TO:	Winton	Date:	29 September 2025
COPY TO:	Simon Ash	Job No:	65507
FROM:	Laura Drummond		

SUNFIELD DEVELOPMENT– ECOLOGICAL ASSESSMENT

Introduction

Bioresearches were engaged by Winton to provide a baseline assessment of the ecological features present within the proposed Sunfield development in Ardmore, near Papakura, as part of the Fast-track Approvals Act (FTA) Application. Following review of the application by Auckland Council, it was identified that further information was required regarding the reasons for resource consent as it pertains to ecology was identified.

This memorandum addresses the resource consenting requirements regarding ecology, and the actual and potential adverse effects of the proposed activities on ecological features within the site. Recommendations to avoid, minimise or remedy and adverse effects, and the appropriate effects management strategies have been provided.

Refer to the ecological assessment (Bioresearches, 2024) for an overview of the ecological values of the site, as presented in Figure 1.

Figure 1. Map of the site and the existing watercourses (orange) and the proposed stream diversions (blue) to facilitate the urban development.

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Methodology

Assessment framework

This assessment generally follows the Ecological Impact Assessment Guidelines (EcIAG) for use in New Zealand published by the Environmental Institute of Australia and New Zealand (EIANZ) (Roper-Lindsay et al., 2018). The EcIAG provide a standardised matrix framework that allows ecological effects assessments to be clear, transparent, and consistent. The EcIAG framework is generally used in Ecological Impact Assessments in New Zealand as good practice, and a detailed analysis of this methodology is presented in Appendix A.

Existing Ecology

Existing ecological features within the site is detailed in the ecological baseline assessment (Bioresearches, 2024). In summary, four permanent watercourses, totalling 2.56 km and one natural inland wetland are present within the site. Multiple artificial farm drains with a cumulative length of 4.6 km intersect the property (Photo 1 - Photo 4). Indigenous vegetation within the site is limited to riparian yards and shelterbelts, with a stand of damaged kahikatea (*Dacrycarpus dacrydioides*) present on the north-eastern portion of the site. Ecological features, including freshwater and terrestrial, throughout the site was overall considered to be **Low**.

Photo 1. Typical terrestrial environment

Photo 2. Modified permanent stream

Photo 3. Natural inland wetland

Photo 4. Artificial farm drain

Ecological Impact Assessment

The development proposes to undertake bulk earthworks throughout the site, and the consequential construction of a master-planned community with 4,000 residential lots for industrial/employment use, and residential amenity's including schools, parks, health care and outdoor recreational areas. To facilitate the development, bulk earthworks within 100 m of the natural inland wetland, streamworks, culverting and vegetation removal are proposed.

