

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of a submission in respect of the **PROPOSED WAIKATO DISTRICT PLAN** by **AMBURY PROPERTIES LIMITED** pursuant to Clause 6 of Schedule 1 of the Act seeking the rezoning of land at Ohinewai

STATEMENT OF EVIDENCE OF CHAD DONALD CROFT

1. INTRODUCTION

- 1.1 My name is Chad Donald Croft. I am employed as Principal Ecologist by a specialist ecological consulting firm, Ecology New Zealand Ltd.

Qualifications and experience

- 1.2 I am a professional ecologist with 18 years' experience with specialist expertise in ecological impact assessment, mitigation and terrestrial and freshwater habitat restoration. I have worked with clients across a wide variety of industries including oil and gas, forestry, mining, transportation and construction as well as various government authorities throughout multiple jurisdictions in both Canada and New Zealand.
- 1.3 I am a current member of the Environment Institute of Australia and New Zealand, and a former Registered Professional Biologist of both the College of Professional Biology in British Columbia, Canada and the Society of Professional Biologists in Alberta, Canada.

Involvement in the Ohinewai project

- 1.4 I have been involved with the Ohinewai Sleepyhead Estate project at 52- 58 Lumsden Road, 88 Lumsden Road and 231 Tahuna Road ("the Site") since May 2019. My involvement to date has been as the lead ecologist. I completed an initial Ecological Opportunities and Constraints Assessment. I am the author of the Ecological Impact Assessment ("EIA") dated 03

December 2019 which was attached as Appendix H to the Assessment of Environmental Effects and section 32AA Evaluation dated 6 December 2019. I have also prepared an EIA for the resource consent application for Stage 1 (Foam Factory Development) ("Stage 1").

- 1.5 I have supervised the completion of on-site assessments and surveys undertaken by my team of specialist ecologists. Assessments completed to date have included both aquatic and terrestrial flora and fauna. Specialist fauna surveys have included fish, birds, bats and lizards. In addition, I have participated in expert witness conferencing and agreed to a joint witness statement ("JWS") on ecology matters.
- 1.6 I have also participated in a project hui and presented a summary of the ecological constraints and opportunities to local iwi and I participated in a local community information transfer session whereby the community was afforded the opportunity to attend and discuss the project with specific project experts.
- 1.7 I have visited the Site on numerous occasions, and last visited the Site on 12 November 2019 as part of a site visit to investigate the ecological constraints associated with a proposed new haul road alignment.

Purpose and scope of evidence

- 1.8 The purpose of this evidence is to present the findings of investigations and assessment of ecological effects.
- 1.9 Specifically, my evidence will:
 - (a) Describe the ecological context and landforms (Section 3).
 - (b) Describe the ecological impact assessment undertaken, including methodologies (Section 4).
 - (c) Describe the ecological features of the Site and the determination of ecological values (Section 5).
 - (d) Provide an overview of actual and potential ecological effects (Section 6).
 - (e) Describe the outcomes of the ecological expert conferencing undertaken (Section 7).
 - (f) Comment on the Council Officer's Report (Section 8).

(g) Provide a brief conclusion (Section 9).

1.10 A summary of my evidence is contained in Section 2.

1.11 My evidence relies on / should be read alongside the evidence of:

(a) Robert White, water and wastewater.

(b) Pranil Wadan, stormwater.

(c) Ben Pain, erosion and sediment control.

(d) Stuart Penfold, planning.

Expert Witness Code of Conduct

1.12 I have read the Code of Conduct for Expert Witnesses, contained in the Environment Court Consolidated Practice Note (2014) and I agree to comply with it. I can confirm that the issues addressed in this statement are within my area of expertise and that in preparing my evidence I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

2. SUMMARY OF MY EVIDENCE

2.1 The Site is situated between the Waikato River to the west, Lake Ōhinewai to the south and Lakes Rotokawau and Waikare to the east.

2.2 The Site encompasses a highly modified agricultural landscape composed of dry stock pasture areas, with no original indigenous vegetation communities remaining. The Site contains both terrestrial and aquatic habitats of generally low value. Aquatic habitats include farm drainage channels located throughout the property providing ground water drainage across much of the Site. These channels discharge to the Balemi Rd and Tahuna Rd drainage channels adjacent to the development area (i.e. the Site) which form part of a large surface water management scheme managed by Waikato Regional Council ("WRC") as part of the Franklin-Waikato Drainage Scheme (Waikare drainage area, West subdivision).

