IRD 119 841 372
1 Brisbane Street, Sydenham,
Christchurch 8023 NZ
Phone +64 (0) 3 366 9671
Email nzclient@epiqglobal.com

Event:	Weston Lea RMA Hearing Excerpts
Date:	3 May 2019
Audio Recording:	"Weston Lea RMA Hearing – 3 May 2019 9am – 12:30pm" – transcribed from start to 01:53:12
Before:	Commissioner Wasley (Chair) Commissioner Lovell Commissioner Knott
Witnesses:	Mr Kieran Miller - freshwater ecology Andrew Blayney - terrestrial ecology Georgia Cummings - bat ecology Dr Sarah Flynn - ecology

COMMISSIONER WASLEY: Two more witnesses this morning, if we hear from, in terms of your first witness in respect of fresh water ecology, and then we'll ask some questions; the same in terms of terrestrial ecology. But when we get to bat ecology we'll hear from both the witnesses and then we'll ask questions.

MR MAKGILL: But, sir, the suggestion was to have the terrestrial ecologist sit with the bat ecologist because there is an overlap between the vegetation management rationale that is put in place and how that will respond over time versus how bats operate in that environment, which is why I suggested the three of them together.

COMMISSIONER WASLEY: Okay, we are happy with that. That is fine.

MR MAKGILL: Thank you.

COMMISSIONER WASLEY: Over to you.

MR MAKGILL: Thank you, sir. I would like to call Kieran Miller, freshwater ecologist.

COMMISSIONER MILLER: So my name is Kieran Miller, I'm a freshwater ecologist for Boffa Miskell and I will just provide a brief overview of the summary of my evidence.

So the proposed development site contains 13 watercourses of varying size. The majority of the watercourses consist of negligible to low ecological value; this is based on high modification and limited in-stream habitat, limited riparian protection, and limited connectivity. However, there is one reach within the main valley that I consider to have moderate ecological value.

The effects of freshwater ecology from the proposed development include watercourse loss and modification, the erosion and sedimentation and discharge of storm-water. The assessed level of effects on freshwater ecology values to be very low and low.

Recommended mitigation for adverse effects, which include perennial and intermittent stream enhancement as well as creating a new stream habitat. Other recommendations include erosion and sediment controls and then sediment treatment as well as native fish salvage.

I understand there were no fish issues raised within the section 42A report or in the evidence of submitters that is relevant to freshwater ecology.

I am happy to answer any questions.

COMMISSIONER WASLEY: Okay, thank you. Commissioner Lovell.

COMMISSIONER LOVELL: I just wanted to ask if you had any involvement with the pipeline?

COMMISSIONER MILLER: No.

COMMISSIONER LOVELL: I have no other ...

COMMISSIONER WASLEY: Commissioner Knott.

COMMISSIONER KNOTT: No, the evidence is clear, so that is fine, thank you.

COMMISSIONER WASLEY: I do not have any questions either, so thank you, Mr Miller.

COMMISSIONER WASLEY: You can go and enjoy the rest of your day. Mr Makgill.

MR MAKGILL: Thank you, sir. I would now like to call Andrew Blayney, terrestrial ecology, Georgia Cummings, bat ecology, and Dr Sarah Flynn, who will address overall ecological function.

MR BLAYNEY: Good morning, I am Andrew Blayney; I'm a terrestrial ecologist for Boffa. The scope of my evidence in-chief was around terrestrial vegetation, herpetofauna and avifauna. My intention at the moment is to summarise the evidence in-chief and then go through and look at more detail of my evidence in reply. Happy to receive questions afterwards.

So the assessment methodology that we carried out included desktop analysis and site investigations. We followed best practice guidelines developed by the Ecological Institute of Australia and New Zealand. The development area's ecological context includes two previously identified SNA sites, which are on the western bank of the Waikato River and there are also several others in the area.

The site's only high-value vegetation occurs along the Waikato river bank, which is significant kanuka and some other mixes. There are predominantly low herpetological ecological value across the site, the only native lizard likely to be on the site is the copper skink. The avifauna habitat along the Waikato River does have medium to high value because of some at-risk shag species that we believe are nesting there.

The assessed ecological impact assessed that most of the native vegetation of value, including the vegetation that was primarily of value to both birds and lizards, were going to be avoided by the development.

We recommended several opportunities for increasing ecological value within the proposed development and we've also recommended they manage direct and indirect effects on that fauna.

I have provided a response to submissions, which I won't go through point by point. I don't consider that there are any points of contention between me and Mr Kessels in his section 42A report. I have responded to several recommended changes within the conditions proposed by the section 42A report.

