MEMORANDUM

To: **Independent Hearing Commissioners**

From: **Dr Graham Ussher**

Date: **14 April 2021**

Re: **HUIA REPLACEMENT WATER TREATMENT PLANT (BUN60339273): OFFICER RESPONSE TO EVIDENCE REGARDING ECOLOGICAL COMPENSATION**

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1. This memorandum sets out my reply to the evidence of the applicant and submitters presented at the hearing regarding the Huia Replacement Water Treatment Plant.

2. I prepared a technical memorandum dated 12 December 2019 which is included in the Agenda as Attachment 4. I note in that memorandum that I consider that the proposed Waima Biodiversity Management Area ('Waima BMP area') ecological compensation package will provide enhancements that are at least commensurate with the values proposed to be removed from within the project footprint. I also proposed a number of conditions of consent regarding the Waima BMP Area and these were included in the set of conditions attached to the Agenda as Attachment 10.

3. This memorandum responds to the matters raised by Dr Sarah Flynn (for the Applicant), and Dr Tim Martin and Ms Jaqueline Wairepo (for the Director-General of Conservation; DOC). I also provide comment with respect to the conditions, and those amendments proposed by Ms Karen Baverstock in the conditions set Version 6 (dated 11 April 2021).

4. My qualifications and experience are listed in **Appendix A** to this memorandum.

5. I have been provided with a copy of the Code of Conduct for Expert Witnesses contained in the Environment Court's 2014 Practice Note. I have read and agree to comply with that Code. This evidence is within my area of expertise, except where I state that I am relying upon the specified evidence of another person. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

Waima Biodiversity Management Area

6. In my technical memorandum dated 12 December 2019 I noted that my assessment was based on a revised extent of the Waima BMP area that included an additional agreed area to the east of the previous boundary. That new area would bring the total extent of the Waima BMP area to ca. 1,200 ha (**Attachment B**). The addition of that area was confirmed in a meeting with the Applicant and Applicant's ecologist (written confirmation was provided in a memorandum from the Applicant's ecologist dated 5 July 2019).

7. The ca. 220 ha extension area was requested by Auckland Council's Biosecurity Unit, and I support it. The reasons for requesting a change to the control boundaries was so that the Waima BMP area would encompass all of the Little Muddy Creek catchment, encompass some areas of Regional Parkland, and provide a more logical and defensible boundary to the east for animal pest management.

8. I had expected that the Waima BMP area provided in Dr Flynn's evidence, and the maps shown in the accompanying Pest Management Strategy for the Waima BMP area would reflect this extended area. They do not. I understand that Watercare Services has decided not to expand the Waima BMP into the areas that were agreed at the July 2019 meeting.

9. Therefore, my starting position in preparing this memorandum is that the proposed Waima BMP area is 18 % smaller in area (i.e. a reduction of 216 ha) than I had used in my assessment as reported in my initial officer's report dated 12 December 2019.

10. I do not consider that this smaller area changes my overall conclusions set out in my officer's report dated 12 December 2019. However, by considering only a 990 ha, it does, in my opinion, place a much greater emphasis on the quality of animal and weed pest control undertaken, including setting and achieving target control levels, and committing to the delivery of a programme of effective pest animal control for a minimum duration.

11. It is important that the Panel understands that this is different to the consent holder committing to a minimum duration of pest control (*per se*) in the Waima BMP area – which could be met without necessarily achieving control targets or sustaining effective control for a minimum duration.

Exclusion of effects not avoided under the NPS-FM 2020

12. Since the Hearing for this project was adjourned in March 2020, the National Policy Statement on Freshwater Management 2020 (NPS-FM 2020) has become active (as of 3 September 2020). Provisions in the NSP-FM require that some activities that can have potential adverse effects on 'natural inland wetlands' must be avoided. I am aware that the project area is in close proximity to a natural wetland that most probably meets the NPS-FM definition of 'natural inland wetland'. I am not aware of a specific assessment by the Applicant to assess the site, and areas around the site (within at least 100 m as per the NPS--FM) for 'natural inland wetlands'. Therefore, I do not know if the compensation package proposed by the Applicant is intended to address unavoidable, unmitigated adverse effects on 'natural inland wetlands', which I understand may be prohibited by the NPS-FM or require a separate consent.