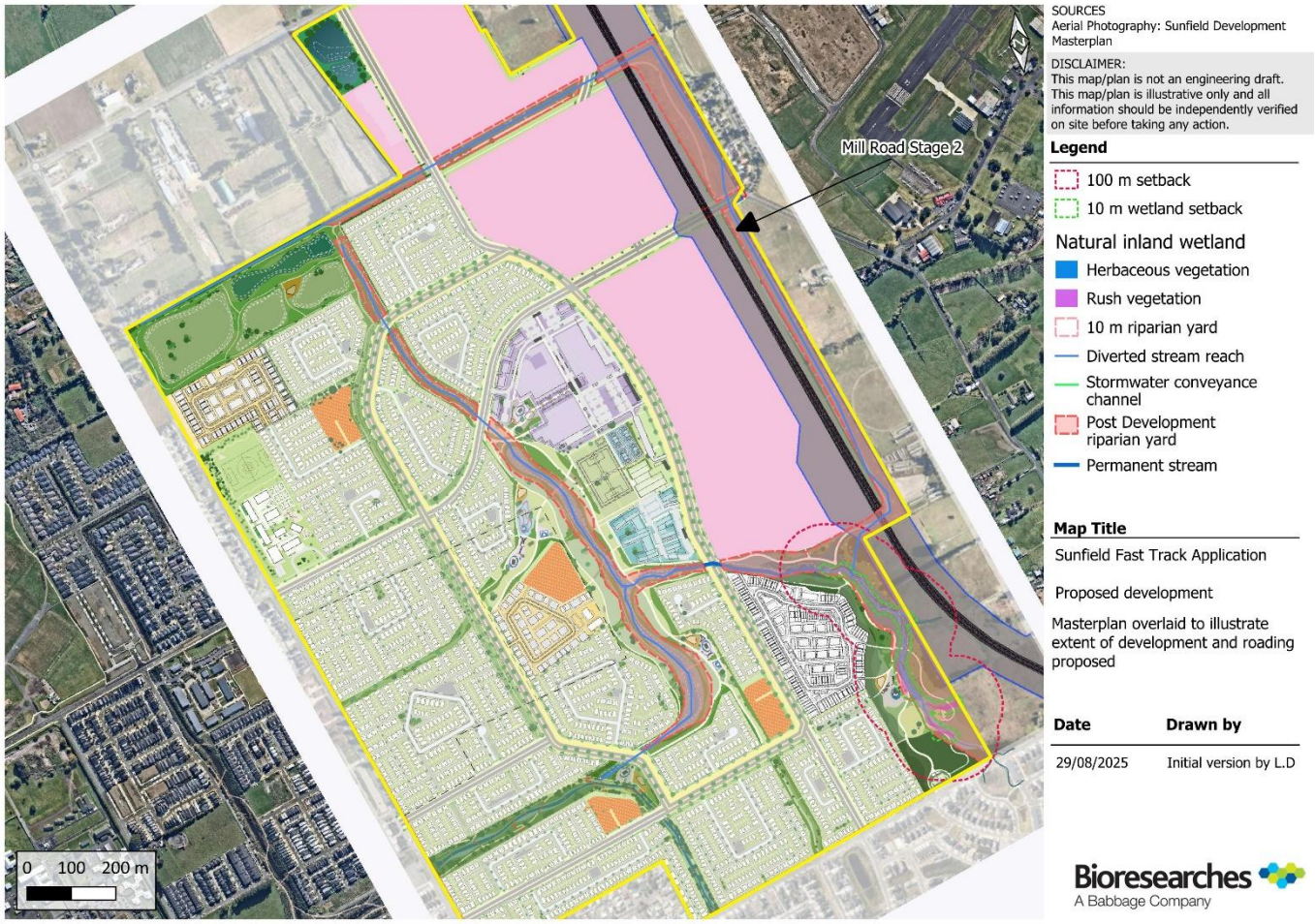

Figure 2. Map of the proposed development masterplan and the post-development ecological features.

Streamworks

The proposed development includes the diversion of 2,220 m of modified permanent stream to a new alignment. The final diverted stream length will comprise 4,447 m of linear stream bed. Under the AUP OP, the diversion of a stream to a new course is classified as a discretionary activity (Rule E3.4.1(A19)).

The potential adverse ecological effects as it pertains to freshwater include:

- Temporary loss and permanent modification of low-quality aquatic habitat;
- Potential release of fine sediment;
- Potential native fish injury or mortality; and
- Stream modification

The proposed diversion will realign the modified permanent stream approximately 120 m to 260 m from the existing alignment and incorporate an additional 2,227 m of stream extent, thus there will be no loss of stream extent. Therefore, no permanent loss of aquatic habitat will occur, and rather, there will be a net-gain in stream length and stream bed area.

The artificial farm drains will be infilled during the streamworks phase. As this infilling will not result in the removal of natural stream habitat, adverse effects and consent requirements as a result of their removal is not required.

This increased instream bed extent will be hydrologically supplemented through upstream catchment management and control of surface water runoff, ensuring an increase in permanent aquatic habitat. Water sensitive design has been incorporated into the development design, which includes the use stormwater treatment devices, inert building materials to reduce the overall contamination potential, and stormwater wetlands and ponds[1]. As such, stormwater which may enter the stream systems should be of high quality and not result in the reduction of instream quality.

