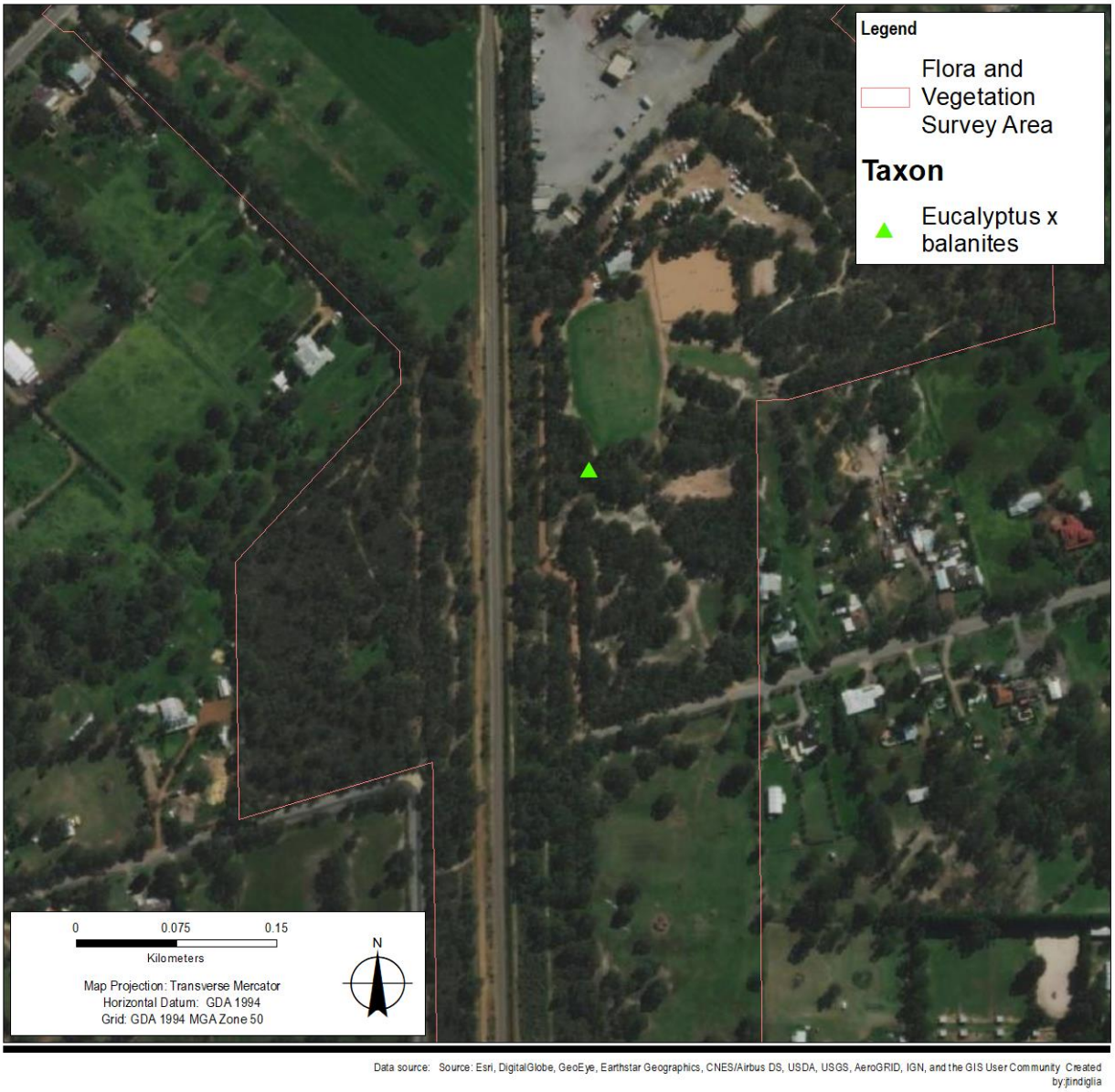


Figure 1 Location of Eucalyptus x balanites in Fletcher Park

Attachment 2 – Byford ERD Calculations

Table 20 Impacts to native vegetation types mapped within the Development Envelope and Footprint