13. My assessment of the Applicant's compensation package is therefore based on the assumption that the residual adverse effects arising from the project do not include prohibited adverse effects on 'natural inland wetlands'. Where residual adverse effects on 'natural inland wetlands' may result from this project, I assume that the ecological effects will be addressed elsewhere in the Applicant's submission, or will be included in a revised statement regarding the compensation package and how these effects will be included and specifically addressed.

The benefits of pest animal control

14. Several submitters have commented on the lack of evidence for the need for pest animal control within the proposed Waima BMP area, or they have voiced concerns that pest control may not provide benefits for biodiversity. Dr Flynn and Dr Blackie have provided evidence on these matters and I support their opinions.

15. As these issues are a key consideration in my assessment of the appropriateness of the proposed pest animal control programme, I also offer some additional notes and observations as follows:

    a. Auckland Council has been undertaking pest animal control over Taumatarea Esplanade Reserve, which forms a small part of the coastal fringe of the Waimea BMP area. Monitoring of possums and rats prior to control showed that both were in high numbers (as measured by trap catch and tracking tunnel indices).

    b. Pest animal specialists from Auckland Council's Biosecurity Team visited three of the reserve areas within the proposed Waima BMP area in June 2019 and assessed evidence of pest animal sign in detail. They provided me with a detailed description and photographs of the evidence that they observed, and their opinion of the pest animals present. At each site they noted an abundance of possum sign, including bite marks on kohekohe, scratch marks on kohekohe and totara, and possum foliar browse on various native plants. Their assessment of the bush habitats throughout the sites that they visited was that rat numbers would be in moderate to high numbers. No sign of feral goats, deer or pigs was observed. These findings support the indications of pest abundance recorded by the Applicant in and around the Huia WTP site; they do not support the inference by the Director-General of Conservation (paragraph 13 of Dr Martin's primary evidence) that forests within the Waima BMP area are not being impacted by possums.

    c. I have been involved with native lizard conservation programmes for many years. Many of those involve the control of introduced pest animals to improve habitats or to improve survival and breeding for resident native lizards. I agree with Ms Wairepo (para 8.2 of her evidence) that there is scant empirical evidence of how lizards respond to pest animal control. However, I offer some observations based on my own personal experience which, in my opinion, provide some assurance that control of animal pests is likely to provide benefits to resident lizard populations within the proposed Waima BMP area:

        i. Over several years of lizard monitoring at Tawharanui Open Sanctuary, Auckland (2004 – 2007), I recorded extensive population range expansion and increase in relative abundance of shore skinks (*Oligosoma smithii*) following eradication of animal pests, and suppression of mice. When mice levels subsequently increased, lizard numbers decreased, however populations still maintained an increase over pre-pest control levels.

        ii. I set up monitoring programmes for several species of native skink at Shakespeare Open Sanctuary, Auckland. Catch levels across multiple monitoring lines using pitfall traps were 14 native skinks in 2005 when there was very limited

pest animal control in place. The same monitoring lines were re-assessed recently (2019) in the absence of all pest animals, apart from mice which are still present in high numbers. The catch levels were 234 native skinks across the same habitats and same trap locations, clearly indicating that lizard populations can rebound even in the presence of mice (but absence of other animal pests).

iii. I have undertaken salvage of elegant geckos (*Naultinus elegans*) from regenerating kanuka/ manuka shrubland and mixed forest at Hunua Quarry, Papakura, over the past 11 years. That site has been controlled for the same suite of animal pests since 2009, at a high level of target control, as is proposed for the Waima BMP area. I have not assessed changes in abundance, however, each year of salvage I continue to catch juvenile and sub-adult animals that are less than 2-3 years old. This means that resident geckos are breeding successfully in the presence of low levels of animal pests, and in a situation where mice are not able to be suppressed to low levels.

d. I note that the 15 ha lizard relocation area within the Waima BMP area will receive intensive control of all animal pests, including mice, for a period of no less than 10 years. Given the results recorded above for lizards in the presence of mice, I predict that relocated and resident lizards within the lizard release site will benefit substantially over that period.