I will move through my evidence in reply section by section and I do acknowledge that in my discussions and my evidence in reply there is some crossover into bat ecology, I will defer the technical matters around that to Ms Cummings, but it seems to be quite important to give the context around that.

So I'll start at about paragraph 8 where I describe the ecological context within terrestrial ecological effects assessment and that aligns well with Clarkson's descriptions. We have also identified opportunities for restoration, however we also caution applying generic or wide-scale restoration methods such as large-scale removal of vegetation along the river, non-native vegetation that is, because of the habitat value of this vegetation for native fauna.

Our ecological assessment approach, as I mentioned in evidence in-chief, does follow standard guidelines and we consider it very important to identify the effects and components of the ecology that are affected by our project and this directly relates to the goals and outcomes of the mitigation. The mitigation approach that we've detailed is very targeted and is targeted towards these effects that we've assessed.

There have been several submitters, primarily Dr Clarkson, who propose a mitigation approach that aligns with best practice for restoration of forest ecosystems. I agree that Dr Clarkson does set out a best practice approach and these methods of mitigation are appropriate when the goals of the mitigation are to establish forest ecosystems. However, some of the areas on the project site don't have the goal of establishing forest ecosystems, they have a more targeted and narrower scope, which is to establish vegetation that has immediate or is quick as possible value for long-tailed bats and creating features such as edge habitat that bats prefer.

In my opinion, if we were to contiguously plant many areas of the riparian zone around the project, we would in effect push the edge habitat that is available for the bats closer and closer to the urban and road edge, because the only edge that would be available is in the interface area. Our mitigation is aimed at creating what we and Ms Cummings referred to as internal hedges, which are buffered and protected from urbanisation and associated disturbance.

We do go on agree that, where we have the goals of establishing forest ecosystems, that we do follow best practice

methods as outlined by Dr Clarkson. There has been some questions about the maintenance of the meadow or exotic tree land. I don't consider these will be difficult to maintain and this type of land cover is very common in the wider landscape on both private and public land.

There has been questions about buffering function of vegetation and Dr Clarkson outlines that this can take 20 to 25 years. This is true in regards to the buffering of forest ecosystems where they have a greater need for density and buffering for humidity, light, wind and other factors. However, the buffering that we have proposed is a very simple and structural function that blocks light and noise and as such I do not consider that it would take 20 to 25 years for this function to be equipped.

Dr Clarkson also has some questions or concerns around the additionality of the mitigation proposed. However, based on the definition put forward I don't consider that there is any uncertainty of the mitigation if the proposed development did not go ahead, the proposed mitigation of the vegetation of the river margins and gully would also not go ahead.

There has also been concern around the catering of the southern gully or several people have called it the major gully, but it's the gully that isolates the main site from the island. There is no trade-off between protecting the north/south shelterbelt or the riparian zone, there is a proposal to re-vegetate that entire valley to the edge of the summit.

I also consider that the land form within this gully is similar to that of Hammond Park will similarly limit the intrusion of human impacts.

Regarding the open space framework document, there have been questions by Dr Clarkson around what concepts underpin that document and I consider that that document illustrates the area or the extent of the mitigation and some conceptual ideas around what that mitigation could look like. It's not a developed or completely finished ecological management or monitoring plan that is proposed as a condition for the project. The concerns around surrounding tall trees not being included or removed inappropriately within the vegetation is addressed also within EMMP.

The species list presented within the open space framework is also a conceptual list and not exhaustive in nature. I have

provided an annexure A to this evidence to demonstrate a draft list that's being developed for the area that further details the approach.

A minor correction to Dr Clarkson's evidence where he refers to 0.18 hectares of SNA being removed. This is incorrect and I referred to paragraphs 40 and 68 of my evidence in-chief but broadly the clearance is limited to 0.0019 hectares of vegetation and this is for a temporary period of time and it will be reinstated with buffer vegetation.

I responded to the conditions, I won't go point by point, however I agree with Dr Clarkson's desired outcomes for the conditions and I have gone through and pointed out where these have been accommodated within the current condition set.

In response to the evidence of Dr Stirnemann, many of the issues raised by Dr Stirnemann are analogous to concerns of Dr Clarkson and I won't refer to them again, however there has been some concerns aligned with an abundance of invertebrates and I will respond to that in general.