Vegetation type	Condition rating	Extent in Development Envelope (ha)	Extent in Footprint (ha)
VT01	Excellent	0.07	0.02
	Very Good	0.15	0.06
	Good	2.38	1.95
	Degraded	0.84	0.80
VT03	Degraded	<0.01	0.00
VT04	Degraded	0.93	0.25
	Completely Degraded	0.64	0.13
VT06	Good	0.10	0.10
	Degraded	2.62	1.84
	Completely Degraded	9.44	6.01
VT08	Degraded	0.05	0.03
	Completely Degraded	8.29	4.62
VT09	Degraded	0.95	0.17
Sub total	Excellent	0.07	0.02
	Very Good	0.15	0.06
	Good	2.48	2.05
	Degraded	5.40	3.10
	Completely Degraded	18.37	10.76
Total		**26.5**	**15.98**

Table 1: Quantum of impact on each environmental matter

Environmental Value	Significance	Area of significant residual impact to community/habitat (PTA, 2021)	Quality of area of community/habitat being impacted	Calculation methodology	Total quantum of impact	Section
SCP3a	MNES	2.83 ha	6	Offsets assessment guide	1.70 ha	3
Carnaby's cockatoo foraging habitat	MNES	19.3	3	Offsets assessment guide	5.8 ha	4
Forest red-tailed black cockatoo foraging habitat	MNES	61.1	3	Offsets assessment guide	18.3 ha	4
Baudin's black cockatoo foraging habitat	MNES	8.65	6	Offsets assessment guide	5.2 ha	4
Black cockatoo potential breeding trees	MNES	139 trees	NA	NA	139 trees	4
Conservation Category Wetlands	MNES	2.6	NA	NA	2.6	5
Bush Forever (native vegetation)	MNES	1.54	NA	NA	1.54	5

Table13 Bush Forever Sites in or within 1 km of the Development Envelope

Site No.	Site name	Size (ha)	Extent in Development Envelope	Extent in footprint (ha)	Location relative to proposal
264	Lambert Lane Bushland, Wungong	15.13	3.06	2.73	Site lies either side of the Development and Footprint and incorporates the rail corridor
266	Wungong Brook, Byford	26.21	1.13	0.36	Site intersects the Development and Footprint and extends east and west along Wungong Brook
350	Byford to Serpentine Rail/Road Reserves and Adjacent Bushland	93.13	1.71	1.04	Site intersects the Development Envelope and Footprint and extends approximately north and south within the road and rail reserve.
Total			5.9	4.13	

Attachment 3 –Carters Freshwater Mussel Translocation Strategy

Background

Westralunio carteri (Carter's Freshwater Mussel) is the only native freshwater mussel found in south-western Australia and is currently listed as Vulnerable on state (*Biodiversity Conservation Act 2016* (BC Act 2016)), national (*Environment Protection and Biodiversity Conservation Act* (EPBC Act 1999)) and international conservation lists (ICUN Redlist (ICUN 2020).

A targeted fauna survey for Carter's Freshwater Mussel was conducted within the BRE survey area by Stream Environment and Water Pty Ltd. The survey included assessment of suitable habitat and confirmation of the presence and distribution and density of the Mussel.

Carters Freshwater Mussel was found within the development envelope within Wungong Brook system with estimated densities of 0.6 mussels per m2. This area was without riparian vegetation and having been subject to historical disturbance (Stream Environment and Water 2021).

The species was also found in variable but generally low densities upstream and downstream of the development envelope (approximately 500m of Wungong Brook was surveyed). Where recorded mussel density within quadrats ranged from 1 to 12 mussels per m2, with an overall mean mussel density of 2.6 mussels/m2. Mussel size ranged from 9 to 65mm (median shell length of 52mm). The presence of mussels in Wungong Brook, with a range of size classes, indicates a healthy self-sustaining population (Stream Environment and Water 2021).