Currently, the streams are modified with no obvious straightening and deepening. The stream diversion will allow for the opportunity to remediate the already modified/damaged stream by removing the excessive silt build up on the floodplain and stream bed. The new stream channel should comprise of a meandering low-flow channel within a high flow channel base, and be designed to provide enhanced hydrological variation. Where applicable, substrates existing within the stream should be retained on-site and installed throughout the diversion channel. These inclusions will provide enhanced hydrological variation and habitat diversity, with the inclusion of large hard substrates providing eddies, velocity changes and interstitial spaces and pools providing resting and refuge habitat. Further stream enhancements may be undertaken in the lower un-diverted reach, by installing logs or bounders into the stream to create meanders through the relatively straight alignment.

The streamworks will likely result in the temporary loss of aquatic habitat during the construction/diversion phase. Once the diversion channel is operational, and the ecological enhancements have been incorporated, it is expected that within a short period of time (less than three years), the diversion will provide a complex and well-functioning stream habitat.

The permanent modification of the stream through diversion, without mitigation, is considered to be of **High** magnitude due to the permanent modification of in-stream habitats. Accounting for positive stream design and the stream restoration activities, the stream diversion following mitigation measures in regards to both stream extent and stream value is considered to be of **Low** magnitude, resulting in an overall **Low** level of effect.

[1] Maven (2025a). Sunfield – Fast-Track Approvals Application. Stormwater Management Plan.

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Stormwater conveyance channels

In addition to the diversion and enhancements of stream systems within the site, 3,520 m of stormwater conveyance channel is proposed to be constructed throughout the site. These stormwater conveyance channels will have connectivity to the enhanced streams and provide an increase in available aquatic habitat within the site. Stormwater generated within the site should be appropriately managed and treated, and should not result in reductions in water quality within aquatic habitats within the site.

Sedimentation

Works within the site can generate sediment, which would negatively impact freshwater habitats downstream to the site which are not being modified, and the immediate downstream receiving environment. The effects of excessive sedimentation can impact aquatic fauna through increased turbidity, heat absorption and light refraction. The sedimentation effects, due to current site uses and condition, are currently high, thus the potential magnitude of sedimentation effects without mitigation is also considered to be **High** due to potential adverse effects to the immediate downstream receiving environment

Due to the extent of streamworks required, the project will be undertaken in stages, therefore disturbance throughout the project area will be isolated over time and to minimise the degree of sedimentation that may occur. Construction methodologies show the diversion channel will be constructed with an earth “plug” separating the existing channel and the diverted channel. Following completion and stabilisation of the new stream channel, this earth plug will be removed and water allowed to flow in before the original channel is removed, minimising the transportation of fine sediments to the downstream receiving environment during these in-filling works.

To minimise the potential for excess fine sediment entering the catchment, an Erosion and Sediment Control Plan (ESCP) has been prepared[2]. The plan details methods on managing sediment in discharges of water as well as dust. No works should occur without the ESCP recommendations being in place. With regard to protection of aquatic health, maintenance and management of the controls adjacent to the streams should be stringent, with erosion and sediment controls checked prior to and immediately following heavy rain events to minimise the potential for failure and sedimentation of the downstream receiving environment.

The potential adverse effects of sedimentation will be limited both in time and magnitude. Erosion, and the consequent mobilisation of sediment will primarily occur during the initial stages of the development of the stream diversion and in-stream works. Following the implementation of the mitigation measures, the magnitude of effect will be **Low**.

Freshwater fauna

The magnitude and level of the potential effect on native fauna is considered to be **Moderate** due to the nature of the activity, extent of habitat loss/alteration, albeit on a temporary basis regarding the modified stream channels, and the ability of fauna to escape the disturbance during both the stream diversion and drain infilling. There is a high potential for injury or mortality of native freshwater fauna during stream diversion in the absence of controls. Potential adverse effects can be minimised through timing of the stream works, and native fish recovery and relocation immediately prior to streamworks and infilling. A Native Fish Recovery and Relocation Plan should include, at a minimum, methods to capture fish, measures to prevent fish re-entering the reach, fishing efforts, relocation sites, and details on storage and transportation of fish to prevent stress and death/predation.

Implementation of native fish recovery protocols, will reduce the magnitude of effect on freshwater fauna to **Low**, therefore a Native Freshwater Fauna Management Plan is recommended.

[2] Maven (2025b). Proposed Sediment Erosion Control Plan Drawing No. C220 - C234.