The response of invertebrate communities to vegetative diversity is generally an increase in invertebrate taxon

diversity. However, it's not necessarily the case that that would relate to an increase in abundance, and often areas of low plant diversity or areas that are in earlier successional stages have much higher invertebrate abundance. It is my understanding that abundance rather than diversity is key to the foraging success of long-tailed bats as they are opportunistic and generalist foragers. There was also evidence that they switch their prey choice depending on habitat, which would also support this.

Given the nature of how invertebrate communities respond to vegetation, I don't consider that the invertebrate prey abundance would rely on the establishment of a large amount of native vegetation. The key objective for the mitigation proposed is the creation of a habitat that provides invertebrates as a food source rather than restoration of invertebrate communities per se.

We almost must consider that insects must come into an area from somewhere and colonise from somewhere. The Amberfield development site is surrounded by an agricultural environment and watered by the river and the proposed bat foraging areas are already vegetated by exotic grasses and herbs, which as mentioned earlier may have low invertebrate species diversity

but will have high insect abundance. Therefore, they are a productive source of invertebrate prey. We also have the advantage of being able to retain vegetation within the meadows rather than trying to replace it and therefore maintaining the invertebrate prey communities already present.

Conventional forest ecosystem restoration could have a detrimental effect on invertebrate abundance over time compared to the proposed maintenance and expansion of the edge environment. Therefore I consider the statement from Dr Stirnemann's evidence in paragraph 8.4 that the size of the buffer is also critical for maximising invertebrate abundance is not supported.

There has been some concern around the invasion by paper wasps, Polistes, however the predation rates on vertebrates within shrubby communities is similar to the predation rates of German or common wasps in pasture environments and these genus of wasps also preferentially target large invertebrates, which is my understanding is not the same invertebrates that are preferred by long-tailed bats, which target smaller invertebrates.

I also have a correction to Ms Pryde's evidence where she refers to a low value of vegetation in the ecological assessment and that is specifically botanical value and the ecological assessment does clarify and point out that that reflects only the ecological value related to the vegetation and does also point out that the wider value is the habitat that is also considered in the final sections. The TEEA evaluates the habitats onsite with regards to that as very high following EIANZ guidelines.

COMMISSIONER WASLEY: Questions, Commissioner Knott? Sorry, no, we were going to ... So we will move along to hearing from Ms Cummings.

MR MAKGILL: Thank you, sir.

COMMISSIONER WASLEY: Welcome.

MS CUMMINGS: Hi, my name is Georgia Cummings and I am a bat specialist and also work for Boffa Miskell. So if the panel is happy I will just give a summary of my evidence in-chief and also of my statement in reply.

I will start with the context of the site and in relation to the long-tailed bat population. So the site is directly adjacent to the Waikato River, which is an important foraging dispersal corridor for bats. It is located between other key landscape features; these include the Hammond Bush and the Manganoa Valley to the east and the Mangakotukutuku Gully to the west. And it is the location of development site relative to these habitats that have previously been identified as core habitats for the population. That means that one of the more efficient dispersal routes to get from Hammond Bush to the west, to Mangakotukutuku Valley or the middle reaches of that gully are through the project site. But there is evidence to say that the project site itself is core for the bat population as a whole.

As has been talked about at length yesterday, the site itself sits within the Peacocke Structure Plan, which is zoned for residential development, and we have worked to make sure that the mitigation proposed can be integrated with future developments and this is being done to minimise as far as possible the cumulative effects.

I'll also discuss long-tailed bat ecology and give an overview of that and citywide studies in Hamilton have suggested

that long-tailed bats are sensitive to anthropogenic disturbance and this is largely related to studies that have shown that there seems to be decreasing activity around highly-urbanised areas of the city.

I also discuss roosting and foraging and dispersal behaviour and indicate that all evidence shows that long-tailed bats are edge specialists, they are adapted -- their wing morphology and their ecomorphological structure to preferentially use edges and gaps and they're not well suited to moving through cluttered environments.

I also discuss roosting and that there are different roost characteristics that bats use at different parts of their life cycle, particularly breeding and female bats.

I give a quick overview of my survey assessment methodology, I used acoustic recorders along representative features across the site and I also surveyed the margin as well as a series of shelterbelts that extend east beyond the site that provide a continuous vegetative corridor between the Waikato River and the Mangakotukutuku Valley to the west.

As with Mr Blayney, I used the EIANZ best practice guidelines for my ecological -- for my assessment on long-tailed bats.

In terms of the values of the site for long-tailed bats, bats were recorded across all representative features including open pasture, however there were notable differences in the level of activity between features and the highest activity was recorded along the shelterbelt that extends east/west through the proposed site and also the Waikato River margin.