Potential Impacts of the Project on W.carteri

In the absence of suitable mitigation disturbance to the bed of the Wungong Brook within the development footprint may result in mortality of individuals (e.g. by burying or crushing individuals) during the construction phase.

Indirect mortality of individuals could potentially occur downstream of the development envelope during the construction phase through a decline in water quality (resulting from disturbance of the bed and banks of the Brook).

Proposed Management

Translocation (undertaken in accordance with relevant guidelines and best management practices) of potentially impacted individuals of *W. carteri* to another site upstream of the development envelope within the Wungong Brook system is proposed. This will include translocation of those individuals at risk from construction works within the development envelope and individuals at risk from indirect impacts (i.e. If water quality monitoring during the construction process puts mussels downstream of the development envelope at risk then translocation procedures will be triggered for the impacted area).

Permanent relocation of individuals to another site upstream of the development envelope within the Wungong Brook system is considered an appropriate management strategy to avoid impacts to individuals as:

1. Although local variation in habitat does occur along the brook, translocation of individuals within the same system, with careful site selection, is likely to result in a higher chance of translocation success due to the similarity of habitat.
2. The number of individuals within the development envelope is low (0.6 mussels per m^2) and the receiving site also fairly low (2.6 mussels per m^2), reducing the likelihood of density dependent impacts at the translocation site (mussel densities reported for other surveys in south west watercourses range from 1-15 per m^2 (Klunzinger et al. 2012)).

3. The presence of mussels in Wungong Brook, with a range of size classes, indicates a healthy self-sustaining population.
4. There have been several successful translocations of Carters Freshwater Mussel in South Western Australia in recent years (e.g. Busselton Eastern Link and Causeway duplication Project (Murdoch University 2019) and the Lower Helena Pipehead Dam Project (Klunzinger *et al*. 2011).

Translocation Strategy

Objective: To permanently relocate Carters Freshwater Mussel individuals potentially impacted (directly or indirectly) by the project mitigate the likelihood of the mortality of the species and ensure that the long term conservation outcome of the species is not impacted.

Program Outline:

5. Confirm timing of the translocation within the construction schedule and with consideration of mussel spawning period i.e. timing of the relocation will be in summer or autumn, outside of the spawning period of the species (Males typically spawn in July./August with females retaining glochidia until October/November).
6. Prior to on ground activities confirm the indicators of success for the translocation and monitoring and reporting requirements
7. Survey of direct disturbance area to confirm density of mussels and likely number requiring translocation.
8. Locate potential translocation sites utilising baseline surveys by Stream Environment and Water Pty Ltd (2021). Potential translocation sites will be at least 50 m upstream of the development envelope.
9. Conduct an evaluation of proposed translocation sites to establish:
    - Whether mussels are present and current mussel density
    - Whether the location is a suitable space to accommodate densities typical of those in other localities in southwestern Australia (1-15m^2).
    - The presence of dead mussels (may indicate compromised habitat)
    - The presence of suitable substrate
    - Sufficient water flow and depth
    - The presence of riparian vegetation (for shade)
    - In situ water quality monitoring (as a minimum salinity, pH and dissolved oxygen) to ensure that habitat conditions are suitable.
10. Conduct a risk assessment to ensure that the risks of relocating the mussels are identified and managed.
11. Collect mussels from the area of direct disturbance using hand searching of the stream bed. The objective of the collection phase will be to collect all live mussels within the area of direct disturbance for translocation. Transfer mussels to translocation site(s) within the same day at mussel densities of no more than 15 mussels per m2. Translocation will be undertaken by experienced and qualified aquatic ecologists.
12. Complete review and reporting requirements
13. Implement corrective actions if and as required.

Permits and Licences

A Section 40 authorisation will be obtained from DBCA prior to the translocation. In addition, consultation with DPIRD (fisheries) will be required to confirm whether there are any licencing requirements under the FRM Act (commercial fishing).

Roles and Responsibilities

PTA will be responsible for the implementation and success of the translocation program Qualified aquatic ecologists with experience will undertake the translocation procedure.

