Before Independent Hearing Commissioners
In Ngāruawāhia

Under	the Resource Management Act 1991 (the Act)
In the matter of	of a submission by Ambury Properties Limited in respect of the proposed Waikato District Plan pursuant to Clause 6 of Schedule 1 of the Act seeking the rezoning of land at Ohinewai
and	Ambury Properties Limited (Ambury) (Submitter)
and	Waikato Regional Council (Further Submitter)

Statement of evidence of Thomas Kennedy Wilding for the Waikato Regional Council – Ecology

13 August 2020

1 Qualifications and experience

1.1 My full name is Thomas Kennedy Wilding. I am the Team Leader of Freshwater Science at Waikato Regional Council. I hold the qualifications of PhD in Biology from Colorado State University and MSc in Biology from the University of Auckland.

1.2 I have 19 years' experience working in the Environmental Science area, focussing on aquatic ecology and hydrology. I have worked for several regional councils (Waikato, Bay of Plenty, Hawke's Bay), and NIWA. Overseas, I have worked for The Nature Conservancy (NGO), and the Colorado Water Conservation Board (State Government). I have authored 49 technical reports plus 6 peer-reviewed journal articles.

1.3 My relevant experience includes:

- Master of Science thesis on the effects of urban development on Auckland stream ecosystems (1996);
- Investigating the effects of urban development on Hamilton streams (Waikato Regional Council, 1998);
- Studying the spatial extent of streams in the Auckland region to inform policy on the point at which piping and other instream works is regulated (NIWA, 2006); and
- Closer to the proposed development, I completed investigations on the effectiveness of the fish pass into Lake Waikare (2004), in addition to monitoring the health of native fish in the Waikato River (2006) as a Freshwater Fisheries Scientist for NIWA.

1.4 My evidence is given on behalf of Waikato Regional Council in relation to the submission seeking rezoning by Ambury Properties Limited (**Ambury**) in respect of the proposed Waikato District Plan.

2 Involvement with the proposal

2.1 I reviewed the Assessment of Environmental Effects prepared for Ambury, participated in the Ecology Conferencing (15 June 2020), and visited the proposed rezoning site (17 June 2020).

3 Code of conduct

3.1 While I acknowledge that I am an employee of Waikato Regional Council, I have read and am familiar with the Code of Conduct for Expert Witnesses in the current Environment Court Practice Note (2014). I have complied with it in the preparation of this summary statement and during expert witness conferencing. I also confirm that the matters addressed in this statement are within my area of expertise, except where I rely on the opinion or evidence of other witnesses. I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.

4 Scope of evidence

4.1 My evidence is given on behalf of Waikato Regional Council and addresses the following:

a The potential for black mudfish to be present at the site;

b Habitat for black mudfish;

c Avoiding and mitigating the effects of development on black mudfish;

d The Fish Management Plan; and

e Response to the Waikato District Council Officer's report.

4.2 I have read the evidence of Mr Chad Croft on behalf of Ambury.

5 Summary of evidence

5.1 Black mudfish have not been found within the proposed rezoning site from surveys to date.

5.2 However, the possibility of occurrence remains, with black mudfish recorded close to the proposed rezoning area, and mudfish have been found in habitats like those found on the property.

5.3 If black mudfish are present, then the waterways would qualify as a significant habitat of indigenous fauna in accordance with the criteria in 11A of the Waikato Regional Policy Statement (**RPS**). This is because black mudfish are classified as

'at risk-declining' in the Department of Conservation's (**DOC**) freshwater fish threat classification list[1].

5.4 Few attempted translocations of mudfish have succeeded in establishing self-sustaining populations in new habitats.

5.5 Given translocation of mudfish populations is unlikely to succeed, the two options are to avoid loss of habitat effects through habitat protection for this at-risk species, or to accept the risk of failure of translocation if mudfish are encountered at the site during development.

5.6 If the development proceeds, the Fish Management Plan proposed in the draft provisions should include provisions for long-term monitoring so that habitat offsets can be triggered if translocation fails.

5.7 Changes to the wording of the provisions for earthworks would be required if the fish management plan is intended to apply to habitat for black mudfish, which includes artificial drains and wetland areas.