This led to the conclusion that the open pasture, as is supported by other readings on long-tailed bats, is of low value to the bats and we also found that the roots of ornamental trees in the minor gully were used but they were used to a lesser extent and the high-value features that I have identified are the east/west shelterbelt, the riparian margin primarily at the point because it buffers the Waikato River, which is a key feature, and the minor gully or the southern gully because of its restoration potential because at the moment it seems that the low activity in this area is likely to be due to the fact that it is not fully connected to the vegetative feature.

I assess the effects of the proposed development on long-tailed bats; a key potential effect would be disturbance to the Waikato River, which could set a key community in the corridor, but I consider this has been avoided through mitigation.

There is also a potential fragmentation of this linkage that I discussed, this is also being avoided. There is also a physical removal of a small amount of its oak trees on the site and potential for short-term functional removal of the habitat being retained upon the site and this is due to potential disturbance of the adjacent development.

Now, I do not consider that the removal of open pasture will have an adverse effect on bats and this is because the key habitat features are generally being planned and enhanced and the key riparian corridor across the site is being retained.

The proposed mitigation includes extensive planting in the northeastern terrace and this has been simply provided or designed in order to create long-tailed bat habitat. Also, extending and buffering the existing riparian margin to avoid impacts on the Waikato River and allow continued use of the inland end of the margin, of the vegetation. Also full re-

vegetation of the minor gully and southern end of the site and retention and buffering of the east/west shelterbelt.

I consider that the time lag between the buffer planting becoming effective has been minimised through conditions including the development of key lots adjacent to the habitat as well as lighting regime conditions and early planting.

For mitigation, the citywide surveys have indicated that bats are sensitive to urbanisation and avoid more-developed areas of Hamilton but recent radio telemetry surveys have shown that bats are extensively using spaces within areas surrounded by residential housing and it seems that these areas are being used because they have connectivity to the Mangakotukutuku Gully and the Waikato River and I am confident that our proposed mitigation will be used by bats for this reason.

I outlined the issues raised in the submissions and I consider that most of these issues have been addressed through updates to the proposed development since original lodgement and the key event here being the retention of the connectivity east/west through the site and an additional foraging habitat being created directly opposite Hammond Bush.

Then in terms of issues raised in the section 42A report, the key issue raised by Mr Kessels is the consideration of the time lag between effects and mitigation and he believes that residual effects remain because that should be offset or compensated. I disagree and consider that the short-term effects within the site have been managed through the lighting conditions, lot deferral and buffer planting conditions and I consider the timeframe between the proposed restoration areas becoming viable is mitigated through the quantum of these restriction areas compared to the habitat being removed on the site.

I also agree with Mr Kessels that when a solitary roost has been confirmed within the site or a roost used by a male bat has been confirmed in the site that replacement roost habitat should be installed and planted.

I'll just start with a summary of my evidence in reply. To begin with I assessed the risk of maternity roosts being removed as part of the proposed development and I consider that the information available is sufficient to conclude that there is a low likelihood of the footprint containing maternity roosts. And I also discussed my concerns with a hard-line approach requiring the avoidance of every mature tree in the landscape,

given that long-tailed bats are generally using the landscape, and this is because under the current planning rules in the land use they are not protected and this could undermine collaborative efforts to conserve bats in the wider landscape.

I also discuss in more detail issues raised about insufficient survey effort to provide certainty around the effects on long-tailed bats. And I discuss that acoustic surveys are an accepted survey method and that I targeted all habitats on the site and given the mobility of the long-tailed bats I did not consider it necessary to survey every piece of habitat on the site and targeted representative habitats across the site.

I also know that, as far as I'm aware, there are only two developments that have used radio telemetry as an alternative method to ascertain effects on long-tailed bats and these were large infrastructure projects, one being the southern links project, which is discussed by myself and submitters, and also the Mount Messenger bypass in Taranaki. I consider that both of these projects have significantly more effect than the current development.

I also discuss the proposed requirement for a 100-metre setback from the river margin, which has been raised by Mr Kessels and one of the submitters. I do not consider that research cited supports this assertion.

I consider that the buffer height proposed is sufficient to allow continued use of key features that are retained on the site and I do not think the recommendation for the buffer planting to be 15 metres high prior to the development is justified and this is particularly considering that potential light sources will be lower than this height.

I note that the majority of mitigation measures put forward by Dr Borkin in her evidence in-chief to minimise the potential effects of the development have already been offered by the applicant and I consider that the lot deferral condition provides sufficient certainty that the plantings will provide adequate buffering to light and noise before disturbance is introduced to the adjacent key features on the site.