Review and Compliance

The success of the translocation procedure will be established through monitoring the health and survival of Carters Freshwater Mussel individuals using short and long term indicators of success. Corrective actions will be discussed with relevant authorities if the translocation plan is unsuccessful.

Attachment 4 –Byford Flora and Vegetation Monitoring Measures

Byford Rail Extension Potential Impact	Byford Rail Extension	Malaga to Ellenbrook Rail Works	Yanchep Rail Extension: Part 2 – Eglinton to Yanchep	Yanchep Rail Extension Part 1 – Butler to Eglinton	Thornlie-Cockburn Link
Permanent loss of up to 16 ha of native vegetation	• Consideration of flora and vegetation values during detailed design to avoid clearing, particularly in areas of significant flora and vegetation. • Construction and operational access tracks have been designed to coincide with existing tracks or aligned along cleared areas wherever practicable. • Cleared areas will be used for temporary construction requirements, wherever practicable. • The Proposal Footprint has been narrowed through Lambert Lane Nature Reserve and Fletcher Park as far as practicable to minimise impacts on native vegetation. • The Development Envelope and Footprint to be marked on all design drawings as site boundaries.	• Construction and operational access tracks have been designed to coincide with existing tracks or aligned along cleared areas wherever practicable. • Cleared areas will be used for temporary construction requirements, wherever practicable. • The Footprint has been aligned on the edge of Drumpellier Drive to minimise clearing required along the eastern extent of Bush Forever site 304. • Demarcation of the Development Envelope, Footprint and NVRAs in accordance with a CEMP that has been prepared and will be implemented by the PTA. • Manage clearing of vegetation in accordance with the PTA Ground Disturbance Procedure (7310-000- 001) and PTA Environmental Spatial Data Procedure (7310-000-002).	• Minimise clearing to as low as reasonably practicable. • Demarcate the development envelope (e.g. via installation of temporary fencing) to prevent clearing outside of approved areas	• Demarcate the development envelope (e.g. via installation of temporary fencing) to prevent clearing outside of approved areas.	Demarcate the development envelope (e.g. via installation of temporary fencing and/or flagging) to prevent clearing outside of approved areas.

	• Manage clearing of vegetation in accordance with the PTA Ground Disturbance Procedure and PTA Environmental Spatial Data Procedure. • No land clearing or ground disturbance work is to be undertaken until a Ground Disturbance Permit has been signed and issued by PTA. • Vehicles and equipment access limited to designated roads/access tracks and cleared areas. • Areas cleared for the Proposal will be revegetated where not required for permanent infrastructure or management access and with consideration for operational safety requirements.	• No land clearing or ground disturbance work is to be undertaken until a Ground Disturbance Permit (GDP) has been signed and issued by PTA. • Areas cleared for the Proposal will be revegetated where not required for permanent infrastructure or management access and with consideration for operational safety requirements			
Loss of ecological values protected in Bush Forever sites nos. 264, 266, 350	• Clearing regionally significant bushland associated with Bush Forever has been avoided wherever practicable. • The Proposal Footprint has been narrowed through Bush Forever site no. 264 as far as practicable to	• The Development Envelope was positioned to minimise impacts on Bush Forever site 304 by locating the bridge crossing it at the narrowest practicable point, commensurate with the requirements of rail design geometry. • The Footprint has been aligned on the edge	• Development envelope was modified during the design phase to avoid the direct impacts to Bush Forever Site No. 130 and Bush Forever Site No. 288	• The development envelope was modified during the design phase to avoid the direct impacts to Bush Forever Site No. 130, Bush Forever No. 288 and nearby parks and	• Minor adjustments to the development envelope in Bush Forever Site 456 (Tom Bateman reserve) have been implemented to avoid impacts to wetland vegetation in this location.