6 Issue 1 – Potential for black mudfish to be present at the site

6.1 At paragraph 4.1 of the Joint Witness Statement for Ecology (15 June 2020) (**JWS-Ecology**), the experts agreed black mudfish are located close to the site but have not been detected on the site to date. Surveys were conducted in July and August 2019 by Ecology New Zealand Ltd[2].

6.2 However, the possibility of occurrence remains, as agreed in the JWS–Ecology[3].

6.3 The national distribution of black mudfish is limited, with the proposed rezoning site located among a large cluster of records that includes Whangamarino wetland (Figure 1). The second map shows the mudfish records located adjacent to the Ohinewai property where development is proposed (Figure 2).

6.4 If mudfish are present, then these areas would qualify as a significant habitat of indigenous fauna in accordance with the criteria in 11A of the RPS. As black mudfish are identified as 'at risk - declining' in the DOC freshwater fish threat classification list, their presence would meet Clause 3 of Table 11-1 in the RPS.

[1] Dunn, N.R., Allibone, R.M., Closs, G.P., Crow, S.K., David, B.O., Goodman, J.M., Griffiths, M., Jack, D.C., Ling, N., Waters, J.M. and Rolfe, J.R. (2018). Conservation status of New Zealand Freshwater Fishes, 2017. New Zealand Threat Classification Series 24. Department of Conservation, Wellington.
[2] See section 4 of Mr Croft's evidence for Ambury.
[3] Paragraph 4.1(c).

Method 11.2.2 of the RPS protects areas of significant indigenous vegetation and significant habitats of indigenous fauna.

6.5 The *Operative* Waikato District Plan (policies 2.2.7 and 2.2.8) extends protection from inappropriate subdivision to areas used during the life cycle, and to refuges of indigenous fauna. Avoiding, remedying, or mitigating adverse effects on indigenous biodiversity is also included in the *Proposed* Waikato District Plan (policy 3.1.2(b)), but without the specific protections for areas used during the life cycle.