2.3 Terrestrial habitats include both exotic and indigenous vegetation communities, suitable for commonly occurring bird species which prefer open country and aquatic margin habitats, as well as indigenous lizards and bats.

2.4 The potential presence on-site of At Risk and Threatened native fauna species (e.g. black mudfish and bats) has increased the assessed ecological

value of the area. The presence and utilisation of the Site by these species is currently uncertain and there are no other high value ecological features that will be adversely impacted within the Site. The potential presence of these species nevertheless makes it necessary to consider the means by which potential adverse effects of the proposed development, that would be enabled by the rezoning, can be avoided or mitigated.

2.5 Although the risk of actual significant adverse ecological effects is considered low, appropriate recommendations have been made to avoid and mitigate those possible effects at the time of future development. The recommended ecological management measures will decrease the risk of adverse impacts on any potential high value features. Consequently, the overall level of ecological impact for the project is considered to be low.

2.6 Expert conferencing with WRC, Waikato District Council ("WDC") and Fish and Game confirmed that there is agreement on most of the points raised regarding the following:

- (a) The values of the Lake Rotokawau Reserve were agreed to be significant.
- (b) The ecological values of the Lake Rotokawau Reserve were agreed to be sufficiently significant to justify a predator control framework to control domestic cats and dogs (and other pest species) within the APL – Ohinewai Structure Plan area ("OSPA").
- (c) It was agreed fish management planning may not be able to adequately address the potential effects of development within the OSPA, on black mudfish, if present.
- (d) It was agreed that the determination of whether the rezoning will provide for an improvement in water quality leaving the site and discharging to Lake Rotokawau and Lake Waikare should be made by experts for stormwater and wastewater design and management.
- (e) There was disagreement on whether the waterways on-site had been classified correctly as artificial drains.
- (f) It was agreed experts would reconvene to discuss options available for controlling dogs and cats.

2.7 In my view, there are positive outcomes provided by the retiring of the existing dairy farm and extensive provision of open space and restored wetland habitat. The recommendations presented for avoiding or mitigating

the effects of the development are appropriate and conceptually sound to enable the proposed re-zoning to be approved. Those recommendations have been formulated into proposed plan provisions.

3. ECOLOGICAL CONTEXT AND LANDFORMS

- 3.1 The Site lies within a rural area, bordered by agricultural land on all sides, with the North Island Main Trunk Railway Line, State Highway 1, and the Waikato River to the west, Lake Ōhinewai to the south and Lakes Rotokawau and Waikare to the east. The Site is located within the Hamilton Basin landscape unit and Meremere Ecological District of the Waikato Ecological Region.
- 3.2 WRC maps indicate there is no direct surface water connectivity between the Site and the Waikato River. WRC maps indicate Lake Ōhinewai and the Site are connected to the greater Whangamarino Wetland complex via a managed artificial drainage canal and both Lake Rotokawau and Lake Waikare. Whangamarino Wetland has been a Ramsar Site since 1989 and is a wetland of international importance. It is the second largest bog and swamp complex in the North Island.
- 3.3 The Site contains a small amount of Significant Natural Area (“SNA”) as classified by WRC along the eastern extent of the Site. This is an extension of the SNA surrounding Lake Rotokawau. The vegetation within the SNA is characterised as predominately exotic with mixed indigenous and exotic communities covering both wetland, and terrestrial ecosystems. This area is also classed as an Outstanding Natural Feature in the proposed district plan (“PDP”) (subcategory Wetland and River Margin). The area surrounding Lake Rotokawau is considered regionally significant, based on the criteria outlined in the Waikato Regional Policy Statement (“RPS”).
- 3.4 A second SNA is located just over a kilometre to the south of the Site, surrounding Lake Ōhinewai.
- 3.5 The Site is a highly modified agricultural landscape with no remnant indigenous vegetation. The Site’s current condition is reflective of an historical farming operation, with an abundance of pasture grass, an extensive network of farm drainage channels, the absence of indigenous vegetation communities and an abundance of exotic vegetation cover. Nearly 100% of the Site is currently used as grazing pasture. WRC’s Vegetation Biodiversity Map (Land Cover layer) shows the entirety of the site as ‘High-Producing Exotic Grassland’.