	minimise impacts on native vegetation.	of Drumpellier Drive to minimise clearing required along the eastern extent of Bush Forever site 304.		reserves potentially containing this TEC	
Permanent loss of up to 2.83 ha of *Corymbia calophylla* - *Kingia australis* woodlands on heavy soils, SCP (SCP 3a) TEC	• Consideration of vegetation values during detailed design to avoid clearing, particularly in areas of significant vegetation. • The Proposal Footprint has been narrowed through Lambert Lane Nature Reserve and Fletcher Park as far as practicable to minimise impacts on TEC SCP 3a.	• The Proposal has been designed to avoid three patches of TEC.	• Minimise clearing to as low as reasonably practicable.	• The development envelope was modified during the design phase to avoid the direct impacts to Bush Forever Site No. 130, Bush Forever No. 288 and nearby parks and reserves potentially containing this TEC	• PTA has completed several revisions of the development envelope and reconfigured the boundaries to reduce the extent of the impact on two TEC patches (Patches 1 and 3).
Permanent loss of aquatic GDE	• Consideration of vegetation values during detailed design to avoid clearing, particularly in areas of significant vegetation. • The Proposal Footprint has been narrowed through Lambert Lane Nature Reserve and Fletcher Park as far as practicable to minimise impacts on Conservation Category Wetlands.	• Impacts to GDE have been minimised by aligning the project footprint away from native vegetation wherever practicable	• In May 2019, the PTA modified this Proposal to remove the requirement for groundwater abstraction to remove the potential for impacts to local ESAs.	• N/A	• Minor adjustments to the development envelope in Bush Forever Site 456 (Tom Bateman Reserve) have been implemented to avoid impacts to wetland vegetation in this location.
Loss of conservation significant flora	• The *Diuris purdiei* record will be avoided and buffered to prevent	• The alignment has been designed to avoid 8.05 ha of inferred suitable *Caladenia huegelii*	• N/A	• N/A	• The proposed location for the TCL has taken into account potential *Caladenia huegelii* habitat, and where possible these

	ground disturbance at this location. • All significant flora will be mapped and marked on site and avoided where possible during clearing. • Ensure staff and contractors are aware of the location of significant flora and vegetation on site and their responsibility to ensure they are protected.	habitat of which 6.95 ha is maintained in a NVRA. (Area A).			areas have been avoided to reduce impacts on this Threatened species. • Identification of all known locations of significant flora and TECs/PECs in project documentation • Avoid all known populations of *Caladenia huegelii* that exist near the development envelope.
Indirect impacts from dust	• Vegetation clearing and earthworks will be avoided during high winds wherever practicable. • Implement dust suppression measures outlined in the PTA Ground Disturbance Procedure. • Dust suppression measures will be utilised at locations of high dust risk including internal construction roads, cleared areas, batters and stockpiles. • Dust suppression measures such as application of water and dust suppressants will be implemented where dust generation is visible, except during topsoil stripping.	• Vegetation clearing and earthworks will be avoided during high winds wherever practicable. • Implement dust suppression measures outlined in the PTA Ground Disturbance Procedure (7310-000- 001). • Dust suppression measures will be utilised at locations of high dust risk including internal construction roads, cleared areas, batters and stockpiles. • Dust suppression measures will be implemented where dust generation is visible, except during topsoil stripping. • Vehicle speeds on construction roads will be reduced where necessary	• Review daily weather forecasts, and limit construction activities during high wind conditions, where practicable. • Implement dust suppression measures on unsealed roads and access tracks, cleared areas and at other locations at times of high dust risk • Enforce speed limits in construction areas • Use water carts on unsealed roads and tracks	• Review daily weather forecasts, and limit, and if practicable prohibit, construction activities during high wind conditions. • Implement dust suppression measures on unsealed roads and access tracks, cleared areas and at locations and times of high dust risk • Enforce speed limits in construction areas.	• Review of daily weather forecasts, and limit, and if practicable prohibit, construction activities during high wind conditions. • Implement dust suppression measures on unsealed roads and access tracks, cleared areas and at locations and times of high dust risk • Enforce speed limits in construction areas. • Use of water carts on unsealed roads and tracks

