28 September 2021

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Dear Dan,

Compliance with the EPBC Act approval requirements for Alliance Business Park, O'Herns Road Epping
Our ref: Matter 34308

Biosis inspected the Edgars Creek corridor within Alliance Business Park on 1 December 2020. This review also draws on information collected during past inspections of the Edgars Creek corridor for Alliance Business Park.

The objectives of the assessment were to evaluate the condition of the creek corridor in relation to the approval conditions associated with the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) approvals (as described below) for the development of Alliance Business Park (Alliance) which is nearing completion.

EPBC Act approvals for Alliance Business Park were secured in two stages including:

- EPBC 2012-6298 for land previously known as 275 O'Herns Road
- EPBC 2017-7930 for land previously known as 165 - 195 O'Herns Road

A related EPBC Act approval, EPBC 2017-8008, was obtained by the Department of Transport for the development of O'Herns Road and its associated interchange with the Hume Freeway. All works associated with the road reserve of O'Herns Road and the two properties developed as part of Alliance Business Park have therefore been approved under the EPBC Act. EPBC 2017-8008 does not form part of this conditions compliance report and is not the responsibility of Alliance.

As part of the preliminary documentation process for EPBC 2017-7930, Biosis included an assessment of the projects compliance with EPBC 2012-6298 (included as Attachment 1).

Works associated with Alliance Business Park at 275 O'Herns Road began in 2012. These works were initiated after the EPBC Act approval (EPBC 2012-6298) was secured and were also covered by permits issued by the City of Whittlesea including Planning Permits 713586, 713987 (for 275 O'Herns Road – issued 23 August 2012 and 16 July 2013 respectively).

The development was later extended to include 165-195 O'Herns Road with the approval of EPBC 2017-7930 and planning permits 716886 and 716857 (issued 21 November 2017 and17 April 2018 respectively with the latter amended 12 September 2018).

The two sections of the Edgars Creek corridor (i.e. the first within what was 275 O'Herns Road and the second within what was 165-195 O'Herns Road) are each subject to their own separate management plan.

Biosis also conducted a review for MAB of the implementation of the Edgars Creek Management Plan for 275 O'Herns Road in April 2016. This review covered activities completed to that date in relation to works within that property and the relevant section of the Edgars Creek corridor.

Infrastructure construction works have now largely been completed in what was 275 O'Herns Road including the protective fencing bounding the creek corridor, boundary pathways within the corridor, establishment of interpretive signs and the construction of Scanlon Drive over Edgars Creek.

Works on the duplication of O'Herns Road over Edgars Creek (not being done by MAB) conducted on behalf of the Department of Transport are currently progressing. These works are covered by a separate EPBC Act approval (EPBC 2017-8008).

Alliance Business Park has transferred the Edgars Creek corridor previously associated with both 275 and 165 -195 O'Herns Road to the City of Whittlesea but will continue to manage the creek corridor until a yet to be agreed time. From December 2021 works within the creek corridor will be conducted and managed by the City of Whittlesea although MAB acknowledge that is ultimately responsible under the EPBC Act approval conditions for the implementation of the plan.

The plan for each section of the Edgars Creek corridor is scheduled to span a period of ten years from the date of commencement within each property.

Construction began at 275 O'Herns Road during August 2013 and therefore this plan is in effect until August 2023 although the requirement to managed the creek corridor for Growling Grass Frog is permanent.

EPBC 2012-6298

Biosis undertook a review of compliance with EPBC 2012-6298 in August 2017 as set out at Attachment 1. Our findings in this review continue to apply to this date, subject to the updates set out below. In summary, Biosis found no significant non-compliances with any condition of this approval. However, it is noted that work to complete compliance with condition 9 and 10 is still ongoing, and there has been a minor non-compliance with condition 11. We also note that the approval-holder has not complied with the reporting frequency required under condition 17 but this will be rectified in future.

Compliance with approval conditions noted in Attachment 1 has been maintained. Note that any ambiguity which may have existed in relation to works at the interface between what was 275 O'Herns Road and the road reserve for O'Herns Road in relation to **Condition 1** were resolved by the approval of EPBC 2017-8008.

Works on the eastern side of Edgars Creek associated with what was 275 O'Herns Road were only conducted after the approval of EPBC 2017-7930. With the construction of Jutland Way, the associated shared path and construction of the bridge crossing over Edgars Creek for the extension of Scanlon Drive, works associated with EPBC 2012-6298 have now been completed.

To the best of my knowledge and based on my site inspection, works approved under EPBC 2012-6298 have been contained within the project design submitted as part of the approval process. Therefore I have no reason to believe that the restrictions associated with **Condition 2** have been exceeded.

Matted Flax-lily salvage and translocation

Impacts to Matted Flax-lily *Dianella amoena* (MFL) were approved under both EPBC Act approvals as well as under two planning permits including 713987 and 716886. As required by these permits, a translocation plan was prepared and approved by DELWP (Department of Environment, Land, Water and Planning or its equivalent).

The MFL salvaged from both 275 and 165-195 O'Herns Road have recently been planted within the Epping Nature Conservation Reserve (ENCR), managed by the City of Whittlesea. MAB have a contract arrangement

with the Conservation Management section for the City of Whittlesea for the management of a section of ENCR and Biosis is currently monitoring the site to ensure management actions ensure the long term survival of the translocated MFL plants in line with the objectives of the approved translocation plan.

Alliance Business Park is compliant with **Condition 4** of both referrals as a result of the implementation of the planting, management and monitoring program for MFL at ENCR initiated in September 2020.

Edgars Creek Management Plan

Management plans for the Edgars Creek corridor were completed and approved by the Department of Environment and Primary Industries (or equivalent) (DEPI) under the planning permits relevant to native vegetation impacts within Alliance Business Park. The Edgars Creek Management Plan for 275 O'Herns Road (Biosis 2013) is based on the Growling Grass Frog Management Plan identified in **Condition 9** of EPBC 2012-6298. It was adapted from this plan in response to planning permit conditions required by DEPI and includes and expands on all the requirements identified by the EPBC Act approved plan. It is therefore taken as the equivalent of the Growling Grass Frog Management Plan as identified in **Condition 9 and 10** of EPBC 2012-6298. Compliance with the Edgars Creek Management Plan for 275 O'Herns Road (Biosis 2013) therefore equates to compliance with the approved Growling Grass Frog Management Plan and the relevant planning permit condition.

The Edgars Creek Management Plans indicate the creek corridor needs to be protected by means of an on title agreement, zoning and/or planning overlay provisions. The Edgars Creek corridor is still zoned as a Comprehensive Development Zone without any overlays relating to the protection of the biodiversity values present. While the transfer of this land from Alliance to Council has been completed, the rezoning is to be included by Council as part of a package of other rezoning matters in the near future. However, the obligation to establish some level of legal protection still rests with both MAB Corporation and Alliance Business Park as part of the conditions of approval under the EPBC act (**Condition 9** of EPBC 2012/6298 and **Condition 6** of EPBC 2017/7390). While the transfer to Council and rezoning to a public land zone such as Public Park and Recreation Zone (PPRZ) or Public Conservation and Recreation Zone (PCRZ) is consistent with the protection requirements of the Edgars Creek Management plans (Biosis 2013 and 2017) and this process is in progress, until the rezoning is completed the obligation for such protection remains with the approval holders (MAB Corporation and Alliance Business Park). This responsibility remains with the approval holders even though the plan indicates that MAB is responsible for implementing the actions outlined in this plan until management of the creek corridor is handed over to the relevant responsible authority.

Fencing established along the length of the Edgars Creek corridor within Alliance Business Park has been established in a manner consistent with the Edgars Creek Management Plans (Photo 1).

Weed control works within the corridor have occurred, if only on an irregular basis, and have been effective in controlling woody weeds and some other noxious species (i.e. Spanish Artichoke *Cynara cardunculus*).

Biomass levels are not known to be monitored regularly but irregular site inspections by Biosis have generally noted acceptable conditions for Golden Sun Moth *Synemon plana* (GSM) and Growling Grass Frogs *Litoria raniformis* (GGF). However, the most recent site inspection noted high levels of ground-cover biomass which were not beneficial for either of these threatened species.