Mitigation hierarchy for proposed stream diversion

The AUP OP and NES-FM 2020 require that an assessment of effects include an assessment of how potential adverse effects has been avoided, or will be remedied, mitigated, offset or compensated. For the stream diversion, the hierarchy has been followed, and the provisions of the AUP OP, as they relate to stream diversion adhered to.

Avoidance

- While direct effects on stream habitat cannot be avoided due to the diversion, no *permanent loss* of stream length or bed area will occur. Standard practice erosion and sediment controls will prevent excess sediment discharges to the downstream receiving environment.

Remediation

- No remediation is proposed of the streams in their existing alignments

Mitigation

- Reconstruction of the diverted channel with enhanced ecological design, and connecting this diverted alignment to their natural inlets and outlets to the upstream and downstream catchment.
- Minimise adverse effects on in-stream fauna through the salvage and relocation of native fish, and appropriate sediment and erosion controls to prevent sediment discharge to the watercourse downstream.
- Stream enhancements of the diverted alignment to mitigate the effects of the permanent modification of the watercourse. Post-diverted stream creates an additional 2,227 m of stream extent (excluding the stormwater conveyance channels).

Offset

- No offset is considered necessary as there will be no loss of stream extent or stream bed area, therefore no residual adverse effect will be generated by the development.

Riparian yard effects

Vegetation clearance within the 10 m riparian yards within the site will be undertaken during the development. The vegetation proposed to be removed consists predominantly of exotic vegetation, with the exception of common, native vegetation located on the southern portion of the site. Following the diversion of watercourses throughout the site, the 10 m riparian yard will be revegetated, with building platforms, roading and additional surfaces appropriately set back. As such, no riparian yard infringements will occur as a result of the Sunfield Development.

However, it is noted this riparian planting plan lacks tall tree tier vegetation, minimising the degree of shade to the diverted watercourses[3]. It is recommended that "Native Forest" planting palettes be incorporated into the riparian plantings to enhance shade, reduce stream temperatures, and improve ecological function.

Mill Road Stage 2 is proposed to transect the site on its eastern boundary, and will be formed between the eastern-most watercourse and the site boundary. The current alignment of Mill Road, at its closest point is over 20 m from the edge of the watercourse, therefore no reductions in the riparian yard width should occur.

[3] Studio Pacific Architecture (2025a). Sunfield Planting Palettes.

Impacts to wetlands

One natural inland wetland is present on the south-eastern side of the site, and was delineated via the rapid test due to the dominance of facultative wetland and obligate plants.

Earthworks

The project proposes to undertake 443 m^2 of earthworks within the 10 m of the wetland, representing 0.3% of the wetlands contributing catchment (measured relative to the proposed earthworks extent). These earthworks consist of shallow cut earthworks (-1 m), and thus should not significantly alter the catchment due to the minimal depth and extent within the catchment. The upstream contributing catchment will not be subject to earthworks, therefore hydrological inputs should not be significantly altered. These works will be undertaken with regard to Regulation 38 in the NES-F *Restoration, wetland maintenance, and biosecurity of natural inland wetlands*. Post-works, the wetland will support functioning wetland system (compared to its currently degraded state), which would provide habitat for a range of indigenous freshwater species within the local area, and an increase in aquatic habitat features.

The wetland is currently vegetated with entirely exotic species, namely reed-sweet grass (*Glyceria maximus*) an aggressive pest plan and soft rush (*Juncus effusus*). Any indigenous vegetation present would be required to be removed due to the extensive seed and rhizome propagation of reed-sweet grass. Under condition 5(b) of Regulation 38, this removal of exotic vegetation excludes the size restriction (500 m^2 or 10% of the wetland area) laid out in condition 4. Ensuring the restoration of the wetland is undertaken within regulation 55 of the NES-F, the earthworks and vegetation clearance within, and within 10 m of the wetland is a **permitted activity**.

