

**To:** The Neil Group

**Date:** 1 September 2021

**Attention:** Trevor Canty

**Ref:** 64705

**Subject:** Brigham Creek Road: Ecology Assessment

## Introduction

The Neil Group are proposing a sub-division encompassing multiple properties at Brigham Creek Road, Whenuapai (the Site), with each property hereafter referred to as the 'Southern Site' and Northern Site' (Appendix I). This memorandum provides a high-level assessment of ecological effects for the aforementioned development.

## Methodology

An initial site visit of the Northern Site was undertaken by a qualified ecologist on 13<sup>th</sup> July, 2021, and the Southern Site visited during 2020 and further assessed from photos and recent aerial images.

Botanic and terrestrial fauna values within the site were qualitatively assessed. Fauna habitats assessed considered indigenous lizards, birds and bats.

Overland flow paths / watercourses were classified under the Auckland Unitary Plan – Operative in Part (AUP OP) to determine the ephemeral, intermittent or permanent nature of these watercourses.

Wetlands were identified within the Site as per the definitions and criteria laid out in the National Policy Statement for Freshwater Management 2020 (NPS-FM). The aquatic habitat was then qualitatively assessed. The identified ecological features within the Site are presented in Appendix I and photos of these features are provided in Appendix III.

## Existing Environment

### **Background and Ecosystem Classification**

The Site is within the Tāmaki Ecological District of the Auckland Region and is approximately 33 hectares in size. Historically (pre-human), the area would have comprised the forest ecosystem type 'Pūriri forest' (WF7) and would have supported a diverse range of invertebrates, amphibians, reptiles, birds and bats (Singers *et al.*, 2017). WF7 ecosystems have a regional International Union for Conservation of Nature (IUCN) threat status of "Critically Endangered". Earliest historical aerials available indicate that the Site and much of the surrounding landscape has been devoid of native vegetation and managed as agricultural land for at least 60 years (Appendix IV).

Currently, the Site consists of consented earth-worked land, fallow pasture/crops, mixed exotic and native vegetation with several watercourses flowing through the properties. The Site does not support a recognised current terrestrial ecosystem type, as classified under the AUP OP: Biodiversity current extent, and is not subject to any Significant Ecological Area (SEA) overlay.

The Site is surrounded by a mixture of urban development, agricultural land and government infrastructure (New Zealand Royal Air Force base). The surrounding agricultural land is zoned for Future Urban Zone.

### Terrestrial Ecology

The site predominantly consists of earth-worked land and fallow pasture/crops and pest plants with associated exotic shelter belts and overgrown amenity planting. Within the Southern Site, the land had been utilised as a daffodil farm with rows of poplars tree established throughout the property in addition to established shelter belts. Native vegetation throughout the entirety of the site was sparse, with natives predominantly established within the riparian margins.

The botanic value of the native vegetation was **Low**, consisting of low-stature, common native trees (e.g. pōnga, harakeke, tarata and tōtara) sparsely established in the riparian margins with a damaged understorey. The vegetation provides low-quality fauna habitat as the vegetation is of low stature, lacked ecological complexity and is subject to high edge-effects and limited terrestrial connectivity.

### Freshwater Ecology

Four watercourses, one pond and two wetlands were identified within the Site and is a tributary of the Waiahoia Stream. Two ephemeral overland flow paths were present within the Southern site and had been clearly modified through straightening and deepening.

Within the site, watercourses flowed in a general south to east direction. The southern reach originates as an artificial drainage channel (Watercourse 3) and was considered to be an artificial channel as no natural headwaters were observed currently or historically, and no natural portions were observed for the entire reach. The watercourse appears to be constructed as it is unnaturally, straight and deep with no meanders, and is not observable in historic aerial images (Appendix IV). Watercourse 3 drains into a natural but modified intermittent stream (Watercourse 2). The watercourse entered a large pond downstream and transitions to a permanent watercourse further downstream within the property (Watercourse 1). A second intermittent stream (Watercourse 4) was present just beyond the northern property boundary and flowed into the pond, before joining Watercourse 1. Watercourse 1 flowed through the site in an eastern direction before exiting the site through a culvert.

All streams contained similar characteristics with slight variation in riparian vegetation and have been highly degraded through land-use practices. The dominant substrate throughout each reach consisted of fine silt with the upstream reach of Watercourse 2 containing compact clay banks and bed. The upstream reach of Watercourse 2 and the downstream reach of Watercourse 1 were considered to have moderate shading functions provided by riparian vegetation, however within the remaining reaches, riparian vegetation largely consisted of rank long grass providing low shading functions, with macrophytes observed growing within the reaches with low shade.