A single survey for GSM conducted in November 2020 detected a small number of individuals (two) within the creek corridor. This indicates the ongoing presence of the species at this location.

Irregular informal monitoring of the condition of the creek corridor and compliance with the management plan has occurred. However this does not provide the information required to demonstrate compliance

with the plan. More formal and regular monitoring is currently being organised by Alliance to provide clearer information on compliance with the requirements of the creek management plan.

Revegetation works

Both approved management plans require some level of revegetation works although the extent of these is not clearly defined. The plan covering 275 OHerns Road requires a more intensive revegetation effort to establish indigenous grasses and herbs around the retained remnant of native grassland. A similar revegetation requirement appears in the management plan for 165-195 O'Herns Road.

A total of 17 small planting cells were established within the creek corridor for 275 O'Herns Road. These areas were planted with a small number of trees propagated from locally collected material and other indigenous shrubs, grasses and herbs (Photo 2). This was completed in consultation with Biosis and is consistent with the requirements of Biosis (2013). These plantings are well established and have had protective fencing removed. However, as a result, kangaroos have been trampling shrubs and have killed a small number of shrubs.

Similar tree plantings are proposed for the creek corridor within 165 – 195 O'Herns Road. However site preparation and planting works have not begun at this stage. No other revegetation works have been undertaken. The revegetation component of the management plan describes a number of revegetation actions. While no clear timeframe is attached to this process it is an expectation of the plan that such activities would occur and by reasonable interpretation these actions would occur within the ten year timeframe of the plan. Revegetation will be addressed more formally in line with the current arrangements being organised by Alliance for other monitoring requirements of the plan.

Plan Review

The plan has not been subject to a formal review every 2 years since the start of the project but is considered to be still appropriate in its original form. A review of the plan will be conducted in the near future.

Compliance

MAB Corporation (the approval holder for EPBC 2012/6298) therefore remains partially compliant with **Condition 9**. This will change when the corridor is rezoned by Council. This process is in progress but may need a number of months for Council to complete and it is apparent that Council have taken ownership of this task. The plan also indicates that responsibility for the implementation of the plan passes with the ownership of the land.

While previously noted as compliant with **Condition 10**, current biomass levels throughout the creek corridor now indicate the project is only partially compliant with this condition. This issue is currently being addressed by the Alliance land management contractor.

Scanlon Drive Crossing over Edgars Creek

Condition 11 was not assessed under the previous review of compliance for EPBC 2012/6298 (Attachment 1) as no crossing works had been planned. The crossing of Edgars Creek by Scanlon Drive has now been constructed in a manner consistent with the requirements of Biosis (2013). Biosis provided advice to the design process for this crossing (Attachment 2).

The five box culverts installed are of a length and internal dimension consistent with similar crossing structures upstream in the Aurora Estate. It has been demonstrated that Growling Grass Frogs *Litoria raniformis* (GGF) do move through these types of culverts as they have been recorded doing so in the culverts at the Eaststone Avenue Edgards Creek crossing. The basalt wing walls of the culvert underpass for

Scanlon Drive have also been well designed to direct frogs to the entrances of the culverts and to discourage frogs from moving from the creek and up onto Scanlon Drive, where they may be exposed to the risk of roadkill. These are therefore equivalent to (and in fact are likely to be more effective than) the drift fencing recommended by Biosis in the management plan for 275 O'Herns Road (Photo 3).

Works on the Scanlon Drive bridge have only recently been completed and no revegetation works have been conducted to date. Revegetation of the constructed ponds up and down stream of the crossing is a requirement of Section 2.2.4 of the approved plan. Contracts for these revegetation works are currently being organised and will presumably be conducted as seasonal conditions permit.

A pile of basalt boulders was noted on the south eastern corner of the bridge crossing. Rather than remove these rocks it is considered beneficial to distribute these on the creek banks to provide additional habitat features for GGF. Growling Grass Frogs preferentially use areas of bare rock in and on the margins of occupied waterbodies and it is therefore appropriate to make use of any leftover rocks to improve the habitat (Photo 4).

Therefore the road crossing complies with best practice specifications for amphibian-friendly culverts in relevant literature from Australia and overseas. However, Biosis is not aware that detailed plans including maps and illustrations of all proposed culverts were supplied to the Commonwealth prior to the commencement of works. These will be supplied to DAWE in the near future.

As such MAB Corporation is considered partially compliant with **Condition 11** of the approval. While plans will be supplied in the near future, the condition as worded can now never be complied with and this is therefore considered to be a minor technical non-compliance.

The construction of the Scanlon Drive road crossing of Edgars Creek has only recently been completed. The reporting requirement of **Condition 11** therefore remains outstanding and cannot be assessed by this audit.

Condition 12 has been fully complied with.

The status of the remaining conditions reported by Biosis have not substantially changed (see Attachment 1). However MAB Corporation have not provided a public report of their compliance with the conditions of approval within three months of every 12 month anniversary of the commencement of construction. Attachment 1, completed in mid-2017 is the only known reporting of compliance in line with this approval. MAB has now commissioned a consultant to report on compliance as required and this will be made available on a designated website in the near future.

Additional reports on the status of GSM at the external offsets have been provided for the Ninyeunook offset site but are yet to be provided for the Birregurra offset site. These will be put on the Biosis website as they are provided.

Condition 16 requires the maintenance of accurate records to substantiate all activities relevant to the conditions of approval, including measures taken to implement management plans. This was noted in Attachment 1 as uncertain as records relating to the management undertaken within the Edgars Creek corridor had not been sighted. Alliance has subsequently provided copies of invoices totalling over $45,000 detailing maintenance activities in relation to weed control and revegetation works between October 2013 and June 2021. All invoices relating to site management from 2018 have been scanned and are stored electronically. Most of those prior to 2018 have also been stored electronically, with a small number of lost invoices requested from the supplier.

I am therefore satisfied that records of the management activities conducted have been kept and are available to DAWE or another auditor on request. The development is therefore compliant with Condition 16 of EPBC 2012/6298.

This report has been prepared to address the requirements of **Condition 17**. The commencement date for construction at 275 OHerns Roads was August 2013. MAB Corporation is therefore compliance with this condition for 2021 and has put processes in place to remain compliant in the future.

EPBC 2017-7930

This is the first assessment of compliance for this approval and therefore each condition is reproduced and an assessment of compliance follows.

The creek corridor for Edgars Creek through Alliance business Park is clearly defined and has both pathways and fencing established along its margins as anticipated by the relevant creek management plans.

Works within 165-195 O'Herns Road have established the creek corridor. The creek corridor was marked as a no go zone prior to construction but works began before the installation of temporary fencing. As such the contractor impacted native vegetation, threatened species habitat and the stability of Edgars Creek within this zone contrary to the requirements of **Conditions 1 and 6** of EPBC 2017-7930. This non-compliance was reported to DAWE in September 2019. Remediation management for the areas adversely impacted is being organised in line with the general requirements of the Edgars Creek Management Plan.

Works relating to the implementation of the creek management plans have been conducted although are not comprehensive or complete. Management process are being established to ensure ongoing compliance with the relevant conditions.

In summary, Biosis found no significant non-compliances with any condition of this approval that have not otherwise been reported to DAWE.

Condition 1: *The approval holder must not clear more than the following in the project area:*

a. *20.53 ha of Golden Sun Moth habitat*
b. *9.89 ha of Matted Flax-lily habitat*
c. *1.608 ha of NTGWP.*

All areas of retained habitat were associated with either the woodland reserve or the Edgars Creek corridor. The woodland reserve was retained as designated by the project design provided as part of the approved preliminary documentation.

The extent of the approved creek corridor to be retained was marked by a surveyor prior to the commencement of works. However, this area was not delineated with secure temporary fencing or signage prior to the commencement of works. As a result the contractor entered the protected creek corridor along much of its perimeter.

Part of the confusion in relation to the location of the protected creek corridor was exacerbated by stormwater design changes required by Melbourne Water. This required an expansion in the footprint of the originally proposed stormwater management area and the inclusion of an additional structure to the west of the original stormwater infrastructure footprint. These changes, although prescribe by Victorian authorities, were not communicated to the Department of Agriculture, Water and the Environment (DAWE).