	• Vehicle speeds on construction roads will be reduced where necessary to minimise dust emissions. • Vehicles will remain within designated roads and park only in allocated areas.	to minimise dust emissions. • Vehicles will remain within designated roads and park only in allocated areas		• Use water carts on unsealed roads and tracks.	
Introduction and spread of weeds during construction	• Manage weeds in accordance with the PTA Dieback and Weed Control Management Procedure. • Identify weed management zones aligned with significant weed infestations. • Control the infestations of One-leaf Cape Tulip and Black berry within the Development Envelope in accordance with DPIRD guidelines. • Construction Contractor to develop and implement a hygiene management process to control access and movement of vehicles and construction personnel to prevent the introduction and spread of weeds into weed free areas. • Require all personnel to complete a site induction that will include hygiene training,	• Manage weeds in accordance with the PTA Ground Disturbance Procedure (7310-000-001). • Identify weed management zones aligned with significant weed infestations. • Control the infestation of Arum Lily (*Zantedeschia aethiopica*) and African Lovegrass (*Cenchrus macrourus*) at Bennett Brook and Cape Tulip (*Moraea flaccida*) in Whiteman Park paddocks of the Development Envelope in accordance with DPIRD guidelines. • Construction Contractor to develop and implement a hygiene management process to control access and movement of vehicles and construction personnel to prevent the introduction and spread of weeds into weed free areas.	• Source clean fill, limestone, gravel and topsoil or other materials from suppliers with appropriate weed control measures • Manage the six Declared Pests recorded in the development envelope and any other newly identified declared weeds in accordance with the *Biosecurity and Agriculture Management Act 2007* and subsidiary regulations. • Require all personnel to complete a site induction that will include hygiene training with regards to weed management requirements. • Restrict unauthorised access to and from the development envelope by installing temporary	• Manage One-Leaf Cape Tulip (*Moraea flaccida*) and any other newly identified declared weeds within the development envelope in accordance with the *Biosecurity and Agriculture Management Act 2007* and subsidiary regulations. • Require all personnel to complete a site induction that will include hygiene training with regards to weed management requirements • Restrict unauthorised access to and from the	• Weed and pathogen hygiene management measures to prevent the introduction and spread of weeds and dieback • Restrict unauthorised access to and from the development envelope by installing temporary fencing or barriers and signage as required • During the operational phase, herbicide application will be implemented along the length of the railway reserve within an 8m track corridor on a 6-monthly basis and on an annual basis along fences and rail structures. • Require all personnel to complete a site induction that will include hygiene training with regards to weed management requirements. • Source clean fill, limestone, gravel and topsoil or other materials from suppliers with appropriate weed control measures.

	including the environmental implications of the introduction and spread of weeds and associated obligations. • Movement of topsoil restricted to within the same weed interpretation mapping so that topsoil from poorer quality weed interpretive areas aren't used in higher quality weed interpretive areas. • Controlled access in the vicinity of Lambert Lane Nature Reserve and Fletcher Park to reduce and restrict movement of vehicles, plant and people. This may include installation of temporary fencing, barriers and/or signage. • No storage of topsoil known to contain weeds and/or weed seeds near Lambert Lane Nature Reserve and Fletcher Park. • Source clean fill, gravel and topsoil or other materials from suppliers with appropriate weed control measures. • Implement biannual weed monitoring and targeted spraying	• Require all personnel to complete a site induction that will include hygiene training, including the environmental implications of the introduction and spread of weeds and associated obligations. • Movement of topsoil restricted to within the same weed interpretation mapping • Restrict unauthorised access to and from the Development Envelope by installing temporary fencing or barriers and signage as required • Source clean fill, gravel and topsoil or other materials from suppliers with appropriate weed control measures.	fencing or barriers and signage as required. • Undertake regular weed spraying in areas of weed infestation along the edge of the development envelope and within cleared areas.	development envelope by installing temporary fencing or barriers and signage as required • Source clean fill, limestone, gravel and topsoil or other materials from suppliers with appropriate weed control measures • Undertake regular weed spraying in areas of weed infestation along the edge of the development envelope and within cleared areas	