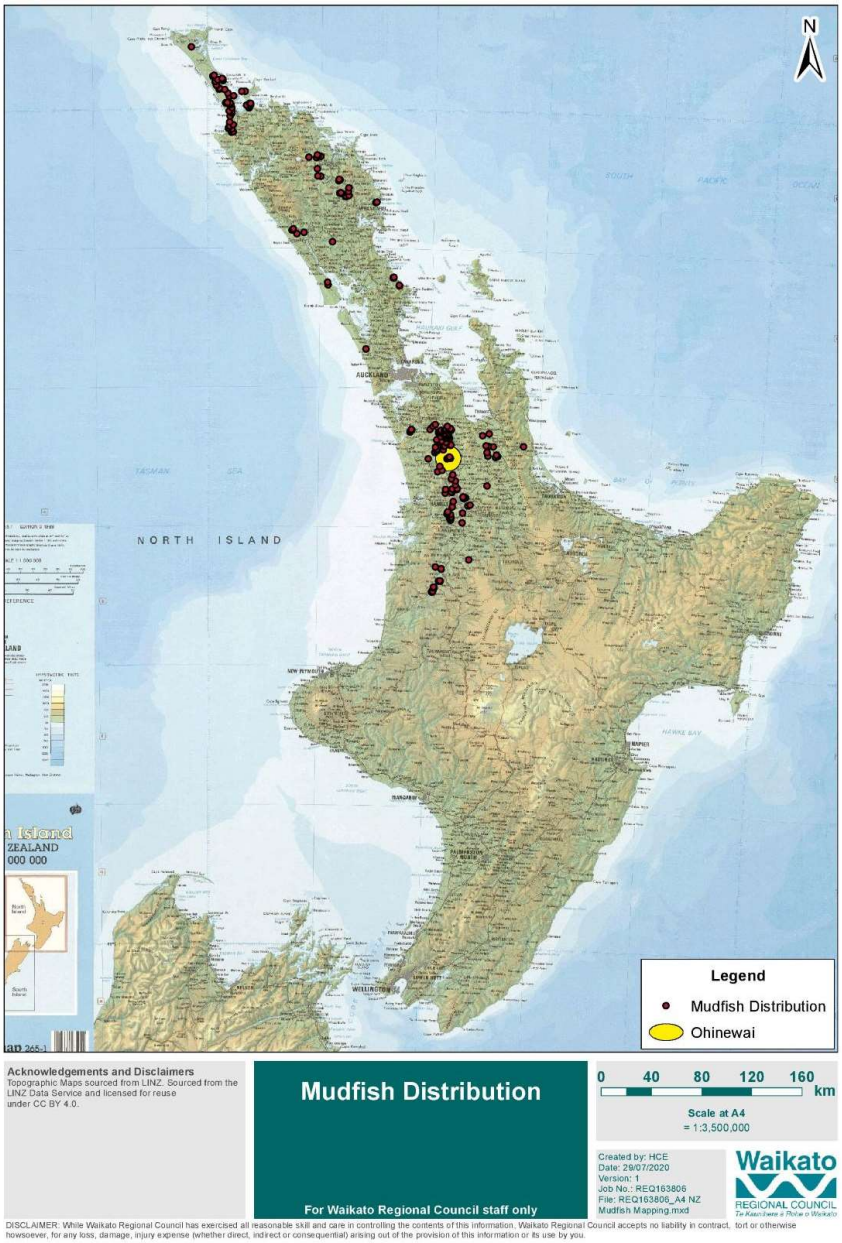

Figure 1. Ohinewai is located within the yellow circle, overlaid with the national distribution of black mudfish records, shown as dots (data sourced from the New Zealand Freshwater Fish Database, accessed July 2020). Black mudfish are not found in the South Island.

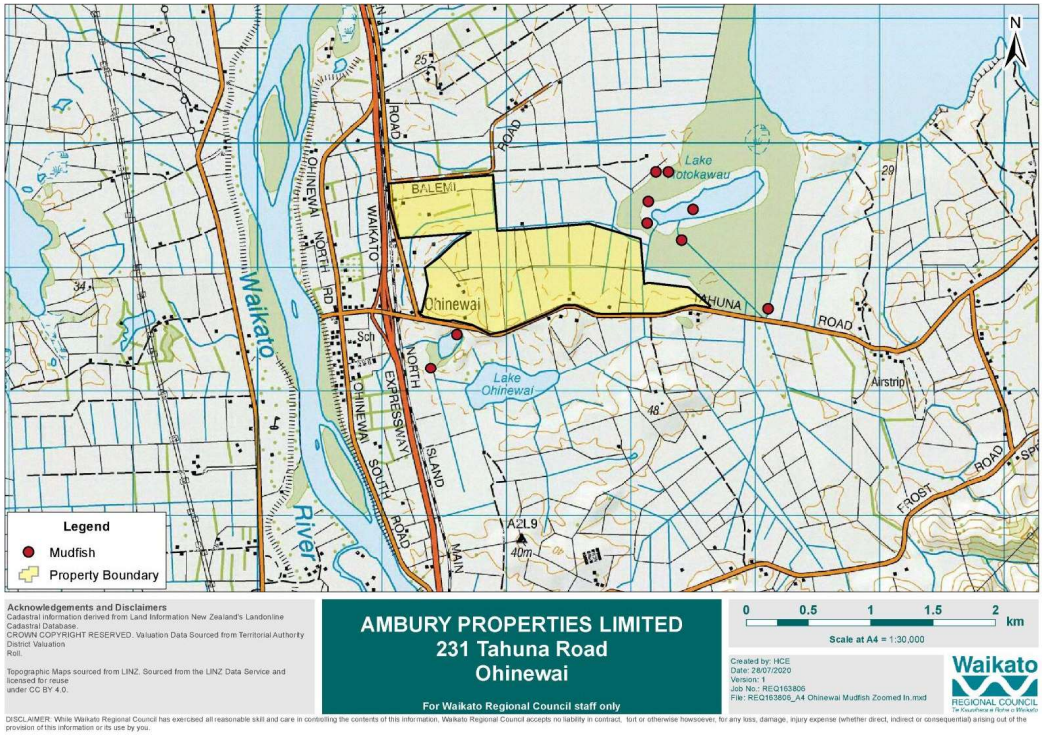

Figure 2. Location of mudfish records (red dots) near the Ohinewai property where development is proposed (yellow highlight).