I support Ms Pryde's recommendation for the monitoring to be statistically robust and include the monitoring of light levels. Although with my alterations I consider that the maximum lux level of 0.1 put forward by Dr Borkin and Ms Pryde

does not relate to specific information that we have on long-tailed bats and a slightly higher lux level is more appropriate. That's discussed in my EIR.

I also agree to the key -- sorry, to the key adaptations of long-tailed bats in support of Mr Blayney's evidence around the features that we are trying to provide through the proposed mitigation planting. And I state in paragraph 47 that long-tailed bats are edge specialists, their wing morphology and structure of their echolocation calls are adapted for foraging along edges and gaps. This behaviour has been demonstrated in both modified and unmodified habitats. In old growth forest of the Eglington Valley, Fiordland, for example, long-tailed bats are found to be most active along the forest edge and along roads through the forest. This is also demonstrated in work that is being carried out in Hamilton.

Given these habitat preferences and the fact that long-tailed bats are a highly-adaptive species, I consider that there is a high level of certainty that bats will use the habitat provided through the mitigation once it is established and this is quickly given the level of connectivity of the site to the wider area.

I disagree with Dr Borkin's suggestion that research undertaken on population-level effects associated with clear felling in plantation forestry can be appropriately applied to the proposed development. This is given the small amount of potential roost habitat being removed is not relevant.

I discuss the potential cumulative effects of the development of the structure plan as a whole and talk through how mitigation and monitoring put forward is designed to integrate with work already undertaken as part of the southern links project and also provide the start of a network of enhanced habitat that future developers can be directed, through the resource consent process, to build upon, which will provide continued connectivity to key habitats across the southern Hamilton landscape.

I agree that large-scale predator control is beneficial for the long-tailed bat populations but I consider that, in the absence of such ongoing co-ordinated large-scale control, habitat protection of identified roosts and is a more appropriate response to protect bats potentially roosting on the site and local-scale pest control. Thank you.

COMMISSIONER WASLEY: Thank you, Ms Cummings. Let us now turn to Dr Flynn.

DR FLYNN: Good morning. My name is Sarah Flynn and I'm a senior ecologist with expertise in vegetation ecology, ecological effects assessment and restoration management.

For an overview of my evidence, I will refer to paragraph 10 of my statement. So my evidence addresses four main points, which is distinguishing between assessment of ecological value, assessing the importance of each value and assessing the significance. The question of the mitigation hierarchy and how it should be applied and how relevant prioritisation of effects is to the application of mitigation hierarchy. I also talk about management of uncertainty and distinctions between uncertainty when predicting the future outcomes versus general uncertainty or lack of confidence. And I also comment on proposed conditions in my statement but I don't think I'll go much further than to say I support the conditions as put forward and in my opinion they'll be effective.

I'll just step through my summary, just to cover off some of those points that I've raised. So with regard to the

significance of ecological features and how the project provides for the protection of them, in my opinion the project does provide for the protection of ecologically significant features appropriately because the features that contribute to the significance are retained, enhanced and permanently protected. And as Ms Cummings has discussed, the key is to help facilitate landscape-wide habitat networks and that's an important benefit of the project.

So I consider that the "mitigation hierarchy" has been appropriately implemented in order to achieve the best ecological outcome, for bats as well as other ecological features. In terms of the notion of applying avoidance until you start getting diminishing returns from avoiding and then address effects where you can achieve better outcomes than avoidance can.

Then we go down to management of uncertainty, I am confident that the proposed consent conditions ensure a low likelihood of adverse effects arising through failure of mitigation. As I discuss in my statement, there will always be some variability between predicted and actual timeframes and outcomes, but these are dealt with through adaptive management and that's an appropriate strategy because we simply don't have

a crystal ball, we can't see into the future, so we provide an adaptive management strategy in order to address that.

I do not accept that any of the ecological enhancements proposed could be termed "experimental: as a pejorative term. The proposed habitat enhancement closely replicates cultural landscape features such as the existing riparian vegetation, hedgerows and shelterbelts, that bats are currently using. As Mr Blayney has alluded to, these features are not difficult to establish or maintain and the performance measures are direct and easy to implement.

So with regard to conditions, as I mentioned, I consider the conditions are appropriate and Ms Cummings has referred to that I do discuss my evidence, the issue of effective implementation of predator control and the need for that to be connected, co-ordinated and large-scale, and the issue of protected local-scale predator control being ineffective and so the strategy that Ms Cummings proposes, which is to protect -- restore and protect roosts and enrich the habitat is a more strategic approach for the time being. I do consider that the application of the project will enable, through adaptive management, future predator control as part of that large-scale response, it creates a framework for undertaking appropriate

predator control in large areas, so it's not excluding the opportunity to do that in the future; that creates an opportunity for managing a target towards higher reactions(?).