Adequacy of the biodiversity compensation package

16. Many submitters have commented on the compensation package proposed by the Applicant, with most disagreeing that the scale and duration will provide a benefit that is commensurate with the level of unavoidable, unmitigated adverse effect within the project footprint.

17. My opinion, expressed in my technical memorandum dated 12 December 2019 is that the benefits will be commensurate, and I stand by that conclusion.

18. I make the following comments in relation to this:

a. I agree with the Applicant that undertaking a package of benefits within the same catchment is preferable to undertaking enhancement works elsewhere in the Waitakere Ranges or elsewhere in the Auckland Region. If revegetation to establish native forest was required instead of enhancement of existing forest, I would assume that the only blocks of available land for revegetation would be located outside of the immediate area of the Waima catchment, and most probably quite distant from the project site. In my opinion, it is preferable to keep biodiversity benefits local.

b. I agree with Dr Blackie (rebuttal evidence, 24 February 2020) that pest control over a wider area for even 10 years is preferable to pest animal control over a much smaller area 'in perpetuity'. New Zealand's forests have been likened to a cathedral without a choir[1], where many of the birds have gone, and many of those remaining are under

[1] Comment by Next Foundation chief executive Bill Kermode.

severe predation pressure from pest animals. This could equally be relevant to lizards, invertebrates and other components of healthy, functioning forest ecosystems. Preventing the loss of this biodiversity over large areas should be an immediate focus, especially given the rapid advances in multi-species pest control that may soon be available. Retaining components of our biodiversity - even in the short term of 10+ years – is preferable to recreating forest while existing biodiversity elsewhere steadily declines.

c. The duration of pest control proposed is not in perpetuity. However, there is no programme that I know of that requires control in perpetuity. To my knowledge, most ecological restoration programmes arising from resource consents assume a duration of 35 years or less, with the implicit assumption that this constitutes a form of 'in perpetuity' management. While I stand by my opinion that the benefits of pest animal control will persist beyond the period of control, I acknowledge that those benefits will be fewer and of a lesser magnitude if pest animal numbers rebound to pre-control levels. In my opinion, that does not invalidate the proposed compensation package, particularly if the peripheral purposes of 'buying time' for biodiversity for future pest control technologies (discussed above) and anticipated benefits for ongoing community engagement (see below) are taken into account.

d. A 10-year programme of control does not qualify this effects management package as an offset – however the Applicant is not claiming that it is such. Ecological compensation spans a spectrum of design quality which may or may not meet characteristics of an ideal biodiversity offset design. Most other effects management programmes that I know of which include pest animal control also include a component of revegetation planting that adds permanence to the package, and which can be used to qualify a package as a biodiversity offset. However, the lack of permanent planting or permanence of pest animal control does not invalid a package as being comprehensive compensation – which is measured by a different standard to offsetting – and which can still deliver extensive and lasting benefits to biodiversity.