7 Issue 2 – Habitat for Black Mudfish

7.1 In addition to streams and wetlands, Waikato populations of black mudfish also inhabit the artificial drains[4] excavated when converting wetlands to pasture, like some of those found on the Ohinewai property.

7.2 The apparent preference that black mudfish have for intermittently flowing waterways may be a consequence of the suppression effect that drying has on competitors and predators, such as eels and gambusia[5].

7.3 Paragraph 168 of the Council Officer's report (section 5.3.5) recognises farm drains are a potential habitat of mudfish.

[4] The Waikato Regional Plan distinguishes an artificial watercourse as containing no natural portions from its confluence with a river or stream to its headwaters.
[5] 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.

7.4 Regional and district policies protecting the habitat of black mudfish apply regardless of whether the habitat is an artificial watercourse, a modified watercourse, or a wetland.

8 Issue 3 – Avoiding and mitigating the effects of development on black mudfish

8.1 Avoiding effects on black mudfish has a better chance of protecting any mudfish populations than mitigating the effects of development.

8.2 Mr Croft cited the successful translocation of a related species (Canterbury mudfish) in paragraph 7.11 of his statement of evidence. His research has demonstrated that relocation of mudfish is possible. He also pointed out that DOC recommended establishing new populations of mudfish through translocation, as part of the threatened species recovery plan that was published in 2003[6].

8.3 However, in 2019 Professor Angus McIntosh (Canterbury University) described the history of mudfish relocations as "littered with failure", after $160,000 was spent relocating 921 brown mudfish near Carterton, with only five fish surviving through to the second survey[7].

8.4 Subsequent surveys revealed only one mudfish in the translocation habitat. Expenditure is still being directed to construct new habitat areas for translocation of those fish still held in captivity[8].

8.5 Closer to Ohinewai, three attempts were made to translocate black mudfish for the highway construction at Rangiriri, and no fish have been recaptured. No mudfish have been recaptured from a wetland in Hamilton where two attempts were made to establish a new population (Sandford Park by Mangakotukutuku Stream)[9].

8.6 Given translocation is unlikely to succeed in establishing self-sustaining populations in a new habitat, the two options are to avoid loss of habitat through habitat protection, or to accept the risk of failure of translocation if mudfish are encountered at the site during development.

[6] https://www.doc.govt.nz/globalassets/documents/science-and-technical/tsrp51.pdf.
[7] https://www.stuff.co.nz/environment/114119726/native-mudfish-move-costs-160000-with-very-few-survivors.
[8] Pers. comm. Alton Perrie, Greater Wellington Regional Council, July 2020.
[9] Pers. comm. Dr Bruno David, Waikato Regional Council, July 2020.

9 Fish Management Plan

9.1 Ambury propose a rule for earthworks requiring an Ecological Rehabilitation and Management Plan that, in some circumstances requires a Fish Management Plan to be prepared. I discuss the specifics of this rule further below. In my opinion, the Fish Management Plan is unlikely to mitigate the effects of development, should the presence of mudfish be confirmed during development of the site.

9.2 Where mitigation is unsuccessful, the proposed Waikato District Plan provides criteria for offsetting effects and requires provisions to address the risk of failure (Appendix 6, section 2[10]).

9.3 Other Waikato Regional Council staff, including Dr Bruno David, have worked with developers in the past to develop mudfish management plans. This recognises the risk of failure for translocation and the importance of monitoring to determine if offset mitigation is required. For example, the following is an extract from a recently issued resource consent that requires a fish management plan and wetland enhancement plan[11].

> "Post wetland enhancement monitoring to assess and address, where necessary:
>
> i. Wetland water levels and extent of wetted marginal areas;
>
> ii. Wetland and riparian planting establishment;
>
> iii. Food source and abundance for relocated black mudfish;
>
> iv. The presence or absence of predatory fish (shortfin eels);
>
> v. The persistence and reproduction of relocated black mudfish using the same monitoring approach detailed in (b).
>
> vi. The monitoring required by (i) – (v) shall be carried out over eight years following enhancement, and the results shall be reported to the Waikato Regional Council by 30 September each year. For black mudfish monitoring (v), this shall include eDNA sampling every year and trapping for the first two consecutive years and every two years thereafter, up to a total of five trapping rounds.