Hydrological heterogeneity was considered to be low with runs present throughout and one large pool at the downstream side of the culvert present in Watercourse 1. Some small cascades were present within

the lower extent of Watercourse 2 and upper extent of Watercourse 1, however this was due to debris such as rubbish and felled trees present within the streams rather than natural hydrological features. Aquatic habitat quality and abundance were low within the watercourses, with available habitat for indigenous freshwater fauna largely restricted to debris, low-quality overhanging vegetation and root systems associated with Wetland 1. Within the stream systems, organic matter input was moderate with high amounts of leaf litter present, particularly within the intermittent streams and some woody debris.

The stream systems were considered to be of **Low** ecological value due to their degraded state, lack of riparian vegetation and hydrological heterogeneity and limited aquatic habitat for indigenous freshwater fauna.

All other overland flow paths were classified as ephemeral reaches, due to their lack of surface water, evidence of substrate sorting processes, and pools and debris within the floodplain, however the reaches often contained well-defined channels due to artificial modifications. The eastern portion of the Southern Site has been entirely earth-worked and remains an active site under an existing consent (Appendix II). No aquatic features (watercourses or wetlands) are present within the eastern portion of the Southern Site.

The two wetlands were located within the Northern Site and contained wetland hydric vegetation and typical wetland hydrology at time of site assessment. A large natural wetland (Wetland 2) was within the headwaters of the Watercourse 4 with a portion falling within the site boundary. Wetland 1 was located within a section of the floodplain of Watercourse 1. Each wetland contained hydric vegetation (Table 1) and hydrology (e.g. standing water, high water table and soil saturation). The surrounding areas of the wetland was dominated by pasture grass.

Of the nine species identified throughout the two wetlands; three species had a wetland indicator status of 'Facultative wetland', and six species classified as 'Facultative'. Mānuka and kiokio were the only two native species were observed, with the remaining vegetation was exotic, including two pest plant species. Due to the presence of 'facultative wetland' species and the dominance test and prevalence index being met for each (2.37 and 2.75, respectively), the areas were classified as natural wetlands under the NPS-FM. The wetlands were assessed to be of **Low** ecological value due to their dominance of exotic plants and pest plants, and provision of low-quality habitat for indigenous freshwater and terrestrial fauna. No other natural wetlands were identified within the Site.

Within the southern site, a large pond was present at the stream transition point from intermittent (Watercourse 2) to permanent (Watercourse 1). The pond is not present within historical aerial images, and is considered to have historically been a reach of the watercourses which has been artificially widened and deepened to construct the pond for amenity purposes. Furthermore, riparian vegetation situated around the pond consisted of degraded amenity planting and landscaping features (e.g. rock fencing) with a small pier extending into the water body. The pond was assessed as an artificially constructed wetland. Constructed wetlands are intended to include bodies of water that have been deliberately constructed by artificial means, including landscaping purposes, and therefore is exempt from the NES-F.



**Table 1. Plant species within each identified wetland**

Wetland	Common Name	Scientific Name	Wetland Classification	Dominant
Wetland 1	Buttercup	<i>Ranunculus</i> sp.	FAC	Yes
	Soft-rush	<i>Juncus effusus</i>	FACW	Yes
	Water pepper	<i>Persicaria hydropiper</i>	FACW	Yes
	Lotus	<i>Lotus pedunculatus</i>	FAC	No
	Yorkshire fog	<i>Holcus lantus</i>	FAC	Yes
	Mercer grass	<i>Paspalum distichum</i>	FACW	Yes
Percent of dominant species that are OBL, FACW or FAC				100%
Prevalence Index				2.37
Wetland 2	Pampas	<i>Cortaderia selloana</i>	FAC	Yes
	Kiokio	<i>Blechnum novae-zelandiae</i>	FAC	Yes
	Lotus	<i>Lotus pedunculatus</i>	FAC	No
	Soft-rush	<i>Juncus effusus</i>	FACW	Yes
	Buttercup	<i>Ranunculus</i> sp.	FAC	Yes
	Mānuka	<i>Leptospermum scoparium</i>	FAC	No
	Yorkshire fog	<i>Holcus lantus</i>	FAC	No
Percent of dominant species that are OBL, FACW or FAC				100%
Prevalence Index				2.75

\*Classifications from Manaaki Whenua. New Zealand Wetland Plant List 2021.