4. **ECOLOGICAL IMPACT ASSESSMENT - INVESTIGATIONS**

Site investigations and analysis

4.1 An Opportunities and Constraints Assessment was undertaken in late May 2019. Assessments and surveys in support of the EIA of the Site was completed in late 2019 in relation to the OSPA. Additional assessment work was completed in early 2020 as part of an addendum to the OSPA EIA, due to occupant land use and timing constraints. Detailed assessments and surveys were undertaken in response to a resource consent application for Stage 1 in July, 2019. The site investigations undertaken and methodology employed comprised:

- (a) Desktop investigations prior to on-site surveys whereby existing maps, aerial photos and fauna databases were reviewed.
- (b) Vegetation assessment using visual identification of both indigenous and exotic vegetation communities as part of the Opportunities and Constraints assessment, the OSPA EIA, and the EIA for the Stage 1 resource consent application.
- (c) Bird surveys using 5-minute bird counts across the site and visual observations as part of the Opportunities and Constraints Assessment, the EIA for the OSP and the EIA for the Stage 1 resource consent application.
- (d) Lizard investigations using manual habitat searches during the Opportunities and Constraints Assessment, the EIA for the entire Site and the Stage 1 resource consent application.
- (e) Bat surveys using acoustic bat monitors in February and March 2020 as part of the EIA for the entire Site and the EIA for Stage 1. Potential bat roost tree risk rating surveys were also undertaken as part of the EIA for the Stage 1 resource consent application.
- (f) Fish surveys using passive sampling techniques (Gee minnow traps and fyke nets) as part of the EIA for the entire Site and the EIA for Stage 1. Fish surveys included a targeted survey for mud fish in July 2019 as part of the Stage 1 EIA.

4.2 The EIA and additional addendum aimed to assess the actual and potential adverse ecological effects associated with the proposed OSPA on the Site's ecological values at a level adequate, to inform the preparation and the

request for a zoning plan change. The report prepared also outlined the ecological enhancement opportunities that the proposed re-zoning enables.

5. **DESCRIPTION OF ECOLOGICAL FEATURES OF THE OHINEWAI SITE**

5.1 This section describes the ecological features of the Site (including the methodology used to assess ecological effects) and the method used to determine ecological values.

Aquatic habitats

5.2 There are two large drainage channels mapped within the Site forming part of the Franklin-Waikato Drainage Scheme (Waikare drainage area, West subdivision). One is known as the Balemi Road drain and the other as the Tahuna Road drain.

5.3 A schematic of these drains in relation to the site is presented in Figure 1 below.



Figure 1: WRC mapped drainage channels adjacent to the APL – Ohinewai site

5.4 The Balemi Road drain runs along the north eastern boundary along Balemi Road and then runs north to discharge into Lake Waikare.

5.5 The Tahuna Road drain is currently culverted under Tahuna Road. The drain conveys flows and runoff from the upstream catchment including Lake Ōhinewai, to Lake Rotokawau.

5.6 Much of the site is covered by a large network of small, unmapped, interconnected, channels classified as artificial farm drains. These channels

were likely created historically to convert the land to productive pasture, for dry stock farming. These small unmapped channels vary in size, with the smallest containing no water and being completely vegetated with terrestrial vegetation. The cumulative length of these artificial channels was approximately 14.5km.