Conversely, 51,650 m^2 of earthworks, largely consisting of deeper cut works is proposed within 100 m of the wetland, predominantly located on the left / west of the wetland. These earthworks represent 40% of the contributing catchment of the wetland. Groundwater levels undertaken by LDE[4] indicate the groundwater within the 100 m setback (MH06) is on average 5.2 m below ground level. LDE has calculated the maximum expected potential drawdown to be 1.1m, indicating no drawdown should occur within the 100 m wetland setback. A groundwater and settlement monitoring plan has been prepared for the wider site. It is assumed this plan would consider the hydrological functioning of the natural inland wetland within the site during the earthworks period to minimise any potential dewatering as far as practicable.

At present, no clear hydrological inputs have been identified that flow directly into the wetland , however the wetland area is proposed to become a local purpose drainage reserve with an increased water body extent post-development. Pre-development and post-development flood plans[5], show the floodplain of the wetland to be largely unchanged, indicating sufficient catchment would be retained within the wetland with 7.9% reduction in contributing catchment, with a post-development catchment size of 34.67 ha compared to a pre-development catchment of 37.63 ha. This reduction should not result in the dewatering of wetlands.

Minor earthworks will be undertaken within the wetland to facilitate the construction of boardwalks and bridges for recreational and amenity purposes. Under the NES-F, earthworks within a wetland for the purpose of a wetland utility structure is a **Restricted Discretionary** activity. It is recommended these earthworks are undertaken prior to indigenous wetland planting to ensure no loss or removal of vegetation occurs. As the boardwalks and bridges will be constructed from permeable materials, no reductions in hydrology from rainfall should occur. Additionally, these wetland utility structures will be located above the wetland bed and water flow, and no damming of water should occur.

Earthworks are likely to be required on the eastern side of the wetland to facilitate Mill Road Stage 2. The indicative Mill Road placement is over 100 m from the natural inland wetland, and the indicative

[4] LDE (2025). Sunfield Developments Limited. Addendum Geotechnical Assessment Report.
[5] Maven (2025c) Stormwater Pre-development Flood Plan Drawing C490 &Stormwater Post Development Flood Plan Drawing No C419

designation is located 20 m from the natural inland wetland. The extent of earthwork which may occur within 100 m of the natural inland wetland is unknown, however as Mill Road Stage 2 would likely be considered 'specified infrastructure' and effects and ecological management of natural inland wetlands should be addressed in the Notice of Requirement, not further assessment can be provided.

Vegetation clearance

Under the AUP OP, vegetation clearance within 20 m of a wetland is a restricted discretionary activity (E15.4.1(A18). Under the NES-F, vegetation clearance within 10 m of a natural inland wetland for restoration, wetland maintenance and biosecurity is a permitted activity ensuring it complies with the relevant regulations and conditions. Vegetation clearance is proposed within 10 m and 20 m setback from natural inland wetland during the earthworks phase. This vegetation is primarily restricted to pasture grasses and low-value cover, and therefore, its removal is not considered to pose a significant ecological effect in isolation.

Following vegetation removal, the wetland and 20 m wetland buffer will be planted with suitable indigenous riparian vegetation, including a diverse range of hydric vegetation, and ground-cover, sub-canopy and canopy vegetation[6]. This re-vegetation should provide a high degree of shade, improve wind buffering, temperature regulation and organic matter inputs to the wetland while increasing the overall biodiversity of the site.

Fish passage

The project also includes the construction of 25 culverts and three bridges within and overtop of the diverted stream channels. Under the AUP OP, bridge structures are a **Permitted** activity (E3.4.1(A29), provided they avoid placing structures within the stream bed, and should not result in direct disturbances to the watercourse.

The proposed culverts will comprise of 25 box culverts between 19.71 m – 59.47 m in length. These culverts are overall wide at 1500 mm, with a shallow gradient of less than 1%. Detailed culvert design has not been provided at this stage, however it is assumed the preliminary designs will replicate stream velocities and movement of in-stream debris and material, providing for fish passage[7].

Under the AUP OP, culverts more than 30 m in length is a **Discretionary** activity (E3.4.1 (A33)). Due to the number of culverts proposed within the site, the cumulative length of culverting proposed across the site totals 808 m, including culverts associated with the stormwater conveyance channels. This large extent of culverting and progressive encasement has been appropriately mitigated for by the large increase in stream length during the diversion process. Consequently, a surplus of 3,630 linear metres of stream bed habitat (*excluding* the stormwater conveyance channels), will be present when accounting for the extent of culverting within the property. This 3.6 km of remaining stream bed habitat remains in excess of the existing length of stream bed (2,220 m), avoiding a 'net loss' of stream bed extent.