e. When considering the scale of compensation proposed by the Applicant, and the likely cost (in their estimate) of undertaking that programme, I have also had regard to the scale of compensation packages elsewhere that rely only upon pest animal and weed control, such as:

    i. The package agreed between Bathurst Resources Ltd and the Department of Conservation for the Escarpment Mine at Westport (2014). That package provided ecological compensation for the loss of values arising from the removal of 45 ha of a threatened vegetation type (coal measures vegetation) overlying coal fields. The ecological compensation package comprised pest animal and weed control over 35,000 ha of beech forest and coal measure vegetation types with a financial package of works costed at $24.5 million. The duration of work is not stipulated – it is for as long as the funding lasts (which will be less than 'in perpetuity'). Even though the 45 ha mine site will be rehabilitated, that was not taken into account when developing the compensation package (DOC and submitters argued that little or no ecological value comparable to that removed would arise from rehabilitation planting at this site)

ii. Consent conditions for the Mt Cass windfarm in Hurunui (2008) require that the loss of 1.3 ha of threatened indigenous limestone shrubland and forest be offset by 35 years of pest animal and weed control over 127 ha of indigenous shrubland and forest nearby.

iii. For both of the above cases, the vegetation removed was of a far greater ecological value - based on the vegetation being a threatened type and supporting multiple threatened and at-risk fauna and pant species) compared to Huia WTP, where the vegetation proposed to be removed is a common type (not Threatened or At Risk) and is relatively young.

19. Apart from benefits within the immediate pest animal control zone, I am also mindful that there will probably be 'spill-over benefits', including benefits to less mobile fauna 200 – 400 m outside of the control zone[2], and most probably greater benefits for the dispersal of birds and some plant seeds to a broader area of the surrounding Waitakere Ranges.

Kauri dieback and the biodiversity compensation package

20. Work to implement the proposed compensation package will most likely require the development of a network of access tracks and probably involve a much greater level of foot traffic over the management area than it currently receives. Increased access to parts of the Waima Pest Control Area catchment and increased foot traffic carries with it an increased risk of accidental spread of soil and the kauri dieback pathogen, within and outside of the site.

21. I have been informed by Auckland Council officers that there are standard protocols that exist and which would be applied to contractors or volunteers working within the Waima Biodiversity Management Area. Those operating protocols will ensure that the risk of spread of Kauri Dieback Disease is minimised.

Pest control targets

22. The Applicant has proposed pest control levels and action thresholds as outlined in Table 7 of the Evidence in Chief of Dr Flynn (reproduced below).

[2] Research undertaken by Landcare Research Ltd at the Ark in the Park project in the northern Waitakere Ranges where monitoring transects installed across pest control boundaries found that at 200–400 m outside of the pest control area, pest numbers are lower and weta numbers were higher than at 600 m beyond the boundary, suggesting that some level of spillover benefit was occurring outside the pest management area (Kararehe Kino - Vertebrate Pest Research; Issue 21; January 2013.

Table 7. Summary of pest monitoring targets. CCI = Chew card index.

Pest species	Management Target	Threshold for initiating additional control	Monitoring frequency
Rats	Rat populations controlled to below 10% CCI, from the start of August to the end of December during the main bird breeding season. Higher abundance (up to 20% CCI) is acceptable for the remainder of the year.	CCI > 10% (August – December) CCI > 20% (January – July)	Three times per year
Possums	Possums controlled to below 10% CCI.	CCI > 20%	Three times per year
Mustelids	Mustelid species controlled to below 5% CCI.	CCI > 10%	Three times per year

23. While I understand the rationale behind the Applicant's choice of Chew Card Index (CCI) to measure control success, I am not convinced that CCI or the targets proposed will provide the assurance necessary that wildlife and pest-vulnerable plants will be able to recover to the extent assumed when predicting biodiversity benefits within the Waima BMP area. I have spoken with pest control experts from Auckland Council, Department of Conservation and private consultants who have extensive experience with CCI and other methods of measuring pest abundance. None support the use of CCI as the only or principal means of assessing pest suppression as a surrogate for biodiversity benefits. The main reason is that there is still insufficient confidence in the CCI method when used on the ground that it is sensitive enough to provide an accurate estimate of pest levels. This is despite the assurances of pilot studies and published literature stated by Dr Blackie in her rebuttal evidence.