- 5.7 During conferencing there was disagreement over the classification of these drains as artificial farm drains or otherwise. In my opinion, the classification as artificial drains is correct in accordance with the Waikato Regional Plan definitions, historical aerial photos, the geomorphology of the Site and the managed pump discharge from the Site. In my view, the habitat values of these drains are widely represented across the northern Waikato Region and can be adequately managed through the resource consent process. No natural watercourses were found within the Site.
- 5.8 Many of the drains contained little to no water at the time of assessment, with vegetation covering the channel bed and banks. Many of the drains had no direct connectivity with downstream environments, with water being drained from the Site via a pump stationed at the eastern end of the Site, discharging water to Tahuna Road drain.
- 5.9 The poor-quality habitat within the drainage channel network, suggests it is unlikely that anything other than highly tolerant species (e.g., shortfin eels, black mudfish and gambusia) would persist in these channels.
- 5.10 Black mudfish have been recorded in the vicinity of the Site (within 2km) and are known to occur in marginal habitats, including habitats that dry out periodically.
- 5.11 Detailed fish surveys to determine fish presence or utilisation throughout the drainage channels across the site were undertaken from July 1st-2nd, 2019. A total of 23 Gee minnow traps and 3 fyke nets were deployed for a maximum of 24 hours. Detailed surveys of fish presence and utilisation (including a targeted black mudfish survey) within the drainage channels affected by the proposed Stage 1 earthworks were also undertaken in early July 2019.
- 5.12 Five of the 26 traps that were deployed caught both native and exotic fish. The only native fish species caught was the shortfin eel (*Anguilla australis*). Pest fish species caught included brown bullhead catfish (*Ameiurus nebulosus*), gambusia (*Gambusia affinis*) and rudd (*Scardinius erythrophthalmus*). No black mudfish were captured.

Terrestrial habitats

- 5.13 Overall, the vegetation across the Site was of low ecological quality with little diversity. Vegetation cover was dominated by pasture grass with few scattered exotic trees, and hedgerows.

Terrestrial fauna

- 5.14 Fauna surveys for bats, lizards and birds were undertaken across the Site to determine current presence or utilisation of the Site.

Avifauna

- 5.15 Due to the dominant vegetation community characterising the site (pasture grass), avifauna habitat consisted primarily of foraging habitat for common native and exotic avian species that have adapted to open agricultural landscape areas.
- 5.16 Five-minute bird counts were conducted across the site and indicated high densities of welcome swallow (*Hirundo neoxena*) and kingfisher (*Todiramphus sanctus*). Other birds seen and / or heard on-site included skylark (*Alauda arvensis*), spur-winged plover (*Vanellus miles*), magpie (*Gymnorhina tibicen*), white-faced heron (*Egretta novaehollandiae*), fantail (*Rhipidura fuliginosa*), house sparrow (*Passer domesticus*), Australasian harrier (*Circus approximans*), black swan (*Cygnus atratus*), paradise shelduck (*Tadorna variegata*), common myna (*Acridotheres tristis*), yellowhammer (*Emberiza citronella*) and Eastern rosella (*Platycercus eximius*). Limited arboreal nesting habitat was noted with scattered, suitable exotic trees on-site.
- 5.17 The limited habitat values noted on Site suggested the overall ecological value for avifauna was low.

Herpetofauna

- 5.18 Some suitable habitat for ground-dwelling lizards was noted on Site, specifically within leaf litter, clumped vegetation and rank grass along the drainage channels, decomposing logs and inorganic farm debris, such as corrugated iron sheets, provided suitable cover objects.
- 5.19 Targeted manual searches across the Site confirmed the presence of both copper skink (*Oligosoma aeneum*) and non-indigenous plague skinks (*Lamprophelis delicata*). Suitable habitat for arboreal lizard species was not observed at the Site.

- 5.20 The limited habitat values noted on Site suggested the overall ecological value for herpetofauna was low.

Chiropteroфаuna

- 5.21 Historical long-tailed bat (*Chalinolobus tuberculatus*) records are sparsely distributed across the northern Waikato Region. However, limited bat surveys have been undertaken in the stretch of land from Huntly to Pokeno. Intensive surveying was undertaken for the Huntly Bypass Expressway project to the south of the Site, which required years of monitoring and management and the records are therefore clustered around the realignment in the Taupiri Ranges. Approximately 126 surveys were undertaken for this project from 2014-2017 indicating a range of bat activity in this area¹. Bat activity in this area was shown to vary from no activity to relatively high amounts of activity averaging up to 51 bat passes per night.²
- 5.22 Assessments from the Waikato Expressway project indicated that bats were detected approximately 7.5km from the Site³. A 2018 unpublished assessment by Wildland Consultants refers to the confirmation of long-tailed bats approximately 5km south of the Site at Lake Kimihia⁴; however, a summary of monitoring between 2014 and 2017 at Lake Kimihia as part of the Huntly expressway long-tailed bat monitoring programme specified only a single bat pass was noted during vegetation removal protocol implementation⁵.
- 5.23 14 Acoustic Bat Monitors ("ABM") were deployed across the Site from February 26th to March 14th, 2020 as part of an acoustic bat survey. Potential bat roost trees were identified across the Site as well. In addition, risk rating of potential bat roost trees was undertaken as part of an EIA completed for the Stage 1 earthworks consent application.
- 5.24 Placement of the ABMs targeted potential bat roost trees (large isolated trees with visible cavities), linear commuting flightpaths (hedgerows) and foraging areas (edge of existing vegetation along Lake Rotokawau and large drainage channels) across the Site.