	program at the Proposal during operation.				
Changes to surface water drainage flow patterns and infiltration during rainfall events	• Installation of drainage structures to maintain or improve existing surface water drainage within the DE and incorporate erosion protection measures, where required. • Placement of culverts to maintain existing surface water flows. • Temporary capture of runoff to control discharge of sediment and minimise turbidity of water leaving the Development Envelope • Construction staging will ensure appropriate surface water management such as culverts and drainage diversions are installed prior to the wet season wherever practicable.	• Wherever practicable, drainage infrastructure will be designed with the objective of maintaining current surface water flows across the Development Envelope. • Culverts incorporated in design to minimise changes in surface water flow during operation. • Construction staging will ensure appropriate surface water management such as culverts and drainage diversions are installed prior to the wet season wherever practicable.	• Implement drainage controls to prevent offsite discharge of runoff. • Implement sediment control measures to prevent offsite sedimentation	• Stormwater and surface water management measures and controls will be implemented during construction to limit the risk of significant alteration of surface water flows offsite, and offsite sedimentation is controlled.	• Implement drainage controls to prevent offsite discharge of runoff. • Implement sediment control measures to prevent offsite sedimentation
Introduction and spread of dieback during construction	• Manage dieback in accordance with the PTA Dieback and Weed Control Management Procedure. • Construction Contractor to develop and implement a hygiene management process to control access and	• Manage dieback in accordance with the PTA Ground Disturbance Procedure (7310-000-001). • Construction Contractor to develop and implement a hygiene management process to control access and	• If practicable, conduct ground disturbance activities in dry months to reduce the risk of spreading disease. • Avoid soil movement from uninterpretable areas to uninfested areas.	• If practicable, conduct ground disturbance activities in dry months to reduce the risk of spreading disease.	• Weed and pathogen hygiene management measures to prevent the introduction and spread of weeds and dieback • Require key personnel to complete a site induction that includes dieback awareness and hygiene management requirements, the environmental implications of the introduction and

	movement of vehicles and construction personnel. • Ensure all vehicles and machinery observe appropriate hygiene measures as identified in the CEMP. • Require all personnel to complete a site induction that will include hygiene training with regards to dieback, the environmental implications of the introduction and spread of dieback and obligations. • Movement of topsoil restricted to within the same Phytophthora dieback interpretation mapping unit. • Source clean fill, limestone, gravel and topsoil or other materials from suppliers with appropriate weed and dieback control measures • Any topsoil known to be dieback infested to be reused in infested areas, buried onsite in a suitable location or disposed of at landfill, in accordance with regulatory requirements. • Undertake disturbance activities	movement of vehicles and construction personnel into uninfested - protectable areas. • Ensure all vehicles and machinery observe appropriate hygiene measures as identified in the Construction Contractor CEMP • Require all personnel to complete a site induction that will include hygiene training with regards to dieback, the environmental implications of the introduction and spread of dieback and obligations. • Movement of topsoil restricted to within the same Phytophthora dieback interpretation mapping unit. • Source clean fill, limestone, gravel and topsoil or other materials from suppliers with appropriate weed and dieback control measures • Any topsoil known to be dieback infested to be reused in infested areas, buried onsite in a suitable location or disposed of at landfill, in accordance with regulatory requirements.	• Require all personnel to complete a site induction that will include hygiene training with regards to dieback hygiene management requirements, the environmental implications of the introduction and spread of dieback and obligations to follow this CEMP.	• Avoid soil movement from uninterpretable areas to uninfested are as. • Require all personnel to complete a site induction that will include hygiene training with regards to dieback hygiene management requirements, the environmental implications of the introduction and spread of dieback and obligations to follow this CEMP.	spread of dieback and obligations to follow this CEMP.