24. I have received advice from experts in the organisations listed above, that it is more appropriate to set lower CCI targets and to use proven methods such as RTC and tracking tunnel rates as additional or alternative methods for measuring success.

25. I note that the Applicant has since revised the pest animal control targets and monitoring methods to be applied in the proposed set of resource consent conditions so they reflect the points outlined above. I have reviewed the revised targets and methods proposed by the Applicant in Condition 94, and I agree with these.

Proposed conditions

26. In previous versions of the resource consent condition set, the Applicant has sought to make outcomes of the Waima BMP programme 'objectives' rather than 'requirements' (Condition 92). In my opinion, the use of 'objectives' removes the absolute certainty that the Waima BMP programme will deliver successes that will result in good biodiversity outcomes, and instead potentially diminishes the value of the programme to a 'best endeavours' exercise, rather than a guarantee to deliver. This is at odds with requirements to provide proof of quality and completion for aspects of geotechnical and engineering works on the project.

27. In the latest version of the conditions set (version 6), I note that the Applicant has separated out elements of ‘objectives’ and ‘requirements’. I support this change, and it satisfies my concerns raised above.

28. I agree with changes proposed by the Applicant to Conditions 93 and 94 (which now show as agreed changes in version 6 of the condition set), which provide greater assurance around a sustained delivery of a high standard of animal pest control. I support those changes, and I support the proposed conditions as worded.

29. I also support the addition of a contingency clause if monitoring shows that pest animal control targets set out in the conditions are not being met. Condition 95, 96 and 97 provide an appropriate level of assurance that commensurate biodiversity benefits will be provided with regard to animal pest control should targets within the Waima BMP area not be achieved.

30. In Condition 98, the Applicant has sought certification of the WBMP. While the draft WBMP is at an advanced stage of development, there may be changes that need to be made to the document at the time that the works commence. If the works commence several years in the future, changes to approach and methods applied within the management area may be required, and may be beneficial to the programme.

31. Therefore, my preference is for Council to retain the ability to engage further on reviews and possible updates of this document as the ecological compensation programme is finalised. In my view, this would be best achieved by requiring (at Condition 98) ‘written approval’ from Council, rather than ‘certification’.

Dr Graham Ussher

14 April 2021

Appendix A

Qualifications and Experience of Dr Graham Ussher.

1. My name is Graham Thomas Ussher. I am a Restoration Ecologist and Director of RMA Ecology Limited, a company specialising in ecological effects assessment and management.

2. I hold the qualifications of Bachelor of Science (Zoology; 1993), Master of Science (Conservation Ecology; 1995) and Doctor of Philosophy (Conservation Management; 2000) from the University of Auckland, New Zealand.

3. I have 25 years' experience in environmental research and consulting with a particular focus on land-based ecology and methods for providing improvements to indigenous biodiversity. My experience includes managing and providing technical inputs into programmes to map patterns of vegetation and species distribution, classify and assess the significance of ecological values, identify impacts and develop solutions to avoid or manage adverse effects on natural environments, and monitor species, habitats and regional patterns of ecological health.

4. I have previously been employed as a Principal Ecologist at Tonkin & Taylor Ltd, Environmental and Engineering consultants, Auckland (2007 – 2016) where I was a senior-level ecologist and helped lead the Ecology Team. Over my period of employment at Tonkin & Taylor Ltd, I managed, undertook fieldwork, reported on or reviewed in excess of 120 projects involving ecological effects assessments, management and ecological mitigation/ restoration on projects in New Zealand spanning small to large scale of effects, and covering all aspects of land use. Prior to that I was employed as a lecturer in Environmental Science at the University of Auckland (2000 – 2003) and as Regional Ecologist for the (former) Auckland Regional Council (2003 – 2007), with a focus on projects that managed species and ecosystems, and the restoration of Auckland coastal parklands.