The net result of these actions was an increased impact of 0.806 hectares of GSM habitat and 0.534 hectares of MFL habitat including the loss of one individual proposed to be otherwise retained as part of the approved development (Attachments 3 and 4).

No additional impacts to areas of Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP) occurred as a result of these works.

The project is therefore not compliant with **Condition 1**. This transgression was reported to DAWE by mail and email on 20 September 2019. When notification was made, the approval holder proposed corrective action and an amendment to the approval to bring the approval holder back into compliance with this condition, and are awaiting feedback from DAWE.

Areas of the creek corridor accidentally impacted by the contractor are proposed to be rehabilitated by the land management contractor. This will involve ongoing control of noxious weeds and revegetation of land disturbed within the corridor using locally indigenous species.

Condition 2: *The approval holder must submit for approval by the Minister an Offset Strategy for the loss of 20.53 ha of Golden Sun Moth habitat; 9.89 ha of Matted Flax-lily habitat; and 1.608 ha of NTGWP. The approval holder must not commence the action until the Offset Strategy has been approved by the Minister. Once approved, the approved Offset Strategy must be implemented. The Offset Strategy must:*

- *a. provide a written description and map that clearly defines the location and boundaries of the proposed offset area(s) for Golden Sun Moth habitat; Matted Flax-lily habitat; and NTGWP offsets*
- *b. detail the minimum offset areas and evidence that the offset areas are in accordance with the EPBC Act Environmental Offsets Policy*
- *c. include timelines and mechanisms for legally securing the offset areas and offset outcomes.*

The offset strategy was submitted to DAWE and approved on 25 January 2019 (Attachment 5).

Alliance Business Park (the approval holder) has therefore complied with **Condition 2**. No additional reporting on this condition is required.

Condition 3: *The approval holder must, within 2 months of approval of the Offset Strategy specified in condition 2, submit an Offset Management Plan(s) for approval by the Minister. The approval holder must not commence the action until the Offset Management Plan(s) has been approved by the Minister. Once approved, the approved Offset Management Plan(s) must be implemented. The Offset Management Plan(s) must:*

- *a. be prepared by a suitably qualified expert*
- *b. be prepared in accordance with the Department's Environmental Management Plan Guidelines, and the EPBC Act Environmental Offsets Policy*
- *c. provide a written description and map that clearly defines the location and boundaries of the offset area(s), consistent with the Offset Strategy approved under condition 2. This must be accompanied with the offset attributes and shapefiles*
- *d. a survey and description of the current condition (prior to any management activities) of the offset area proposed, including existing vegetation (the baseline condition)*
- *e. detail management actions, regeneration and/or revegetation strategies (i.e. weed, grazing and/or fire management) to be undertaken on the offset area(s) to improve and extend Golden Sun Moth habitat, Matted Flax-lily habitat and NTGWP, including:*
  - *i. a description and timeframe of measures that will be implemented to improve the condition and extent of Golden Sun Moth habitat, Matted Flax-lily habitat and NTGWP within the offset area(s)*
  - *ii. performance and completion criteria for evaluating the management of the offset areas, and criteria for triggering remedial action*
  - *iii. a program to monitor and report on the effectiveness of these measures, and progress against the performance and competition criteria*

iv. *a description of potential risks to the successful implementation of the plan, a description of the measures that will be implemented to mitigate against these risks and a description of the contingency measures that will be implemented if defined triggers arise*

v. *details of who is responsible for monitoring, reviewing and implementing the plan.*

Offset plans were submitted to DAWE and approved in March 2019.

Alliance Business Park (the approval holder) has therefore complied with **Condition 3**. Ongoing compliance requirements only relate to the implementation of the approved plans.

Condition 4: *The approval holder must submit a Matted Flax-lily Translocation Plan for the salvage of all Matted Flax-lily plants to be removed as part of the action, and translocation of those plants to the recipient sites. The approval holder must not commence the action until the Matted Flax-lily Translocation Plan has been approved by the Minister. Once approved, the approved Matted Flax-lily Translocation Plan must be implemented. The Matted Flax-lily Translocation Plan must include but is not limited to the following requirements:*

a. *selection criteria to determine appropriate nursery (if required) and recipient site(s) for the translocation Matted Flax-lily*

b. *a map and description of the chosen recipient site(s) and surrounding land uses, including evidence of consultation with the manager of the recipient site*

c. *pre-clearance surveys for the project area*

d. *protocols and timeframes for the salvage and translocation of the impacted Matted Flax-lily*

e. *post-translocation management actions for the nursery (if required) and recipient site(s), including protection measures for the translocated Matted Flax-lily*

f. *roles and responsibilities (clearly stating who is responsible for activities)*

g. *translocation failure risk assessment*

h. *a monitoring and adaptive management program for at least five years after translocation of the Matter Flax-lily plants, which must include:*

    i. *Performance indicators (clear and concise criteria against which achievement of outcomes are to the measured), which are capable of accurate and reliable measurement*

    ii. *Outcomes (time bound outcomes as measured by performance indicators), including milestones (interim outcomes) where applicable*

    iii. *Monitoring requirements (timing and frequency of monitoring to detect changes in the performance indicators, to determine if outcomes are being achieved, and to inform adaptive management)*

    iv. *Trigger values for corrective actions*

    v. *Corrective actions to be implemented if trigger values are reached, including timeframes, and how environmental incidents will be managed.*

The translocation plan was submitted to DAWE and approved on 12 February 2019 (Attachment 6).

Alliance Business Park (the approval holder) has therefore complied with **Condition 4.** Ongoing compliance requirements only relate to the implementation of the approved plan.

Condition 5: *Pre-clearance surveys, as required under condition 4, must be undertaken by a suitably qualified expert within one month prior to any translocation activities being undertaken. The approval holder must document the results of the surveys. Any additional Matted Flax-lily plants identified during the pre-clearance surveys that were not previously recorded must be salvaged and translocated in accordance with the approved Matted Flax-lily Translocation Plan.*

Pre-clearing surveys were conducted for MFL and the result of this survey supplied to DAWE (then the Department of the Environment and Energy - DoEE).

Alliance Business Park (the approval holder) has therefore complied with **Condition 5**. No additional reporting on this condition is required.

Condition 6: *For the life of the approval and for the protection of Growling Grass Frogs, Golden Sun Moth habitat and Matted Flax-lily habitat, the approval holder must establish the Edgars Creek Corridor. The Edgars Creek Corridor must be managed for the life of the approval in accordance with the Edgars Creek Management Plan, including but not limited to:*

a. *Prior to the commencement of the action, the approval holder must establish the designated no-go zone, including signage and fencing within 20 m of the corridor to prevent sediment transfer and restrict access until construction is complete*

b. *After the construction phase is complete, the no-go zone must be protected by permanent fencing that restricts access to the no-go zone*

c. *Hygiene controls must be implemented for all vehicles or personnel entering within 30 metres of Edgards Creek.*

Construction works around the Edgars Creek Corridor have recently been completed. As indicated in the response to **Condition 1**, prior to the commencement of the action, the creek corridor was delineated by a surveyor. However, temporary protective fencing and signage was not installed prior to the contractor accessing land adjacent to this protected area and the contractor ignored the surveyors peg markers. This resulted in disturbances within the designated no-go zone. Works included machinery entering the creek corridor and sections of Edgars Creek and the movement of sediment into the creek.

Eventually soil stockpiled in the protected area was removed and protective temporary fencing established in the correct location with appropriate signage.

The design of stormwater infrastructure established adjacent the creek at Edgars Road is different to that outlined by Biosis (2017). While this was a Melbourne Water requirement, the footprint of these works was larger than that identified in the creek management plan and the approved project footprint identified by EPBC 2017-7930. While these works did not impact any patches of native vegetation, they are not in compliance with the conditions of approval.

Works were therefore not compliant with **Condition 6 (a)**.

Construction works within 165 – 195 O'Herns Road are now complete. Works have included the installation of permanent fencing to protect the creek corridor no go zone. Alliance Business Park is therefore compliant with **Condition 6(b)**.

No documentation is available on any hygiene controls implemented by the contractor. Therefore compliance with **Condition 6(c)** could not be evaluated.