¹ Department of Conservation National Bat Database (20 May 2020).

² Opus International Consultants Ltd (2017), Huntly Section Long-tailed bat Monitoring 2016-17., Prepared for NZ Transport Agency, Reference number 1-HTYV0.71.

³ Tonkin & Taylor Ltd (2014), Waikato Expressway Huntly Section Bat Survey, Prepared for NZ Transport Agency, T&T Ref: 61446.2013.

⁴ Wildlands Consultants Ltd. (2018), Ecological Assessment of the Proposed Lakeside Development Subdivision at 65 and 94 Scott Road, Te Kauwhata.

⁵ Opus International Consultants Ltd (2017), Huntly Section Long-tailed bat Monitoring 2016-17., Prepared for NZ Transport Agency, Reference number 1-HTYV0.71.

- 5.25 A total of four long-tailed bat (*Chalinolobus tuberculatus*, Threatened – Nationally Critical) passes were detected on two of the ABMs during the monitoring period. The recordings ranged within a timeframe of six minutes on a single night, and therefore, most likely represented one or more bats using the hedgerow to commute across the Site. No other activity, such as roosting or feeding buzzes, were noted.
- 5.26 Confirmation of bat presence and the presence of suitable bat roosting trees and foraging habitat on Site suggested the overall ecological value for chiroptero fauna was moderate.

Determination of ecological value

- 5.27 Ecological values were assigned in accordance with the four matters prescribed in the EIANZ guidelines (2018). The overall values assess the matters at an ecosystem / vegetation type, fauna habitat and species level.
- 5.28 The presence of long-tailed bats was recorded at the Site, although only a limited amount of activity was displayed on a single night. Long-tailed bats have substantial home ranges (average home range is 100km²). The level of activity detected suggests that bats are commuting across the Site and may not be actively present or utilizing the Site.
- 5.29 The identification of bat activity coupled with the presence of potentially suitable bat roost trees and foraging areas suggests the overall ecological value of the terrestrial features on Site are considered moderate, based on a conservative approach.
- 5.30 Overall, the ecological value of the freshwater features would generally be considered low; however, given the uncertainty around the presence of black mudfish across the remainder of the Site, a conservative approach would class the ecological value as moderate.

6. OVERVIEW OF POTENTIAL ECOLOGICAL EFFECTS

- 6.1 This section provides an overview of potential ecological effects of undertaking development in accordance with the proposed rezoning.

Potential adverse effects

- 6.2 The potential adverse effects of the proposed development of the Site on ecological values and features can be summarised as follows:

- (a) The development will result in the loss of moderate value habitat for indigenous lizards and long-tailed bats.
- (b) The development will result in the loss of low-value exotic vegetation communities and an increase in impermeable surface cover across the site.
- (c) The development will result in the loss of moderate-value aquatic habitat for indigenous fish species.
- (d) Potential injury / death of native fauna, particularly native birds, lizards and bats inhabiting the exotic vegetation on-site and native fish species within the drains and downstream;
- (e) Sedimentation of aquatic ecosystems if earthworks activities are not effectively managed. Erosion and sediment control is discussed in Mr Ben Pain's statement of evidence;
- (f) Introduction of contaminants to the adjacent environment if stormwater runoff is not effectively managed. Stormwater management provisions are discussed in the evidence of Mr Pranil Wadan.
- (g) Increased noise and lighting during construction and operational phases.
- (h) Introduction of pets and exotic garden species associated with residential development which may impact on adjacent indigenous fauna around Lake Rotokawau.