So on the basis of these points, I do not consider there is any basis for requiring an offset or compensation package on the basis of any residual effects on bats.

COMMISSIONER WASLEY: Thank you. Questions, Commissioner Knott?

COMMISSIONER KNOTT: Thank you. I think you may have to bear with me a little in that my A-level biology 35 years ago has not helped an awful lot in this, so I am trying to take this back to the basics as I see it, so in terms of the significance of the site to bats, it seems from what I have read, and I will sort of make a statement I guess and tell me whether I am wrong, it seems that it is more important to bats passing through and along the boundaries of the site, ie along the river and along the shelterbelt, that seems to be much more important than bats roosting on the site because there seem to be very few instances where bats perhaps have been found roosting there. Is that fair to say?

MS CUMMINGS: Yes, I agree with that.

COMMISSIONER KNOTT: And so I think probably I have read there is three instances of locations where bats have been found roosting on the site and in terms of your knowledge of the wider area, again I have read that these bats travel an extensive area, so therefore their habitat is large, I presume that within the other locations you have spoken of there is significantly greater numbers of roosts relative to what we see amongst the site?

MS CUMMINGS: Yes, based on radio telemetry work that has been done, there are particular areas of Hamilton that seem to be core habitats in providing maternity roost sites, which are a key habitat feature for the population and this is where the female bats congregate during the breeding season and they have specific thermal characteristics because it is a very energy-expensive time for female bats. Whereas on the site we have identified, or the southern links project radio telemetry work has identified a single male bat roosting at three different trees within the site. It is discussed in Dr Borkin's evidence that because male bats generally roost solitarily and really all they need is shelter within its roost and thermal acquiring, but they do sometimes move into communal roosts but I do not

consider any of the evidence demonstrates that the roosts that we're using can't potentially be communal roosts.

COMMISSIONER KNOTT: So moving on from that, so we have a single male bat who has been roosting in three trees, I do not know how large the population of bats is, I suppose that is another question, how many bats are we talking about in terms of is it a community or whatever it is called, how many bats are we talking about that we believe, not use the site, but the bats that use the site that are part of a wider group I guess, how many bats are we talking about?

MS CUMMINGS: That is a very good thing to find.

COMMISSIONER KNOTT: Any guess?

MS CUMMINGS: Dr Borkin has stated in her evidence, she has been part of the southern links project, that the minimum number, a live estimate is 61 bats.

COMMISSIONER WASLEY: Just on that, but in what general locality?

MS CUMMINGS: Yes, so that is probably the Hamilton population, which uses that southern Hamilton area, so including Sandford Park and areas that are urbanised and Hammond Bush and also through the Manganoa Valley, the Mangakotukutuku Gully and further south towards the airport and the Narrows area, if you know that area.

Mr Makgill: So this area, but this is the whole of the area.

MS CUMMINGS: Okay, if you refer to my evidence, annexure A, so this shows all of the bats at the southern (overspeaking) population and the Enfield site we can probably locate along the river in the northern -- currently where the bats are tracked in there, and I also say that this is one colony, it might be a bigger population, so there are bats in Cambridge and the east of the site.

Mr Makgill: I know there is a number of other ecologists in the room and they probably will hear what you are saying, do you mind if we just pause and bring the pictures up? I just think that is fair.

COMMISSIONER WASLEY: Just while that is happening, I would certainly also be interested in terms of the commentary in terms

of bat populations heading north and obviously along the Waikato River corridor.

MS CUMMINGS: So this is a map that has been provided by ACON as part of the southern links project and so this identifies the home ranges of all the bats tracked to date and that's four radio telemetry sessions over two years. So the coloured-in parts are the core areas of individual bats and you can see the overlap, I think this is 24 bats in total, and you can see areas of overlap between where multiple bats are using the same area. And so it does a good job of identifying key landscape features and just so everyone is aware that is our site there. And there are two bats that have core habitat as identified in the radio telemetry studies generally associated with the adjacent Waikato River and Hammond Bush, which is through here. But they do cover part of the northeastern terrace and one of these bats is one of the bats that was confirmed roosting on site.