The crossing structures of Mill Road Stage 2 over stream channels within the site is not known. As Mill Road Stage 2 does not form a part of the Sunfield application, and ecological effects and management of the Mill Road stream crossings are associated with the Notice of Requirement, no further assessment has been made.

Terrestrial Fauna effects

Avifauna

The proposed activities within the site have the potential to disturb nesting native birds utilising the site. Adult birds are likely able to relocate themselves during these works, and the surrounding area contains many areas of equal or higher quality habitat than the vegetation proposed to be removed, which any displaced birds can utilise. The site currently contains limited avifauna habitat due to the lack of

[6] Studio Pacific Architecture (2025b). Wai Mauri Stream Park. Sunfield Stream Remediation landscape Design Report.
[7] Maven (2025c). Proposed Culverts Drawing No. C4414-1 - C4425-2.

complexity, density and well-vegetated areas, with only common native birds expected to be present. As the works are temporary, it is expected that the birds can return to utilise these areas once the works are completed, in which the diversity and density of indigenous vegetation and available habitat would increase above what is currently present as it matures.

However, chicks and eggs are at risk of injury or death during the proposed works, if the works disturb adult birds so that nests are abandoned, or if nests are found within the works area. Consequently, the following effects management measures are proposed to reduce the likelihood of impacts to native birds:

> *"Vegetation removal must be undertaken outside the main native bird breeding season (September to January inclusive) except where a suitably qualified ecologist has confirmed that vegetation is clear of any native nesting birds, eggs, or chicks.*
>
> *Should an active nest be found, a 50 m exclusion zone must be demarcated for any Threatened or At Risk bird species if present, and a 20 m exclusion zone for any Not Threatened species. Works must remain outside of this zone until the chicks have fully fledged."*

If these effects management measures are followed, it is considered that the magnitude of effects of the proposed vegetation removal upon birds would be **low**, resulting in an overall **Low** level of effect. No further effects management measures for birds are required.

Herpetofauna

Works within the site have the potential to disturb lizards, through displacement, mortality of harm. While the ecological value and potential for native lizards was considered to be low, the likelihood of native lizards being present within the site within the identified, albeit limited habitats (woody piles, riparian and shelter belt margins) at the time of works cannot be excluded. To appropriately mitigate for the potential harm to native lizards, a Lizard Management Plan (LMP) has been prepared to manage potential effects of the vegetation clearance to lizards. The LMP addresses the following (where relevant):

- Credentials and contact details of the ecologist/herpetologist who will implement the plan;
- Details regarding the Wildlife Authority Act Permit for Auckland wide lizard salvage.
- Timing of the implementation of the LMP;
- A description of methodology for survey, trapping and relocation of lizards rescued including but not limited to: salvage protocols, relocation protocols (including method used to identify suitable relocation site(s)), nocturnal and diurnal capture protocols, supervised habitat clearance/transfer protocols, artificial cover object protocols, and opportunistic relocation protocols;
- A description of the relocation site(s); including discussion of:
  - provision for additional refugia, if required e.g. depositing salvaged logs, wood or debris for newly released native skinks that have been rescued;
  - any protection mechanisms (if required) to ensure the relocation site is maintained (e.g.) covenants, consent notices etc;
  - any weed and pest management to ensure the relocation site is maintained as appropriate habitat.
- Monitoring methods, including but not limited to: baseline surveying within the site; baseline surveys outside the site to identify potential release sites for salvaged lizard populations and lizard monitoring sites; ongoing annual surveys to evaluate translocation success; pre and post – translocation surveys; and monitoring of effectiveness of pest control and/or any potential adverse effects on lizards associated with pest control;
- A post-vegetation clearance search for remaining lizards.

If these effects management measures are followed, it is considered that the magnitude of effects of the proposed vegetation clearance to lizards would be low, resulting in an overall **Low** level of effect.