Implementation of the approved Edgars Creek management plan (Biosis 2017) has commenced in the form of woody weed control works. The creek corridor within 165-195 O'Herns Road has had substantial woody weed works completed. However the cover of woody weeds is still apparent and more works are required to remove this element from the creek corridor.

It is our understanding that works for the control of woody weeds is ongoing and the existing mature individuals will be removed in the near future.

Infestations of other noxious weeds are also apparent. Species such as Spanish Artichoke *Cynara cardunculus* are still present as scattered occurrences but these have clearly been subject to recent control works (Photo 2).

The creek corridor supports a substantial cover of Chilean Needle-grass *Nasella neesiana*. This significant weed is also a food plant for GSM. Management of this species can practically only be restricted to biomass control as the infestation is intractable.

While the creek corridor supports scattered occurrences of Serrated Tussock *Nassella trichotoma*, control works have targeted this species and a minimal on-going effort should keep this species under control.

The only other common noxious weed is Patersons Curse *Echium plantagineum*. This species is dominant in areas of the creek corridor, predominantly where the contractor has disturbed the surface soil within the protected area. These areas will require ongoing control and revegetation works to mitigate the dominance of this noxious weed.

Other noxious species such as Saffron Thistle *Carthamus lanatus*, still have scattered occurrences across the creek corridor.

Other works outlined within the approved Edgars Creek management plan to be completed include establishing a level of legal protection for the creek corridor (currently being organised by Council), revegetation of stormwater infrastructure (to be initiated soon), biomass control, general revegetation works within the creek corridor and water quality monitoring. Alliance is in the process of ensuring all these matters are appropriately managed.

Overall, Alliance Business Park is partially compliant with **Condition 6**. Alliance is initiating works to conduct the corrective actions required to respond to non-compliance with this condition.

Other issues

The construction of Jersey Drive intruded into the floodplain of Edgars Creek. This area was filled to elevate the roadway and associated shared pathway on its northern boundary.

When in flood Edgars Creek is not restricted to following in its' main channel at this location and part of the flood flow is diverted into another channel which now follows the northern edge of Jersey Drive. The narrowing of the floodplain at this site and the removal of vegetation in association with the construction of Jersey Drive has resulted in significant channel erosion along this flood path (Photos 5, 6 and 7).

While the erosion has the potential to undermine the shared path and eventually the road, the sediment movement during flood flows also influences both water quality and habitat condition for GGF. As such remediation works are required in this area. This is likely to include the placement of rocks and revegetation works as the erosion is within the protected creek corridor. DAWE would need to be informed of the proposed works and approve these mitigation measures as they are not included in the approved Edgars Creek Management Plan.

Condition 7: *Within 14 days after the commencement of the action, the approval holder must advise the Department in writing of the actual date of commencement of the action.*

The audit is not aware of Alliance Business Park providing DAWE written advice of the actual date the action commenced. However, Biosis is aware that site works commenced in about mid-2019 (July or August).

Compliance with **Condition 7** is therefore undetermined.

Condition 8: *The approval holder must maintain accurate records substantiating all activities associated with or relevant to the conditions of approval, including measures taken to implement any management plans required by this approval, and make them available upon request to the Department. Such records may be subject to audit by the Department or an independent auditor in accordance with section 458 of the EPBC Act, or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the Department's website. The results of audits may also be publicised through the general media.*

Biosis is aware of some documentation in relation to the implementation of the Edgars Creek Management Plan. Alliance will provide the documentation it has to a soon to be commissioned updated audit program.

Condition 9: *Within 3 months of every 12 month anniversary of the commencement of the action, the approval holder must publish a report on their website addressing compliance with each of the conditions of this approval, including implementation of the management plans specified in the conditions. Documentary evidence providing proof of the date of publication and noncompliance with any of the conditions of this approval must be provided to the Department at the same time as the compliance report is published. Reports must remain published for the life of the approval. Reports must continue to be published until such time as advised by the Minister in writing.*

This audit has occurred outside the required reporting period. It is our understanding that non-compliance with **Conditions 1 and 6** was been reported to DAWE by mail and email addressed to the known assessing officer (Alexandra Cooper) on 20 September 2019.

This review report will be provided to DAWE at the time of publication on the relevant website in compliance with **Condition 9.**

Alliance is therefore has not complied with **Condition 9** until 2021 but issues of non-compliance are being attended to and Alliance will ensure future reporting requirements are completed as required.

Conditions 10 to 16 are administrative conditions which have not been activated by either the approval holder or the Commonwealth Minister administering the EPBC Act (or their delegate).

Condition 17: *Unless otherwise agreed to in writing by the Minister, the approval holder must publish all management plans referred to in these conditions of approval on its website. Each management plan must be published on the website within one month of being approved by the Minister or being submitted under Condition 11. Management Plans must remain published for the life of the approval, or until such time as advised by the Minister in writing.*

The preliminary documentation for Alliance Business Park was initially available for public viewing on the Biosis website. While taken down for a short period of time these documents are again on the Biosis website.

Alliance is therefore currently compliant with **Condition 17**.

Please contact me on 0429 808 732 if you have any enquiries in relation to this assessment.

Yours sincerely

Steve Mueck
Senior Consultant Botanist

References

Biosis 2013. Alliance Business Park, 275 O'Herns Road, Epping: Edgars Creek Management Plan. Report for MAB. Author: Daniel Gilmore and Steve Mueck, Biosis Pty Ltd, Melbourne

Biosis 2017. 165 - 195 O'Herns Road, Epping: Edgars Creek Management Plan. Report for Alliance Business Park. Author: Daniel Gilmore and Steve Mueck, Biosis Pty Ltd, Melbourne. Project No. 25346.

Photos

Photo 1: Barrier fencing and shared pathway along the western boundary of the creek corridor within 275 O'Herns Road.

Photo 2: Trees and shrubs were planted in small areas along the creek corridor (275 O'Herns Rd).

Photo 3: The creek crossing at Scanlon Drive.

Photo 4: A pile of rocks has been left after works on the crossing of Scanlon Drive (far side of the creek)

Photo 5: Erosion on the margin of the creek corridor within 165-195 O'Herns Road.

Photo 6: Erosion on the margin of the creek corridor within 165-195 O'Herns Road.

Photo 7: Sediment deposition into Edgars Creek as a result of erosion on the margin of the creek corridor within 165-195 O'Herns Road.

Attachment 1

Alliance Business Park Project Area

1. Project activities must be limited to the 'Study Area' as illustrated in Appendix 1

Compliant to the best of my knowledge and based on site inspections (i.e. none of the development has occurred outside the property known as 275 O'Herns Road).

Note the approval does not include the road reserve for O'Herns Road. None of the southern side of the road reserve is within the MSA.

Impact Limits

2. The person taking the action must ensure that project activities do not disturb more than 46 hectares of Golden Sun Moth habitat.

Compliant to the best of my knowledge and based on site inspections the project works have been contained within the project design submitted as part of the approval process. Therefore I have no reason to believe that this restriction has been exceeded.

3. The person taking the action must ensure that project activities do not disturb more than two endangered Matted Flax-lily.

Compliant. The 2 plants within the construction footprint we salvaged and no additional plants have been impacted.

4. The person taking the action must translocate the impacted Matted Flax-lily identified in condition 3. The translocation must be undertaken by a suitably qualified ecologist. The final translocation site must be selected in consultation with the Victorian Department of Sustainability and Environment.

Partially compliant. Plants have been salvaged and are being held in a native nursery. Discussions have been had with DELWP to identify an approved location for plants to be planted. Discussions have also been held with the City of Whittlesea to identify an acceptable reserve to take the plants. Details of planting are yet to be finalised.

5. The person taking the action must ensure that project activities do not disturb more than1.09 hectares of the Natural Temperate Grassland of the Victorian Volcanic Plain ecological community.

Compliant. Only areas of NTGVVP identified within the construction footprint have been impacted. Areas of NTGVVP within the creek corridor were avoided in the design for the shared path.

Other MNES

6. Proposed activities must not impact on any matter of national environmental significance (MNES) other than those identified in proposed conditions 2 to 5 above. If at any time, the person taking the action becomes aware of a potential disturbance to MNES not identified above, activities in the affected area must stop immediately and the department must be contacted. The department may direct the person taking the action to prepare a species management plan that, at a minimum, quantifies the impact, specifies mitigation and avoidance measures as well as propose offsets to compensate for the impact. Work in that area cannot recommence until directed in writing by the department.