Stormwater management

- 6.3 Mr Pranil Wadan outlines the stormwater management strategy for the Site in detail in his evidence. In summary, the change in land use to industrial, commercial and residential zones will result in an altered stormwater runoff regime.
- 6.4 The proposed stormwater management strategy for the development incorporates a toolbox approach including a 'treatment train' philosophy which aims to ensure stormwater discharged from the Site achieves appropriate water quality standards, is consistent with the statutory framework and meets stakeholder expectations.

Positive effects

- 6.5 In addition to the adverse effects, it is important to consider the potential positive effects attributable to the proposed rezoning and the Ohinewai Structure Plan.
- 6.6 Currently the Site is dominated by intensive land use as a working dairy farm. The environmental consequences of dairying are increasingly understood. The following positive effects are considered attributable to the retirement of the farm and specific design features of the OSPA:
- (a) A likely significant reduction in nutrient contamination (e.g. nitrogen and phosphorus) from surface water runoff.
 - (b) Probable reduction in nutrient loading of Lake Rotokawau, Lake Waikare and ultimately the Whangamarino wetland.
 - (c) Restoration of the functional capacity of wetlands adjacent to and within the Site increasing the availability of wetland habitat for wetland dependent indigenous flora and fauna.
 - (d) A significant re-allocation of approximately 55ha of land to be managed as open space, comprising of a mix of functional stormwater management areas, recreational opportunities, and wetland parks.
 - (e) Creation of an ecological buffer adjacent to the SNA surrounding Lake Rotokawau which has the unique potential of reversing current degradation and potentially expanding the conservation estate through negotiated agreements or partnerships with the Department of Conservation ("DOC"), Mana Whenua and / or other stakeholders.

7. OUTCOMES OF EXPERT CONFERENCING

- 7.1 On 15 June 2020, an expert conferencing session in relation to ecology was undertaken by myself (for APL), Thomas Wilding (for WRC) and David Klee (Auckland/Waikato Fish and Game). A JWS recorded the outcome of the session.
- 7.2 Key issues considered at conferencing and outcomes are set out below.

Are the values of the Lake Rotokawau Reserve significant?

- 7.3 The experts agreed that the values are significant.

Are the ecological values of the Lake Rotokawau Reserve significant enough to justify rules or covenants requiring:

- (i) the prohibition of landowners within the OSPA owning cats? and**
- (ii) requiring dogs to be always be on a leash within the OSPA?**

7.4 The experts agreed that there was a need for protection of the Rotokawau Reserve from predators and that further work would be undertaken with APL and Fish and Game to formulate an appropriate predator control framework. APL is currently developing this framework and intends for it to be completed by the end of August 2020.

Can a Fish Management Plan adequately address the potential effects of development within the OSPA on black mudfish?

7.5 The experts agreed that a fish management plan cannot provide certainty of mitigation, if mudfish are found on Site. It was also agreed that black mudfish have not been found on Site to date; however, black mudfish populations are located close to the Site and the absence of black mudfish on the Site cannot be proven absolutely.

7.6 It is my opinion that this can be addressed through the application of the Precautionary Principle and by taking a precautionary approach at the consenting stage. As part of any resource consent application, increased confidence in black mudfish presence can be obtained through the measurement of proven habitat predictors such as summer and winter water depth, level of vegetation disturbance and turbidity which have been found to successfully predict black mudfish presence⁶. In addition, targeted black mudfish surveys can be undertaken at the appropriate times of year (mid to late winter) for both fry and juvenile / adult life stages to better understand presence across the Site. Measurement of habitat predictors can be conditioned to occur over multiple seasons and any additional sampling undertaken can utilise a full spectrum of sampling techniques suitable for the variable habitat characteristics of the Site.

⁶ B. J. Hicks & R. F. G. Barrier (1996) Habitat requirements of black mudfish (*Neochanna diversus*) in the Waikato region, North Island, New Zealand, *New Zealand Journal of Marine and Freshwater Research*, 30:1, 135-150, DOI: 10.1080/00288330.1996.9516703

Will the rezoning provide for an improvement in water quality leaving the Site and discharging to Lake Rotokawau and Lake Waikare?