Summary

Within the proposed Sunfield development, a range of ecological features are within the site, including permanent and highly modified watercourses, a natural inland wetland, and artificial farm drains with limited indigenous vegetation. While the existing ecological values are generally considered to be low, the proposed development activities, particularly stream diversion, vegetation clearance, and earthworks, have the potential to result in adverse ecological effects if not appropriately managed.

Mill Road Stage 2 will contain a section of roading on the eastern side of the site. The overall degree of earthworks and disturbance within the site due to the inclusion of Mill Road Stage 2 has not increased. As ecological effects and management of ecological effects is considered in the Notice of Requirement, no further assessment in regards to the Sunfeild application has been made.

The project will result in the diversion of permanent stream throughout the site, and an increase in overall stream extent, avoiding permanent stream loss. Post-diversion, ecological enhancement of the diverted stream channels should ensure stream function is retained and provide an overall uplift in freshwater ecological value. Sediment and erosion control measures, and fauna management plans for both freshwater and terrestrial species should ensure potential adverse effects during the construction phase are minimised, and result in an overall **Low** level of effect.

Appendix A EIANZ Guidelines

Table 1. Criteria for assigning value to habitat/species for assessment.

Value	Determining Factors
Very High	Nationally Threatened species found in the 'zone of influence' (ZOI) either permanently or seasonally. Area rates 'High' for at least three of the assessment matters of Representativeness, Rarity/distinctiveness, Diversity and Pattern, and Ecological Context. Likely to be nationally important and recognised as such.
High	Species listed as At Risk – Declining found in the ZOI either permanently or seasonally. Area rates 'High' for two of the assessment matters, and 'Moderate' and 'Low' for the remainder OR area rates 'High' for one of the assessment matters and 'Moderate' for the remainder. Likely to be regionally significant and recognised as such.
Moderate	Species listed as At Risk – Relict, Naturally Uncommon, Recovering found in the ZOI either permanently or seasonally. Locally uncommon or distinctive species. Area rates 'High' for one of the assessment matters, 'Moderate' or 'Low' for the remainder OR area rates as 'Moderate' for at least two of the assessment matters and 'Low' or 'Very Low' for the remainder. Likely to be important at the level of the Ecological District.
Low	Nationally and locally common indigenous species. Area rates 'Low' or 'Very Low' for majority of assessment matters, and 'Moderate' for one. Limited ecological value other than as local habitat for tolerant native species.
Negligible	Exotic species including pests, species having recreational value. Area rates 'Very Low' for three assessment matters and 'Moderate', 'Low' or 'Very Low' for the remainder.

Table 2. Criteria for describing the magnitude of effects (EIANZ 2018)