	under dry soil conditions (where possible). • No storage of top soil or movement of soil and plant material from the Development Envelope into Lambert Lane Nature Reserve or Fletcher Park. • Construction of a green bridge near Lambert Lane Nature Reserve.				
Groundwater drawdown from dewatering and abstraction during construction	• The PTA will monitor and manage drawdown and surrounding vegetation condition through: o Monitoring requirements established under a RIWI Act 5C licence o A water operating strategy, where required. o Implementation of a TEC SCP 3a condition monitoring program to avoid impacts on terrestrial GDEs • Adopt a minimum separation distance of at least 50 m, and as far as practicable 100 m, between the proposed construction water supply bores and TEC 3a occurrences.	• Patch 1 and/or Patch 5 Banksia Woodlands TEC vegetation health will be monitored in accordance with the TECMP.	• N/A	• Groundwater abstraction from the superficial aquifer will be regulated under the *Rights in Water and Irrigation Act 1914.*	• Groundwater abstraction bores will be located away from Banksia Woodlands of the Swan Coastal Plain TEC and known populations of *Caladenia huegelii* (where possible), to avoid drawdown of the groundwater beneath these areas. • Preparing and implementing a vegetation monitoring plan to detect changes in the health of significant vegetation immediately adjacent to the development envelope, attributable to the construction of the TCL Proposal.

Increased risk of bushfire	• The Contractor will develop and implement bushfire management measures in line with the PTA Bushfire Management Strategy and in consultation with City of Armadale and the Shire of Serpentine Jarrahdale, to align any relevant existing local government Bushfire Management Plans. • Require all personnel to complete a site induction that will include information on prevention of fires, including designated smoking areas, no fires permitted in workplace, use of extinguishers, hot works procedures • Working fire extinguishers to be fitted to all mobile plant equipment • All fuel stored on site to be in a secure bund with fuel storage to be minimised where possible • Refuelling of equipment and machinery to be completed in the early morning where possible • Machinery (chainsaws etc.) not to be placed on the ground	• The Contractor will develop and implement bushfire management measures in line with the PTA Bushfire Management Strategy (PTA 2018) and in consultation with Whiteman Park and the City of Swan, to align with the risks identified in the Whiteman Park Bushfire Management Plan and any relevant existing local government Bushfire Management Plans. • Require all personnel to complete a site induction that will include information on prevention of fires, including designated smoking areas, no fires permitted in workplace, use of extinguishers, hot works procedures • Working fire extinguishers to be fitted to all mobile plant equipment • All fuel stored on site to be in a secure bund with fuel storage to be minimised where possible • Refuelling of equipment and machinery to be completed in the early morning where possible • Machinery (chainsaws etc.) not to be placed on the ground where long grass exists following use • Approved Hot works permit	• The PTA has developed a Bushfire Management Strategy which responds to this requirement and aims to reduce the risk of bushfire to human settlement, economic, environmental and cultural assets on the PTA land.	• Bushfire management is addressed in the PTA Bushfire Management Strategy	• Procedures to manage risk of causing fire during construction • All fuel stored on site to be in a secure bund with fuel storage to be minimised where possible • Refuelling of equipment and machinery to be completed in the early morning where possible • Machinery (chainsaws etc.) not to be placed on the ground where long grass exists following use • The area immediately surrounding ‘hot work’ (e.g. welding) to be dampened with water if vegetated and vegetation is not already naturally damp

	where long grass exists following use • Approved Hot works permit to be in place for all 'hot work' (e.g. grinding / welding) • The area immediately surrounding 'hot work' to be dampened with water if vegetated and vegetation is not already naturally damp • The PTA will implement the PTA Bushfire Management Strategy to reduce bushfire risk during Proposal operation. Actions may include: o Implement regular bushfire hazard reduction through mechanical and chemical fuel load reduction o Maintain strategic firebreaks o Ensure controlled access to PTA land o Require safe operating procedures for high-risk maintenance activities • Adhere to the PTA's current fire emergency response procedures.	to be in place for all 'hot work' (e.g. grinding / welding) • The area immediately surrounding 'hot work' to be dampened with water if vegetated and vegetation is not already naturally damp.			

4. References

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