Compliant. No other MNES known.

7. Prior to the commencement of construction, a suitably qualified ecologist (the ecologist) must identify all areas of potential Striped Legless Lizard habitat within the Study Area. Before the commencement of any earthworks in areas the ecologist identifies as potential Striped-legless Lizard habitat, the ecologist must undertake targeted pre-clearance surveys for the Striped-legless Lizard in accordance with published species guidelines available at that time.

Compliant. Pre-clearance surveys completed and no animals detected.

8. If at any stage of development, the presence of Striped-legless Lizard is confirmed within the study area, the person taking the action must notify the department, in writing within five business days. Depending on the nature and extent of the population, the department may issue a 'stop-work' order for the affected area and request the submission of a species specific management plan that at a minimum quantifies the impact to the species, specifies avoidance, mitigation and translocation measures as well as commits to offsetting any unavoidable impact on the species. Activities in the affected area would not be able to recommence until directed in writing by the department.

Compliant. No evidence that SLL occur on site.

9. The person taking the action must implement the Growling Grass Frog Management Plan provided as a component of the preliminary documentation. The person taking the action must notify the department of all proposed changes and revisions. Depending on the nature and extent of changes, the department may request that the revised plan be submitted for re-approval.

Partially Compliant. The Growling Grass Frog Management Plan (GGFMP) is identified as the Alliance Business Park 275 O'Herns Road Epping: Edgars Creek Management Plan.

Uncertain if any legal protective mechanism has been put in place.

The plan has not been subject to a formal review every 2 years since the start of the project but is considered to be still appropriate in its original form.

The site has been protected by temp fencing during construction and has been treated as a no go zone. Small intrusion at the proposed road crossing has appropriate sediment control infrastructure.

More permanent fencing / protection included in the landscape design plans.

Advice has been provided for the design of the proposed crossing.

Weed control works within the corridor have occurred. Biomass levels not monitored regularly but when observed have been suitable. Weed control works completed to date have been effective.

One monitoring exercise has occurred. Another would be appropriate and would be consistent with the requirements of the plan.

No ground cover revegetation works have been done although some tree planting has occurred.

10. To ensure that project activities do not have an unacceptable impact on the Growling Grass Frog, the person taking the action must implement all mitigation and avoidance measures identified in the Growling Grass Frog Conservation Management Plan described in the preliminary documentation.

Compliant. No unacceptable impacts to the creek corridor have been observed. No works for a creek crossing have occurred. No upgrade works for O'Herns Road have occurred although they are being planned by VicRoads. The corridor appears to retain its suitability as a movement corridor.

11. Prior to the commencement of works associated with any road crossing of Edgars Creek, the person taking the action must provide the department with detailed plans including maps and illustrations of all proposed culverts. All culverts must comply with best practice specifications for amphibian-friendly culverts in relevant literature from Australia and overseas. All culverts must be inspected regularly to ensure they are kept clear of debris and are in good working order. Every 24 months from the date of this approval, for a period of 10 years, the person taking the action must provide the department with a report on the condition of each culvert. The report must include the dates, times and findings of each inspection undertaken in the previous two years as well as documenting any recorded use of the culverts by Growling Grass Frog individuals.

Not applicable to date. Commencement of any works is not likely within the next 12 months.

12. At least two months prior to commencement of construction, the person taking the action must prepare and submit to the Minister for approval, an offset management plan. The offset management plan must be approved by the Minister and then implemented before commencement of construction. At a minimum, the plan must include:

a. commitments that the person taking the action will offset the impacts to the critically endangered Golden Sun Moth (*Synemon plana*) with the protection of at least 20 hectares of land at the Birregurra property and at least 160 hectares of land at the Ninyuenook Road property;

b. base line data and other supporting evidence that demonstrates both proposed offset sites contain a viable (breeding) Golden Sun Moth population;

c. detailed information about the Golden Sun Moth population at each proposed offset site;

d. illustrations and maps that clearly define the location and boundaries of the offset sites. This must be accompanied with the offset attributes and a shape-file for each offset site;

e. detailed information, including proposed commitments and timelines regarding management arrangements that will be undertaken at each offset site, as soon as it is purchased and then into the future to ensure the ongoing rehabilitation and improvement of each site. This should include all recommended habitat management measures identified in EPBC Act policy statements and papers;

f. commitments that demonstrate how the offset sites will be protected in perpetuity (i.e. Trust for Nature covenant);

g. information and commitments about monitoring and reporting on the improvements in habitat condition of the offset site and the status of the Golden Sun Moth population; and

h. information that demonstrates the proposed offset sites are consistent with the principles of the EPBC Act Environmental Offsets Policy (October 2012).

(Note: A single offset plan may be provided for both properties on the basis that (b) to (h) above are discussed separately for each property.)

Compliant. Offset plans submitted and approved.

13. Within three months of every 24 month anniversary of the date of this approval, the person taking the action must submit to the Minister a report on the status and recovery of the Golden Sun Moth population at each offset site. This must include the results of targeted surveys conducted every second year, supported by an evidence based comparison of the population against base line data required by condition 12 b. This report must be provided to the Minister for the first ten years after commencement of construction.

Partially Compliant. Baseline information was available for the sites to be identified and accepted as offset sites. The offsets were purchased on the basis that the approved OMP was to be implemented by the land owner and that reports were to be provided as directed. MAB has not followed up on the fact that such monitoring reports have not been provided by the landowner. Trust for Nature have indicated the relevant monitoring events have occurred as prescribed (Chris Cook, Trust for Nature pers. comm.). However, the relevant offsets were paid for with landowner agreement to implement the plan and provide the reports as required. Offset monitoring reports are available and have been requested from TfN. Full compliance will therefore be achievable in the near future.

14. If either the Birregurra property or Ninyuenook Road property cannot be secured as an offset prior to the commencement of construction, or information in the offset management plan required by condition 12 fails to demonstrate that either site supports a viable population of Golden Sun Moth, the person taking the action must prepare a contingency offset plan. The contingency offset plan must:

a. be developed in consultation with the department;

b. specify commitments to secure the protection of alternative offset sites, with equivalent or better Golden Sun Moth habitat values· to those of the Birregurra and Ninyuenook properties, to the satisfaction of the department;

c. address (b) to (h) of condition 12 for each proposed offset site;

d. specify commitments to deliver activities that implement priority recovery actions consistent with EPBC Act policy statements and papers, National Recovery Plans and as agreed with the relevant Recovery Planning Teams for the Golden Sun Moth;

e. be consistent with the EPBC Act Environmental Offsets Policy (October 2012); and

f. be approved by the Minister and then implemented prior to the commencement of construction.

Not Applicable as both offsets were secured prior to construction.

15. Within 5 days of the commencement of construction, the person taking the action must advise the department in writing of the actual date of commencement.

Compliant. Notification sent to DoEE by Michael Martin (MAB pers. comm.).

16. The person taking the action must maintain accurate records substantiating all activities associated with or relevant to the conditions of approval, including measures taken to implement management plans and make them available upon request to the Department. Such records may be subject to audit by the Department or an independent auditor in accordance with section 458 of the EPBC Act, or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the Department's website. The results of audits may also be publicised through the general media.

Uncertain. While there are records of actions taken within the property how detailed these records are is not available to me.

17. Within three months of every 12 month anniversary of the commencement of construction, the person taking the action must publish a report on their website addressing compliance with each of the conditions of this approval, including implementation of any management plans as specified in the conditions. Documentary evidence providing proof of the date of publication and non-compliance with any of the conditions of this approval must be provided to the Department at the same time as the compliance report is published.

Partially Compliant. Monitoring reports for the external offset site at Birregurra are available on the Biosis website. Monitoring reports from the Ninyuenook offset site are available (TfN pers. comm.) and will be sent to me soon. We can then post these on a website.

18. Upon the direction of the Minister, the person taking the action must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the Minister. The independent auditor must be approved by the Minister prior to the commencement of the audit. Audit criteria must be agreed to by the Minister and the audit report must address the criteria to the satisfaction of the Minister.