- 7.7 The experts agreed that there is the potential for water quality to be improved in terms of reducing nutrient runoff; however, there is also the increased likelihood of contaminant loading in stormwater runoff and potential wastewater discharges as a result of urbanisation. It was acknowledged that other experts are best placed to confirm these matters.
- 7.8 Having reviewed the evidence of Mr Pranil Wadan and Mr Robert White, it is my opinion that there is sufficient information to provide a broad view that stormwater contaminants will be sufficiently managed and wastewater can be managed appropriately.

Have the waterways on the Site been classified correctly as artificial drains?

- 7.9 The experts were unable to reach agreement on this issue and noted that there was uncertainty regarding how to interpret the Waikato Regional Plan definition. In any case, it was agreed that the values of the watercourses can be accounted for in future resource consent applications for development activities.

Expert conferencing - conclusions

- 7.10 It is my opinion that the key matter remaining from the expert conferencing relates to the appropriate response for the management of black mudfish, if found at the Site during further investigations and development.
- 7.11 If mudfish are found at the Site various options for management can be investigated. These may include avoidance of specific habitats, the translocation of captured individuals to either existing or restored habitat or the capture and holding of individuals for the purposes of a captive rearing and translocation program. The potential of captive breeding and rearing for the conservation of threatened *Neochanna* species has previously been recognised and advocated^{7,8}. General guidelines for captive breeding, rearing and establishment of new *Neochanna* populations have been previously outlined by O'Brien and Dunn⁹. While captive breeding programs have had

⁷ Eldon, G.A. 1993: Guidelines towards a conservation strategy for the Canterbury mudfish (*Neochanna burrowsius*). New Zealand Freshwater Research Report No. 4. National Institute of Water & Atmospheric Research, Christchurch, New Zealand. 19 p.

⁸ Swales, S. 1991: Threats and conservation of native fish. Freshwater Catch 45: 19–21

⁹ O'Brien, L.K.; Dunn, N.R. 2005: Captive management of *Neochanna* (Teleostei: Galaxiidae) spp. DOC Research & Development Series 205. 29 p.

mixed success rates, some captive breeding has been successfully undertaken for Canterbury mudfish (*N. burrowsius*), black mudfish (*N. diversus*), and brown mudfish (*N. apoda*)¹⁰. In addition to breeding, Caskey (2002)¹¹ and Perrie (2004)¹² successfully reared both brown and black mudfish juveniles in captivity. McDonald suggests that the capture of *insitu* fry for the purposes of *exsitu* captive rearing shows greater survival rates for black mudfish than captive breeding and should be favoured¹³.

- 7.12 DOC's Mudfish Recovery Group suggests translocation is a key way of aiding the conservation of the species and lists the Whangamarino wetland as a translocation site¹⁴. McDonald reviewed and tested aspects of black mudfish translocation in the Waikato including environmental parameters of release sites, captive rearing, and the effects of *Gamusia affinis* on mudfish survival upon release, identifying several key aspects influencing translocation success with the aim of improving future translocation programs¹⁵
- 7.13 While certainty in mitigation outcomes cannot be absolute, the above management strategies provide options for managing the effects of development if black mud fish are found.
- 7.14 Specific wording and strategies to be implemented in the management of black mudfish, should they be located at the Site, will be developed in consultation with WRC and set out in an Ecological Rehabilitation and Management Plan ("ERMP"). As set out in the evidence of Mr Penfold, a plan provision has been formulated to require ERMPs to be developed prior to development of the Site. This provision is as follows:

"Earthworks which do not comply with rule 16.2.4.1 P1, P2 or P3 and are designed in accordance with the Ohinewai Structure Plan and include an Ecological Rehabilitation and Management Plan (ERMP) that includes the following;

- a) *If any watercourse is present on the site, an indigenous fish management plan, including a summary of fish habitat and species present, a summary of planned works, permitting requirements, timing of works, procedures for dealing with pest fish, procedures for capturing and*