5. My experience that is directly relevant to this application is listed below. Broader relevant experience is summarised in the following section.
    - DOC biodiversity offsets research programme. Science advisor to multi-agency research programme 2010-2012, which culminated in the development of the guidance document 'Guidance on good practice offsetting in New Zealand' produced by MfE and DOC, 2014.
    - National guidance on biodiversity offsetting; NZ Transport Agency; 2016-2017. Lead author and researcher for the development of national guidance to the Agency on the application of biodiversity offsetting to roading projects in New Zealand.
    - Local Government guidance on biodiversity offsetting; 2017 - 2019. Ecology technical advisor as part of 5-specialist, multi-disciplinary team that prepared national guidance on biodiversity offsetting and ecological compensation for the Regional Bio-managers Group. Contributor to the guidance document 'Biodiversity offsetting under the Resource Management Act; September 2018'. Co-presenter for 14-city workshop programme to socialise report findings amongst regulatory authorities and practitioners (2019).
    - Escarpment Mine, Buller Coal/ Bathurst Resources, 2012–2014. Technical specialist offset programme designer, including model development, offset/ compensation programme design and presentation of expert evidence to the Environment Court for the 80 ha open-cast coal mine on the Denniston Plateau.

- Te Kuha Mine, Westport, Buller District Council, 2016 – ongoing. Peer reviewer to Buller District Council on terrestrial ecology matters for consent applications by Stevenson Mining Ltd to develop and operate a 120 ha open cast coal mine in unmodified native ecosystems at the southern Mt William Range, Te Kuha, Westport. Attendance at hearing; party to Environment Court Appeal. Emphasis on ecological compensation package assessment.

6. Experience of broader relevance, including ecological assessment, survey, impact assessment, development of conditions of resource consent, monitoring programmes, and compliance assessment and reporting.

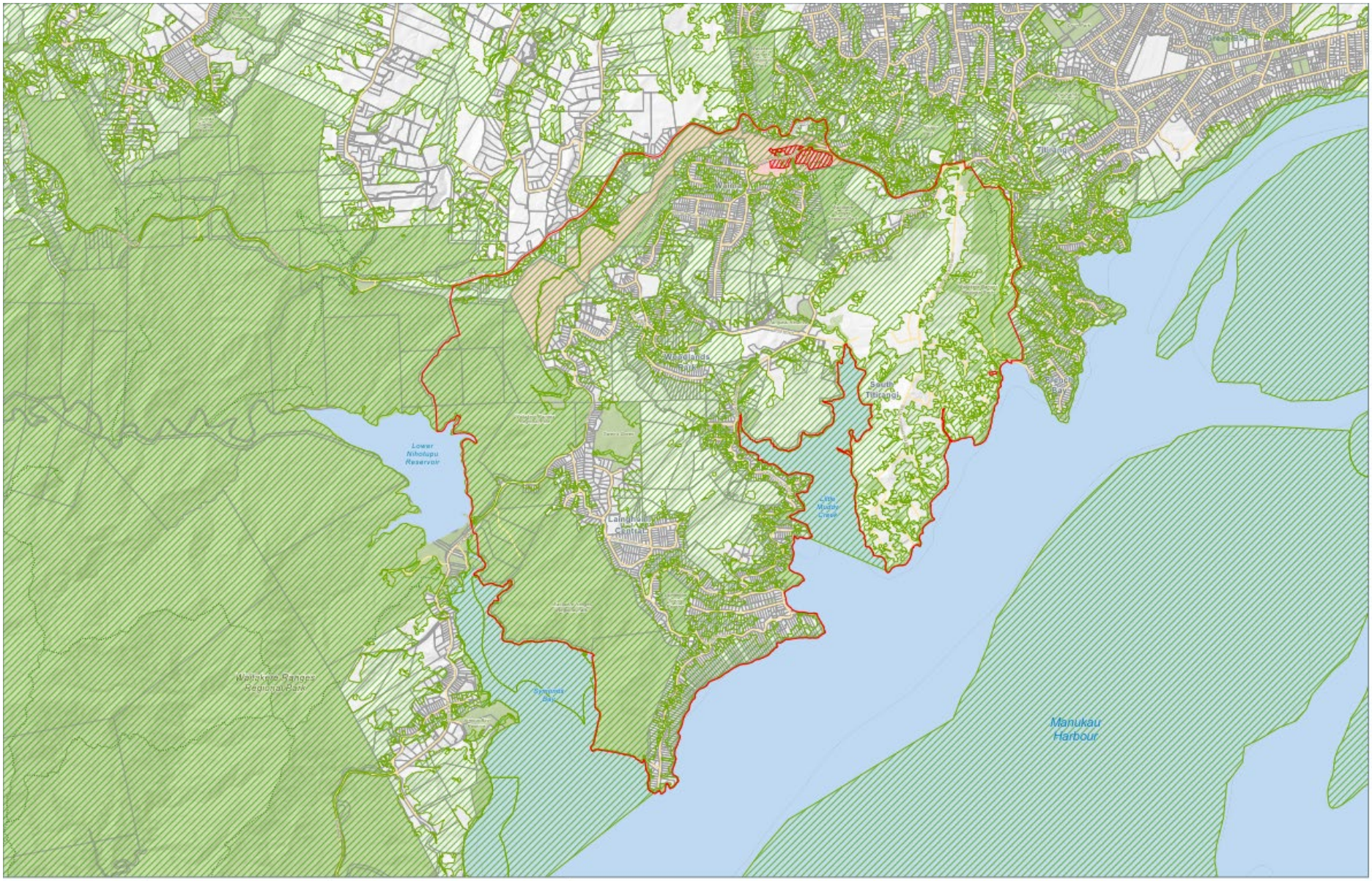
- Ecological impact assessments, technical reporting, and input into conditions of consent – for at least 250 projects (including at least 100 in the last 4 years).