So that is kind of a rough -- obviously some sub-sample of the population, but that seems to be the general area that they are covering, so extends quite far south, but does not extend north into the highly urbanised area of Hamilton. But this area here, which includes a maternity roost and seems to be well used by multiple bats, that is Sanford Park, which is surrounded on

all sides, it's connected to the Mangakotukutuku Gully, but it's also surrounded by residential housing and parts further through the gully are also used. So connectivity via gullies and via the Waikato River seems to be key for bats being able to move through the urban landscape and access these areas.

COMMISSIONER KNOTT: So in terms of heading north along the river, are there bat populations beyond what is shown on the screen?

MS CUMMINGS: Not within Hamilton city.

COMMISSIONER KNOTT: But there are some towards Cambridge?

MS CUMMINGS: Yes, so there's to the east of Cambridge there are bush patches that have bats confirmed and I'm not sure if bats are in Cambridge itself. There are also populations north of Hamilton.

COMMISSIONER KNOTT: So where they roost, do they continue going back to the same place or do they move around?

MS CUMMINGS: They move extensively, so long-tailed bats, one of their key behaviours is that they move roosts often on a nightly

basis. However, in more modified habitats they tend to use roosts more and this is likely because of the limitations of appropriate roosting habitat. And although they'll move roosts on a nightly basis, they will reuse roosts between seasons, so they will come back next year and use a roost for a night and then move around.

COMMISSIONER KNOTT: So is there any reason to believe that the solitary male that we have roosting on the site, on those three occasions, is there any reason to believe that, if one of those locations did not any longer exist, he would not happily find a roost somewhere else within that green area that covers the site, or is he trying to distance himself, for instance, from the females for some reason, not sure why?

MS CUMMINGS: It is my opinion that it will not have a significant impact on that bat, given he's using two other roosts within the site, within the riparian margin of the site that will not be directly impacted. The tree that he was -- well the two trees that he was -- didn't appear to have any quality roosting cavities, but this was based on a visual ground assessment, so I cannot be absolutely certain from that.

Also, the trees that are being roosted in, in the Sanford Park area up there, they are actually artificial roosts attached to those trees and so I can have confidence that the installation of artificial roosts will provide adequate mitigation.

COMMISSIONER KNOTT: Just picking up a comment you just made earlier on, do I take it that, on a seasonal basis, they move around to other locations, is that you were mentioning?

MS CUMMINGS: So they will use trees with particular characteristics depending on the life cycle, so females throughout the winter will be less picky in the roost that they're using and they'll have similar characteristics to the male roosts. But when they come into gestation and lactation they will move into these maternity roosts because they have different thermal characteristics and they have cavities large enough that groups can congregate together and that keeps their body temperature up and minimises energy inefficiencies.

COMMISSIONER KNOTT: So do they still, though, say over a year, stay in that general location or do they move elsewhere?

MS CUMMINGS: As far as we are aware, but to the best of my knowledge there is very few radio telemetry studies, which is essentially what you need to identify roosts that are undertaken in winter because the bats go into what is called torpor, which is kind of a version of hibernation where they lower their body temperature and spend a lot of time roosting, they will be active at some points, but less active and not much research is done overall into long-tailed bats. But given they do go into torpor it does suggest that they generally stay within this area.

COMMISSIONER KNOTT: So sort of moving to this whole issue of the additional planting and whatever, so what I have heard you say is effectively it is more effective in this instance to actually have numerous lines of trees, multiple edges, than it would be to have a large area, which might just have two edges for instance? I am going back to the evidence we heard yesterday from Mr Lambert showing the planting that was proposed above the Esplanade area, through the Esplanade, and then the houses, and they have these various lines of planting through that area.

MS CUMMINGS: Yes. So particularly in this context where their habitat will be adjacent to residential housing, the bats do use

edge habitat, so they're not going to be moving within the interior of the planting that we put in, particularly at a young scrubby stage, and therefore pushing the edge habitat too directly against the interface of the urban development would not be considered appropriate, in my opinion.

COMMISSIONER KNOTT: I think that is it for me because I think you have covered the big issues as I see it. Thank you.

COMMISSIONER WASLEY: Commissioner Lovell?

COMMISSIONER LOVELL: Just looking at your evidence, now DOC have a programme that they have been operating for a while, is that right?

MS CUMMINGS: Yes, they have a national long-tailed bat -- I cannot remember the name.

COMMISSIONER LOVELL: Are there differences between the approach that you are suggesting and their approach?

MS CUMMINGS: DOC's approaches generally focus on that population that is within Conservation land, and so it is large-scale pest control and very intensive survey efforts.