Not Applicable. No audit request has been received.

19. If the person taking the action wishes to carry out any activity otherwise than in accordance with management plans as specified in the conditions, the person taking the action must submit to the department for the Minister's written approval a revised version of that management plan. The varied activity shall not commence until the Minister has approved the varied management plan in writing. The Minister will not approve a varied management plan unless the revised management plan would result in an equivalent or improved environmental outcome over time. If the Minister approves the revised management plan, that management plan must be implemented in place of the management plan originally approved.

Not Applicable. No variations to the proposed activity have been proposed.

20. If the Minister believes that it is necessary or convenient for the better protection of listed threatened species and ecological communities, the Minister may request that the person taking the action make specified revisions to a management plan specified in the conditions and submit the revised management plan for the Minister's written approval. The person taking the action must comply with any such request. The revised approved management plan must be implemented. Unless the Minister has approved the revised management plan then the person taking the action must continue to implement the management plan originally approved, as specified in the conditions.

Not Applicable. No revisions to any management plan have been requested.

21. Unless otherwise agreed to in writing by the Minister, the person taking the action must provide a copy of each approved management plan, report, strategy, agreement referred to in these conditions of approval to members of the public upon request. Copies must be provided within a reasonable time of the request.

Not Applicable. No copies of any management plan have been requested by the public.

Attachment 2

Waterway crossing design

1.1 Crossing structures for amphibians

There is general absence of published information on the effectiveness of underpasses for bell frogs in Australia (see Appendix 1). The bell frog complex is comprised of five or six species (depending on phylogeny and taxonomy) (Burns and Crayn 2006). Three of them inhabit south-eastern Australia: the Growling Grass Frog, Green and Golden Bell Frog *Litoria aurea* and Yellow-spotted Bell Frog *Litoria castanea* (Mahony et al. 2013). While a comprehensive literature review is beyond the scope and requirements of this project, the opinion of review papers (e.g. Jochimen et al. 2004, van der Ree 2007, Glista et al. 2009, Lesbarreres and Fahrig 2012) is that there is little available evidence on the effectiveness of underpass crossings on maintaining connectivity for amphibians generally. Lesbarreres and Farhirg (2012) consider the following possible reasons for this lack of evidence:

- Difficulty accessing research results.
- Post construction studies lack scientific rigor.

They also conclude that two simple patterns become apparent when all studies on fauna passages are viewed together:

- Extended stream crossing passage design works for most species. An extended stream crossing passage is an elongated, open-span structure over a natural stream including wide banks on both sides. They suggested that such a crossing should be "approximately five times the width of the stream at high water, thus allowing movement of terrestrial animals on dry banks. The height of the passage over the dry banks should be sufficient to allow passage of the largest terrestrial animal in the area" (p. 4).
- Fencing is needed for effective functioning of a passage to keep animals off the road and direct animals to the passage.

Factors influencing the effectiveness of crossing structures for amphibians identified in reviews by Jochimen et al. (2004) and Glista et al. (2009) are:

- Location – this is especially vital for small, less mobile species (amphibians and reptiles).
- Dimensions (total length, width and height) – for some species the relative openness in a passage may be more important than overall size – high openness ratios (short in length, high and wide).
- Approaches to structures – availability of cover can determine whether a species will use it, natural vegetation can enhance attractiveness of crossings by allowing continuity of habitat.
- Fencing is needed for effective functioning of the crossing structure as it may help prevent animal access to roads and facilitate movement of animals towards crossings.
- Predators – some evidence that predators use crossing structures to increase their capture of prey species.
- Microclimate – moisture, temperature, light:
    - A moist microclimate is favourable for amphibians.

    - Temperature disparities may dissuade use by some amphibian species (most likely in smaller passages).
    - Ability for air to flow freely through a passage may help negate temperature differences.
    - Maintenance of natural ambient light in the crossing.
    - Conversely artificial light may deter animals from using the structure.
- Substrate and construction material type:
    - Natural substrate can provide continuity of habitat.
    - Replicating natural stream conditions within culverts may increase use by species that use streams for movement. Flat rocks need to be provided for cover, dry substrate should be avoided.
    - Smooth concrete works well – durable and requires minimal maintenance.
- Hydrology – prevent flooding within crossing structure.
- Noise (disturbance) – vehicular noise can influence use of crossing structures by mammals in particular. Amphibians may hesitate but noise does not substantially interrupt migration of frogs and toads.

Schmidt and Zumbach 2008 provide some useful advice in relation to amphibian underpasses ("toad tunnels"). From their review, they consider that underpasses should be:

- "built at least every 50m because amphibians do not travel long distances along a barrier wall" (p. 134).
- "at least 1m high and wide. If the road is wider than 50 m then the width of the tunnel should be at least 2 m...." (p. 135).
- Rectangular in cross section to provide a wide flat base as amphibians will attempt to climb concave sides thereby increasing the time they spend in the underpass and reducing the probability they will cross the tunnel at all.
- Partially flooded or with a small stream in middle but not covering the whole width of the underpass so other wildlife can use the structure.
- Built in conjunction with a barrier wall/fence. "It is important to note that a system of underpasses will only work in conjunction with a well constructed barrier wall; amphibians will not use tunnels without barrier walls" (p. 134). L-shaped elements are best for ease of movement (smooth surface) and to avoid amphibians climbing. "the upper end of the barrier wall should be ground level with the surface of the wall.....permits amphibians and other animals to leave the road if they should get there" (p. 136).
- Incorporate an open-top culvert where the "roof" of the tunnel is a grid flush with the road surface. Advantage is the humid microclimate, disadvantage is change in air pressure by passing vehicles and entry of contaminated material from the road.

Hamer et al. (2015) summarise the recommended minimum dimensions for amphibian tunnels in Europe and North America. Note that this aimed at avoidance or minimisation of change in dispersal patterns for species that are migratory and more predictable in their movements. Designs include:

Waterway crossing design

- Purpose-built 0.5 m width tunnels with slots to allow air, water and light in to maintain an internal temperature similar to outside.
- Concrete rectangle box culverts less than 3 m width.
- Importantly, it is noted that the "precautionary principle should always be applied where there is a lack of information on acceptance rates of these structures" (p. 265).
- Inter-tunnel distances recommended to be less than 50 m (Europe and North America), no more than 30 m (Germany) with the distance from last tunnel to end of barrier wall/fence no less than 50 m.
- Recommended dimensions are summarised in a table on p. 265 of the document.

Shape	Tunnel length (width x height in metres)				
	20 m	20–30m	30–40m	40–50m	50–60m
Rectangular	1.0 x 0.75 m ($0.75\ m^2$)	1.5 x 1.0 m ($1.5\ m^2$)	1.75 x 1.2 m ($2.1\ m^2$)	2.00 x 1.5 m ($3\ m^2$)	2.3 x 1.75 m ($4\ m^2$)
Circular	($1\ m^2$)	($1.2\ m^2$)	($1.6\ m^2$)	($2\ m^2$)	($2.5\ m^2$)
Dome	1.0 x 0.7 m (c$0.5\ m^2$)	1.4 x 0.7 m (c$0.7\ m^2$)	1.6 x 1.1 m (c$1.3\ m^2$)	-	-

Table 1. Recommended underpass tunnel dimensions [reproduced from Hamer et al. (2015) by kind permission of A. Hamer, ARCUE]. () denote approx. surface areas of entrance.

Essentially, Table 1 indicates that the opening dimensions increase with increasing tunnel width.

Another factor to be considered in designing roads with amphibian crossings is the potential impacts of artificial street lighting. Perry et al. (2008) consider the effects of artificial lighting on amphibians:

- Light pollution has been identified as a serious threat to amphibians in urban areas however "few studies of the consequences of artificial lights to reptiles and amphibians have been conducted to date" (p. 239).
- Artificial lighting has the potential to affect time to metamorphosis or size at metamorphosis, disrupt foraging and reproduction and has physiological consequences for frogs. The extent to which a particular species "may be susceptible to these various effects and the magnitude of change in illumination intensity or duration that is necessary to elicit such responses remain unknown" (p. 248).
- Frogs can become light-adapted to the brightest source of light, but when moving into shadows cast by artificial lights the frogs may suffer reduced visual capabilities.
- Some nocturnal frogs regularly forage under enhanced illumination but it is unclear whether frogs are attracted to the light, to the insects available at lights or a combination of the two.