[10] http://districtplan.waidc.govt.nz/pages/plan/Book.aspx?exhibit=pdp01&hid=43024
[11] Resource Consent AUTH139371.01.01 for Rotokauri Development Limited Stage 6 arterial road development, 31 July 2020.

If, following this monitoring, the relocated black mudfish are persisting and reproducing, no further action will be necessary. However, if the relocated black mudfish have not persisted then additional offset mitigation will be necessary in accordance with Condition 10;

The wetland enhancement (offset mitigation) will be deemed to be successful when the number of reads in eDNA samples (standardised by volume filtered) demonstrate an increase in black mudfish reads and is supported by trapping fish length data to demonstrate multiple size classes of black mudfish are present (and therefore reproducing)."

9.4 A rule requiring a Fish Management Plan has been proposed by Ambury as follows:

RD5: 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 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;

…

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;

9.5 My interpretation of "watercourse" in the context of the above provision would include artificial drains. But the term is open to debate. As noted above, suitable mudfish habitat includes artificial watercourses, modified watercourses, and wetlands.

9.6 Given the potential for mudfish to be found on site, in drains and wetland areas, the requirement for a Fish Management Plan should apply to all earthworks subject to the rule. This could be achieved by deleting "If any watercourse is present on the site," from RD5 a) above. This would ensure there is a plan in place, should mudfish be found.

9.7 Given the focus of the RPS[12] on the **protection** of, and the **avoidance** of effects on, the habitat of indigenous fauna, the starting point should be the avoidance

[12] Policy 11.2.

and protection of the habitat. If avoidance is not achievable, then the Fish Management Plan will need to encompass translocation, or habitat off-sets.

9.8 If the proposed development proceeds, the Ohinewai site will be subject to substantial earthworks and filling, in which case avoiding effects on all potential habitat is unlikely to be achieved. However, there may be an opportunity to configure the restoration options shown on the site Masterplan to enable some habitat retention/protection. Requiring this to be considered as a first option is appropriate, in my opinion.

9.9 In configuring restoration options, it would be necessary to consider the areal extent of restoration, in addition to vertical water table dynamics. For example, deep drainage of areas adjacent to the restoration area could decrease throughflow of cool groundwater and render the restored area unsuitable for mudfish.

9.10 If habitat cannot be retained and protected, and translocation is the only viable alternative, then the risk of loss of black mudfish remains for any mudfish inhabiting the proposed development site.

10 Response to the Waikato District Council Officer's report

10.1 The modified watercourses located within the proposed rezoning area are not recognised in the Waikato District Council Officer's report, which describes the farm drains across the site as artificial (section 3.5.5, paragraph 168).

10.2 The Tahuna Drain crosses the eastern side of the Ohinewai property. In my opinion, it qualifies as a modified watercourse under the Waikato Regional Plan, because it connects the lakes and rivers downstream to Lake Ohinewai and its tributaries upstream[13]. Mudfish and other indigenous species may use Tahuna Drain as a corridor between habitat patches (e.g. Whangamarino, Rotokawau, Ohinewai).

11 Conclusions

11.1 Given translocation of mudfish populations is unlikely to succeed, the two options are to avoid loss of habitat effects through habitat protection for this at-risk species, or to accept the risk of failure of translocation if mudfish are encountered at the site during development.

[13] The Waikato Regional Council online drainage map lists Tahuna Drain as a modified watercourse – https://waikatomaps.waikatoregion.govt.nz/Viewer/?map=15b6ef59ffba4d9b9128c70da260bef3

11.2 I support the requirement for a Fish Management Plan, if the development proceeds.

11.3 The Fish Management Plan proposed in the draft provisions should include provisions for long-term monitoring so that habitat offsets can be triggered if translocation fails.

11.4 Changes to the wording of the provisions for earthworks would be required if the Fish Management Plan is intended to apply to habitat for black mudfish, which includes artificial drains and wetlands.

Dr Thomas Wilding
13 August 2020