### Assessment of Effects

The proposed development will involve the removal of three existing culverts and the installation of a bridge/arched culvert crossing. Earthworks are proposed within 10 m of natural wetlands to facilitate the installation of the crossing. However, the proposed earthworks and development are to be designed to ensure there is no partial or complete drainage of the natural wetland.

The installation of the culvert and associated accessway is proposed over the lower portion of Wetland 1, however consideration has been taken to utilise an arched culvert or similar bridge structure. No materials are to be imbedded within the wetland itself, with the edge of the arch culvert proposed to be setback 3m from the wetland edge. All parts of the culvert/bridge installation are to be located outside the wetland body and no active removal of wetland vegetation removal is proposed. As the structure will not be embedded within the wetland, potential adverse effects can be appropriately mitigated for to avoid any significant adverse effects and surface water and groundwater connectivity is to be retained to avoid complete or partial drainage of the wetland. The arch culvert still provides opportunity to enhance and the wetland from its current degraded state.

All other identified aquatic habitats and ecosystems within the Site are proposed to be retained and enhanced with the exception of the artificial channels within the Southern site. No building infringements or removal of vegetation within the 10 m riparian yard is proposed. As such, there will be no direct adverse effects (i.e. removal or reclamation) on those natural ecosystems. Indirect adverse effects, for example from sedimentation and stormwater contaminants, are proposed to be mitigated through appropriate controls and following best practice guidelines to ensure adverse effects on aquatic life are no more than minor.



## Conclusion

Within the Site, four watercourses, two natural wetlands, a constructed wetland and two modified ephemeral overland flow paths have been identified. No other wetlands per the NPS-FM or streams per the AUP OP are present throughout the site. The proposed development has avoided the reclamation of natural aquatic features and drainage of natural wetlands, as the development has appropriately taken the objectives of the NPS-FM into account throughout the design stage. The direct impacts of the proposed development on freshwater ecological features will involve the removal of three existing culverts and the installations of a bridge/arched culvert crossing over a portion of Wetland 1. The crossing has been designed to avoid earthworks and prevent any structures from being imbedded into the wetland itself, and therefore will not result in the complete or partial drainage. The development has not proposed to infringe the riparian yard and provides an opportunity to enhance the freshwater ecological values through restoration planting, riparian planting and the removal of culverts.

The proposed development of the Site is consistent with the outcomes expected of the NES-F and the NPS-FM and will allow for the retention and protection of identified ecological features, including wetlands and natural stream systems. The proposed development is expected to have low adverse effects on the ecological value of the site, and if restoration, enhancement and protection of the ecological features are carried out, the development will provide an overall net positive biodiversity gain.

A more comprehensive ecological assessment will be provided to support the development application, at the expert consenting panel stage, which will further assess the potential direct indirect effects and detail the proposed ecological enhancement actions within each of the sites.

Regards,



Laura Drummond MSc. (Hons) | Ecologist | **Bioresearches**

Level 3, 68 Beach Road | +64 9 379 9417 | s 9(2)(a)

Appendix I: Identified Ecological Features

# Memorandum





Appendix II. Recent aerial image from May 2021.





**Appendix III: Photos of Identified Ecological Features**



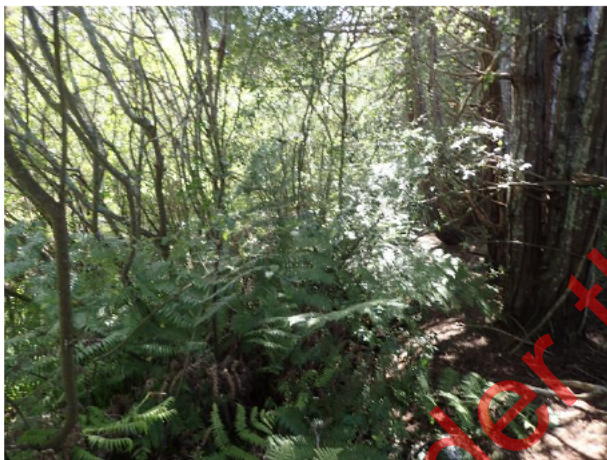
*Exotic vegetation and few native trees present within the Northern Site*





*Aquatic features within the Northern Site including an intermittent stream, permanent stream and two wetlands*





*Exotic vegetation and sparse native vegetation within the Southern Site*



*Aquatic habitats within the Southern Site showing artificial channel (left) intermittent and ephemeral overland flow path which has been deepened (right).*





*Intermittent stream within the Southern Site*

Appendix IV: 1959 Aerial Image