It is important to note that while the costs of constructing crossings and conducting research into effectiveness of the structures are typically low relative to the budget for an entire road

project, they still need to be justified (van der Ree 2007; Lesbarreres and Fahrig 2012; Hamer et al. 2015). Design that maximises the return on the investment toward facilitating movement and minimising road kill is therefore important (Woltz et al. 2008).

1.2 Design elements

Factors which are known or believed to impede Growling Grass Frog passage through various crossing structures under roads which cross terrestrial habitat and / or waterways include:

- Fast flows. Fast flowing water may facilitate movement of frogs and tadpoles downstream (by being washed through) but impedes passage upstream against the flows. Urbanisation will result in higher and more frequent water level fluctuations in the waterway following most rainfall events. These flow episodes will generally be "flashy" following rainfall events with increased velocity and volume of water conveyed in the waterways.
- Dry conditions.
- Darker conditions than natural ambient night illumination.
- Cold conditions.

It is the opinion of the TAG that drier, colder and darker conditions of the structure compared with the outside environment may be viewed as hostile and therefore deter frogs from entering and / or crossing under the road.

General principle

To facilitate movement and maintain microclimatic equilibrium with the outside world, crossings should be:

- as high and as wide as possible.
- as short as possible.

Bridge-specific

Bridges are generally best suited to crossings of major streams, crossings of deeply incised streams and situations where the infrastructure is wide (e.g. dual carriageways). Bridges also enable an "extended stream crossing" (an elongated, open-span structure over a natural stream including wide banks on both sides) to be achieved; this passage design allows for multiple species that use the riparian environment (Lesbarreres and Farhirg 2012), not just Growling Grass Frog. Bridge underpasses are "acknowledged as being the most effective but also the most costly" (VicRoads 2012 p.15).

Refer to the flow chart (Figure 4) to guide the decision for when bridges should be used. Bridge design must consider:

- Minimum set back from top of bank of 5 m for the bridge abutments. If the top of bank is undefined the opening should at least be the width of the 3 month ARI flow (based upon ultimate developed conditions upstream) plus a minimum 2 m (horizontally) each side of the waterway.
- Substrate should reflect the natural riparian environment.

Waterway crossing design

Culvert-specific

Culverts are generally best suited to crossings of ephemeral, low order streams and sections of linear infrastructure crossing terrestrial environs. Refer to the flow chart (Figure 4).

Culvert design elements include:

- Rectangular in cross section to provide a wide flat base.
- Straight and short as possible with a smooth concrete base.
- "Microclimate vents" adjacent to the curb and channel on either side of a 2 lane road, and for larger roads an additional vent in the central median so that there is no more than 10 m between vents.
- High and wide as possible to facilitate microclimatic equilibrium with the outside environment (light, temperature, humidity).
    - Minimum dimensions of 2100 mm W x 600 mm H for culverts installed across floodplains/terrestrial environments.
    - Minimum dimensions of 2400 mm W x 1200 mm H for each culvert installed across a waterway.
- Minimum airspace 600 mm for any culvert that will be inundated during baseflow conditions.
- Entrance as close to the road edge to minimise length.
- Installation of multiple culverts at one location will achieve:
    - a wider overall crossing.
    - may reduce the possibility of interference by other fauna movements e.g. predators (VicRoads 2012).
    - capacity to provide a variety of underpass conditions – inundated, damp or dry.
- A configuration of culverts regularly distributed across a floodplain and on both sides of a waterway provides increased opportunities for Growling Grass Frogs randomly moving through the landscape to encounter underpasses across a floodplain / terrestrial habitat. Maximum distance between culvert openings of 30 m.
- Flexibility in configuration to allow micro-siting of culverts in natural low-lying areas where available.

Note: For the linear infrastructure crossing terrestrial environs, the topographic constraints will often result in minimal (or zero) height difference between the underside of the road formation and the surrounding ground surface. Lifting the road will generally not be practical or feasible due to the potential fill implications for transitioning the road into urban development outside of the Growling Grass Frog corridor. As a result culverts with the bases “dug in” below natural surface may be the only option. In these situations appropriate transition (e.g. maximum grade of 1 in 10) to the culvert invert will need to be considered in the design. The design will also need to meet requirements for minimum 600 mm air space.

1.3 Other considerations

Structures to improve the effectiveness of crossings for Growling Grass Frog movement include:

Constructed aquatic habitat either side of crossing

Incorporation of constructed aquatic habitat either side of a crossing has been considered and it has been resolved that aquatic habitat is not necessary at the entrances to the culverts because:

- Configuration of crossing structures that allows for minimum 50% permeability and therefore increases the likelihood that frogs will encounter and use the crossing structures without further enticement.

Fencing to direct frogs to crossing entrances

Separate structures to direct frogs to the entrances of crossings are not required where minimum 50% permeability is being achieved.

Fencing/barriers to prevent frogs accessing road

Measures to prevent frogs from accessing the road and therefore place them at risk of being killed or injured by vehicles are not considered necessary as:

- Minimum 50% permeability increases the probability that frogs will use the crossing structures rather than the road surface to move to the other side.

Roadway lighting

It is unknown the extent to which artificial lighting may deter Growling Grass Frogs, however, as a precaution:

- Artificial lighting should be minimised close to crossing structure entrances (fewer lights, decreased height and or directed to minimise light-spill) to the extent that applicable safety considerations allow.
- Directional lighting for all roads crossing through conservation areas to reduce light spill.
- Consideration should be given to locating central median street lights such that some artificial light penetrates what could be deep light wells in the centre of a culvert under a 4 lane road.

1.4 Adaptive approach

The design elements identified above are based largely on expert opinion rather than empirical evidence as there is a dearth of published information on design specifications for underpasses and their effectiveness in facilitating movement of frogs, particularly species such as the Growling Grass Frog which move more randomly through a landscape than migratory species.

It is important that road crossings designed on the basis of these standards are tested in a manner specifically designed to learn more about whether the design elements function as intended and measures use of the structures by Growling Grass Frogs. Improved

understanding obtained from such testing will inform potential amendments to future design standards and possibly identify adjustments to be made retrospectively to improve the efficiency of underpasses built according to this guidance.

Given the costs likely to be incurred to design and construct these structures, it is important the opportunity to learn from the experiences is not missed.

There have been several instances where crossings have been installed at waterway crossings for bell frogs in Victoria and New South Wales. Examples for which it has been possible to ascertain the design elements of the structures are provided below. However, in most cases lack of monitoring means there is little or no information about their effectiveness. In turn they offer little guidance for the design of future structures.

1.5 Example of culvert underpass

Aurora, Epping North / Wollert, Victoria

The most recent example of a crossing designed specifically for Growling Grass Frog is from the Aurora residential development in Epping North / Wollert (Koehler and Gilmore 2014). The crossing is constructed over Edgars Creek and the design consists of:

- Two 'ponds'; one on either side of a two lane, single carriageway municipal road crossing. Each pond has:
  - a water surface area of approximately 240 m^2.
  - a maximum depth of approximately 1.5 m
  - vegetation (emergent, submergent and floating macrophytes) to provide breeding habitat for Growling Grass Frogs that were translocated to the created habitat.
- Four 2400 mm W x 1200 mm H x 22 m L concrete box culverts connecting the ponds under the road (Plate 1) that are:
  - approximately 1.5 m below the road pavement
  - set back under the road pavement by approximately 1.5 m to reduce culvert length and improve the aesthetics of the structure in an urban setting.
  - three of the four culverts are permanently inundated (the bases are 300mm below the natural water level) to ensure the water level is maintained throughout and allow for water to move unimpeded along Edgars Creek during periods of high flow. Inundation of the culverts also prevents ready access by humans and terrestrial predators.
  - one culvert altered specifically to provide a dry crossing option accessible via a rock platform, although it too is likely to be briefly inundated during periods of high flows in Edgars Creek.
- Four funnel fences (17 m L x 800 mm H) installed on each side of both ponds to restrict frogs from moving onto the road and to funnel frogs towards the culvert entrances.