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- 10 O'Brien, L.K., N.R., Dunn, 2007, Mudfish (Neochanna Galaxiidae) literature review, Scien and Conservation 277, Department of Conservation, Wellington
- 11 Caskey, D. 2002: Brown mudfish fieldwork report: November 2000–September 2002. Unpublished report, Stratford Area Office, Wanganui Conservancy, Department of Conservation, New Zealand. 27 p
- 12 Perrie, A. 2004: Life history and ecophysiology of black mudfish (*Neochanna diversus* Stokell, 1949). Unpublished MSc thesis, University of Waikato, Hamilton, New Zealand. 78 p
- 13 McDonald, A.E., 2007, Improving the success of a translocation of black mudfish (*Neochanna diversus*), M.Sc. Thesis, University of Waikato.
- 14 Department of Conservation, 2003, New Zealand Mudfish, (*Neochanna* spp) recovery plan 2003-13, Threatened Species Recovery, Plan 51, Wellington
- 15 McDonald, A.E., 2007, Improving the success of a translocation of black mudfish (*Neochanna diversus*), M.Sc. Thesis, University of Waikato.

relocating indigenous fish prior to and during works, identification of indigenous fish release sites, roles and responsibilities of parties, reporting requirements and any specific mitigation measures

- b) *A bat management plan that includes vegetation removal protocols and recommendations for any planting of trees or installation of artificial bat roost boxes for bat habitat;*
- c) *An ecological restoration plan for any parts of the site that are to be converted to wetlands for stormwater management or amenity purposes, including habitat creation and enhancement and planting and pest plant and animal control;*
- d) *A predator control programme;*
- e) *Provisions for ongoing management and maintenance of wetland areas;*
- f) *A description of the proposed ecological monitoring framework; and;*
- g) *Evidence of engagement with tangata whenua during preparation of the ERMP including how outcomes of that engagement have been addressed.*

Council's discretion shall be restricted to the following matters, in addition to the matters in rule 16.2.41 RD1;

- a) *The nature and extent of ecological mitigation measures;*
- b) *The extent of consistency with the Ohinewai Structure Plan."*

7.15 In my opinion, this provision is suitable to ensure specific and appropriate management requirements for the protection of black mudfish are implemented.

8. **COMMENT ON MATTERS RAISED IN THE SECTION 42A REPORT**

8.1 Paragraph 172 of the s 42A Report recommends a Bat Management Plan ("BMP") for construction phases of development within the OSPA be required for future consent applications.

8.2 I concur with this recommendation as it provides further support for the recommendation in Section 18 of the EIA which calls for the development of a BMP and appropriate bat management protocols before any trees are felled on the Site, and where possible to avoid the clearance of large trees.

8.3 This requirement has been captured in paragraph (b) of the proposed plan provision that would require an ERMP prior to development, as set out at paragraph 7.14 above. This provision specifically requires the preparation of

a BMP. In my opinion this provision is appropriate to manage potential adverse effects on bats and bat habitat.

9. **CONCLUSIONS**

- 9.1 The Site encompasses a highly modified agricultural landscape composed of dry stock pasture areas, with no original indigenous vegetation communities remaining. The Site contains both terrestrial and aquatic habitats of generally low value. Aquatic habitats include farm drainage channels located throughout the property providing ground water drainage across much of the site. These channels discharge to the two large drainage channels adjacent to the development area which form part of a large surface water management scheme managed by WRC as part of the Franklin-Waikato Drainage Scheme (Waikare drainage area, West subdivision).
- 9.2 Terrestrial habitats include both exotic and indigenous vegetation communities, suitable for commonly occurring bird species which prefer open country and aquatic margin habitats, as well as indigenous lizards and bats.
- 9.3 The potential presence of At Risk and Threatened native fauna species at the Site increased the assessed ecological value and the magnitude of unmitigated potential effects for the proposed development. However, the presence and utilisation of the Site by these species is currently uncertain and there are no other high value ecological features that will be adversely impacted within the Site.
- 9.4 Although the likelihood of significant adverse ecological effects is considered low, appropriate recommendations have been made via proposed plan provisions to avoid and mitigate those possible effects. The recommended ecological management measures will decrease the risk of adverse impacts on any potential high value features. Consequently, the overall level of ecological impact for the project is considered to be low.
- 9.5 In my view, there are extensive positive outcomes provided by the retiring of the existing dairy farm and extensive provision of open space and restored wetland habitat.
- 9.6 The recommendations presented for avoiding or mitigating the effects of the development to be enabled via the OSPA are appropriate and conceptually sound to enable the proposed rezoning to be approved.

Chad Croft
9 July 2020