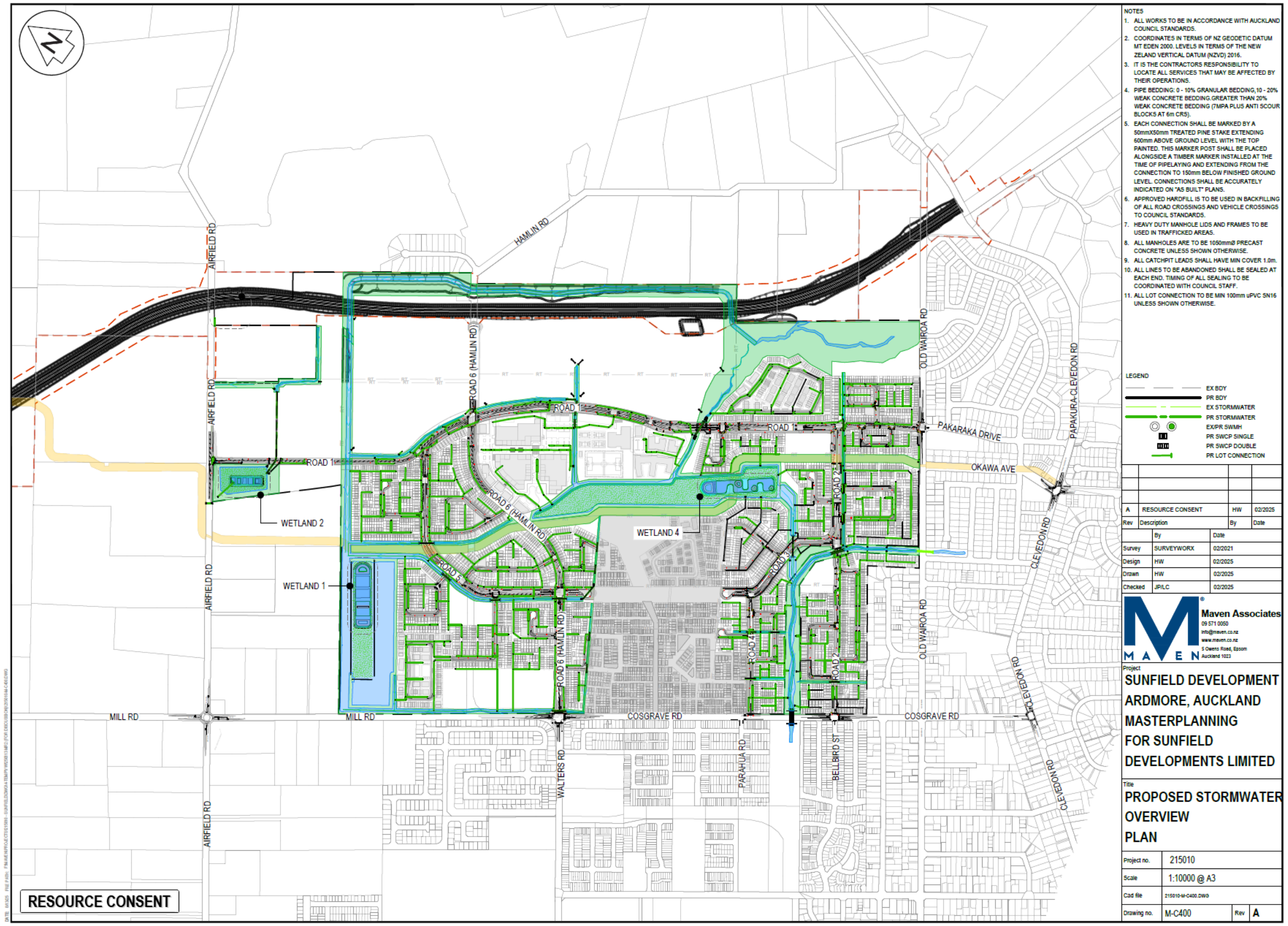
Magnitude	Description
Very High	Total loss of, or a very major alteration to, key elements/features of the existing baseline conditions, such that the post-development character, composition and/or attributes will be fundamentally changed and may be lost from the site altogether; AND/OR Loss of a very high proportion of the known population or range of the element/feature.

Magnitude	Description
High	Major loss of major alteration to key elements/features of the existing baseline conditions such that the post-development character, composition and/or attributes will be fundamentally changed; AND/OR Loss of a high proportion of the known population or range of the element/feature.
Moderate	Loss or alteration to one or more key elements/features of the existing baseline conditions, such that the post-development character, composition and/or attributes will be partially changed; AND/OR Loss of a moderate proportion of the known population or range of the element/feature.
Low	Minor shift away from existing baseline conditions. Change arising from the loss/alteration will be discernible, but underlying character, composition and/or attributes of the existing baseline condition will be similar to pre-development circumstances and patterns; AND/OR Having minor effect on the known population or range of the element/feature.
Negligible	Very slight change from the existing baseline condition. Change barely distinguishable, approximating to the 'no change' situation; AND/OR Having negligible effect on the known population or range of the element/feature.

Table 3. Criteria for describing the level of effects (EIANZ 2018). Where text is italicised it indicates 'significant effects' where mitigation is required.

Magnitude of Effect	Ecological Value				
	Very High	High	Moderate	Low	Negligible
Very High	*Very High*	*Very High*	*High*	*Moderate*	Low
High	*Very High*	*Very High*	*Moderate*	Low	Very Low
Moderate	*High*	*High*	*Moderate*	Low	Very Low
Low	*Moderate*	Low	Low	Very Low	Very Low
Negligible	Low	Very Low	Very Low	Very Low	Very Low
Positive	Net Gain	Net Gain	Net Gain	Net Gain	Net Gain

Appendix 1. Proposed wetland plan – prepared by Maven



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