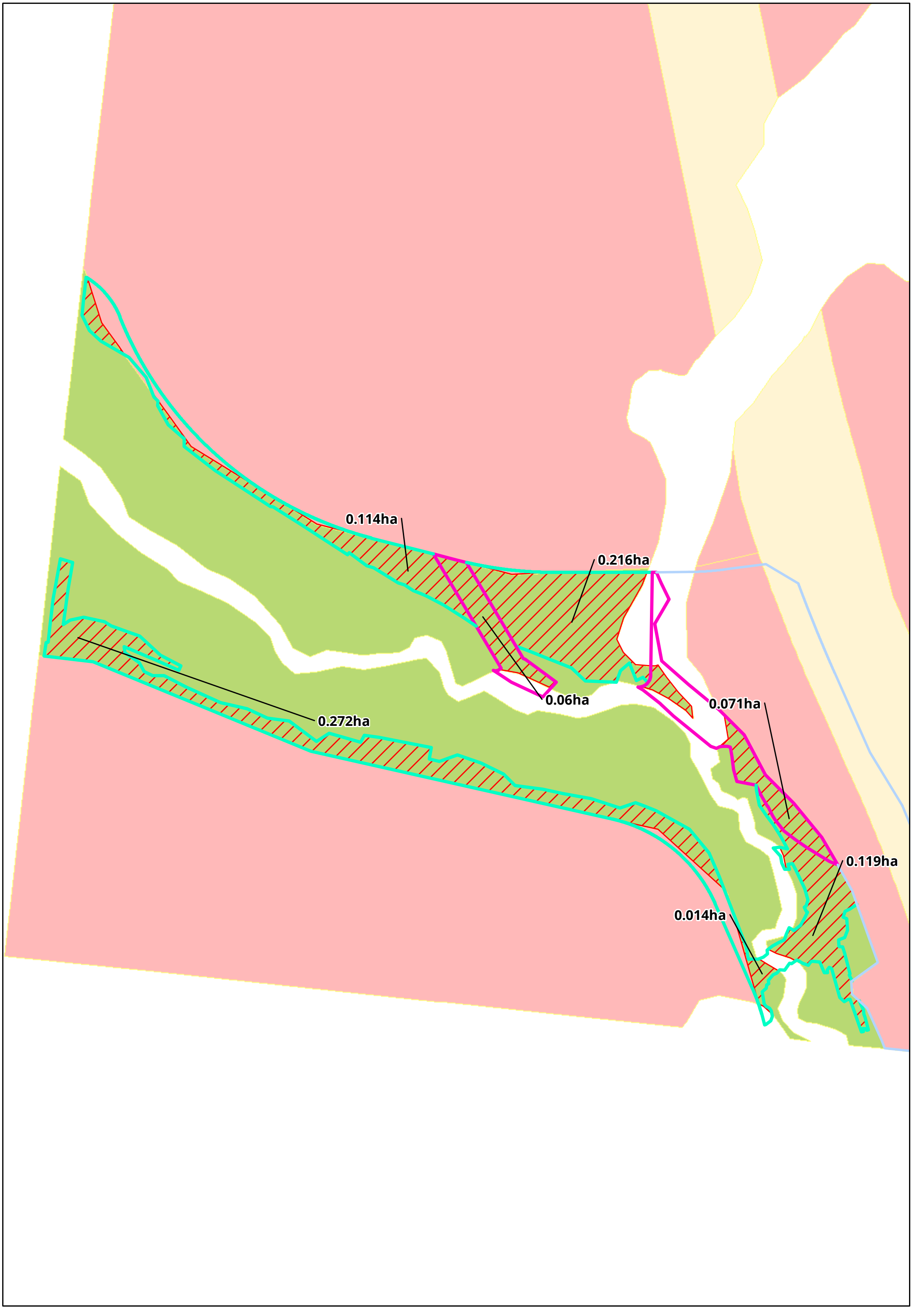
Waterway crossing design

Evidence of the use of this crossing has been documented (Koehler and Gilmore 2014). Movement through the culverts by Growling Grass Frog was established from mark-recapture data with 53 individuals collectively undertaking 63 movements through the culverts. This established that Growling Grass Frog does use culverts of the design used at this location and that for this highly aquatic species culverts were most effective as they are permanently inundated (with air space) and are hydrologically linked to aquatic habitat on either side of the roadway.

However, based on habitat monitoring at this site it is clear that, unlike sites in rural landscapes, breeding habitat located in close proximity to a road in urbanised environment can be severely compromised (S. Koehler and D. Gilmore pers. obs.). As such, any waterbody included in the design of a frog crossing structure should not be relied upon to provide breeding habitat for the frog but rather be regarded only as a tool to facilitate use of the structure.

Plate 1. Example of culvert underpass at Aurora, Epping North, Victoria

Attachment 3


0.114ha
0.216ha
0.06ha
0.272ha
0.071ha
0.119ha
0.014ha

Attachment 4

0.109 ha

0.209 ha

0.145 ha

0.035 ha

0.036 ha

Attachment 5

Australian Government
Department of the Environment and Energy

Mr Michael Martin
Director Business Parks
MAB Corporation Pty Ltd
Level 5, 441 St Kilda Road
MELBOURNE VICTORIA 3004

Industrial development, 165-195 O'Herns Road, Epping, Vic (EPBC 2017/7930): *Offset Strategy.*

Dear Mr Martin

I refer to the Offset Strategy, submitted on your behalf by Biosis Pty Ltd, to meet the requirements of Condition 2 of the *Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act) approval for EPBC 2017/7930.

Officers of this Department have advised me on the Offset Strategy and on the EPBC Act conditions of approval for EPBC 2017/7930. On this basis, and as a delegate of the Minister for the Environment, I have decided to approve the Offset Strategy, signed by Mr Stephen Mueck, dated 22 January 2019, as meeting the requirements of Condition 2 of the approval for EPBC 2017/7930.

The approved Offset Strategy must now be implemented. Please note that, unless otherwise agreed in writing by the Minister, the approved Offset Strategy must be published on your website within one month of this decision.

The Department has an active monitoring program which includes monitoring inspections, and desktop document reviews and audits. Please ensure that you maintain accurate records of all activities associated with the conditions of approval, including implementation of the approved Offset Strategy, so that they can be made available to the Department on request.

Should you require further information regarding my decision please contact Vaughn Cox on 02 6274 2005, or by email: post.approvals@environment.gov.au.

Yours sincerely

Gregory Manning
Assistant Secretary
Assessments (WA, SA, NT) & Post Approvals Branch
Environment Standards Division

25 January 2019

cc. Mr Steve Mueck, Biosis Pty Ltd

Attachment 6

Australian Government
Department of the Environment and Energy

Mr Michael Martin
Director Business Parks
MAB Corporation Pty Ltd
Level5, 441 St Kilda Road
MELBOURNE VIC 3004

Dear Mr Martin

EPBC 2017/7930 Industrial development, 165-195 O'Herns Road, Epping, Vic
Matted Flax-lily Translocation Plan

Thank you for your email dated 29 January 2019, seeking approval of the *Matted Flax-lily Translocation Plan* in accordance with Condition 4 of the approval for EPBC 2017/7930.

Officers of the Department have advised me on the translocation plan and the requirements of Condition 4 of the approval for EPBC 2017/7930. On this basis, and as a delegate of the Minister for the Environment, I have decided to approve the *Matted Flax-lily Translocation Plan* dated 5 February 2019. This Plan must now be implemented.

Approval Condition 11 for this project allows you (under certain circumstances) to implement revised plans without seeking the Minister's approval. If you require any advice on whether to submit a revised translocation plan for approval, please contact the officer below. When submitting any revised plan to the Minister, please provide a 'tracked changes' version of the plan. I also attach a fact sheet providing guidance on 'new or increased impact' relating to changes to approved management plans under EPBC Act.

Should you require any further information please contact Alex Cooper on (02) 6274 1631 or post.approvals@environment.gov.au.

Yours sincerely

Declan O'Connor-Cox, A/g Assistant Secretary
Assessments (WA, SA, NT) & Post Approvals Branch

12 February 2019

Encl: Fact sheet on 'New or Increased Impact'