- Various revegetation and biodiversity management plans as part of consented land development and infrastructure works (at least 80 projects), including revegetation of shrubland and forest plant communities, rare species inclusion in planting plans, managing site risks and constraints for plant community persistence, lizard relocation, fish salvage, fish passage and stream diversion design. Sectors include Auckland coastal property rehabilitations, commercial developments, subdivisions, infrastructure and industrial site rehabilitations. Outside Auckland projects include major hydro and irrigation/ water supply dams, national highways, wind farms, port development, quarries and mines, and landfills (new and rehabilitated).

- Auckland land development projects. 2015 – present. Lead ecologist for baseline ecological values assessments, assessments of effects, offset and compensation programme development, expert representation for clients at Council hearings and development of site ecological management and planting plans (where necessary). Project involvement includes substantial subdivisions such as: Chin Hill (Hatfield's Beach), Auranga A (Drury), Auranga B (Drury), Oraha Rd SHA, Bollard Ave SHA (Mt Albert), Oakland Road (Hingaia), McRobbie Road (Kingseat), Kingseat Hospital site (Kingseat), Stables Retirement Village (Drury), Mangere HNZ/HCL State Housing Redevelopment Project, Milldale housing development, Millwater Housing development.

Appendix B

Revised Waima BMP area as proposed by Council, July 2019.



Boffa Miskell
www.boffamiskell.co.nz

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Data Sources: Boffa Miskell, LINZ, Auckland Council

Projection: NZGD 2000 New Zealand Transverse Mercator

Legend

- Proposed Pest Management Area (1,206.3 ha)
- Extent of Construction Footprint
- Watercare Designation (57.7 ha)
- Significant Ecological Areas (859.2 ha within Area)
- Public Open Space (370.3 ha within Area)

A16055C Huia WTP Ecology Assessment of Effects

WBI Area – Council Version

Date: 08 August 2019 | Revision: 0

Plan prepared by Boffa Miskell Limited

Project Manager: **Ian.Boothroyd@boffamiskell.co.nz** | *Drawn:* ATy | *Checked:* SFI