COMMISSIONER LOVELL: Okay. Just on the roosting trees, you have agreed with Dr Pryde or Ms Pryde about the acoustic data around roosting habitat, being cautious about using that. How likely is it that bats do not use echo or whatever to get across large areas of pasture or anything like that?

MS CUMMINGS: There has been evidence to show that they will disperse across open pasture but based on all of the research to date, that is the less preferred mode of dispersal and they are adapted to using location calls to essentially bounce off structural objects. This is primarily vegetation edges and other structural edges.

COMMISSIONER LOVELL: So, given your acceptance of Ms Pryde's advice around the use of data, should that (inaudible) in terms of the surveys that were done in preparation for this application?

MS CUMMINGS: What I stated in my evidence is that I accept it is difficult to locate solitary roosts using acoustic data, whereas communal roosts or maternity roosts are used by multiple bats and they often exit in quite a short period of time. It is

easier to distinguish if there is a maternity roost in the vicinity.

The evidence that we have from the Southern Links radio telemetry data shows that there are key areas within the landscape that multiple bats are using and these have been associated primarily with maternity roosting sites. At Sandford Park there is a patch of kahikatea there, and the Narrows Christian Camp down here, and there are other maternity roosts within the area. These are all associated either with multiple bats or at least one bat have a core area identified there.

So, based on the evidence that we have today, there is a very low likelihood of maternal roosts being present on the site. I consider that the removal of solitary use is less of an impact on the population level and you can provide alternative habitat.

COMMISSIONER LOVELL: Just getting to issues around roosting trees and things like that. What is the normal process for someone to go cutting up a tree or decide whether to remove it? How do you determine that you are not cutting down a tree where there are bats around?

MS CUMMINGS: There are generally accepted -- they are called tree fell protocols and they are also a part of a wildlife permit application process to DOC prior to any potential roosts being removed. This generally entails acoustic recordings at the specific trees or groups of trees prior to the vegetation being removed. Also, in areas where there is more bat activity and it more difficult, you can use echolocation passes as a proxy for, "Is the bat just moving through or coming out of that tree?", for example. Then you will often have arborists climbing trees under the supervision of bat ecologists and searching for bats within cavities or under loose bark.

COMMISSIONER LOVELL: Just looking at the issue of artificial roosts, the last time I looked at that information was about four or five years ago and at that time, as I understood it, there was not any sort of peer-reviewed literature or research around artificial roosting effectiveness in New Zealand. Picking up on your commentary around maternity roosts and things like that, has that changed? Is there more information now in terms of their success?

MS CUMMINGS: In my opinion, yes. Even at the beginning of this project I considered use of artificial roosts experimental and there is very little evidence, but based on this radio telemetry

work that has been undertaken by Southern Links we have confirmed that bats are using artificial roosts and the fact that a maternity roost has been identified within artificial bat boxes is quite encouraging.

COMMISSIONER LOVELL: That is the report that I think we were talking about yesterday in terms of getting a copy. Is that the DOC --

MS CUMMINGS: Yes. That would be the follow-up report based on the second year of telemetry data. However, this map that we have in front of us now does have the home range and core areas of all the bats tracked, but not the report in its entirety.

COMMISSIONER LOVELL: Are we expecting to get a copy of that?

COMMISSIONER WASLEY: (inaudible) indicated it was due any moment.

MS COCKERELL: Yes. The radio tracking data has been provided to the parties as it has become available and then it will be incorporated into a finalised report that we are expecting any day. I have sent an email this morning just to find out where that is at and get an update.

COMMISSIONER LOVELL: I would be quite interested in it, if nothing else because we are talking about the artificial roosts being used with regard to the new trees and for our solitary boy, and also for pest management. I am quite interested to know how successful the artificial roosts were. As I said, previously I understood there was not any research or any confirmation of how effective it was. I am quite interested (several inaudible words).

COMMISSIONER WASLEY: Just before we leave you, Ms Cockerell, in terms of the Southern Links notice, I presume this is the notice of requirement process which covers a lot of those areas that are on the plan in yellow?

MS COCKERELL: Yes. It is under the lights of the joint NZTA and Hamilton City Council. The radio tracking work is being done by Hamilton City as part of their requirement. There will also be work that NZTA has to do. As part of their consents, they had to do these two years of pre-monitoring. This is the final report of that two years of work.

COMMISSIONER WASLEY: So the notice of requirement -- the requisite areas of road have been designated?

MS COCKERELL: Correct.

COMMISSIONER WASLEY: We would be interested in terms of what the requirements or conditions were around bats, given that what we have behind us covers that Southern Links area and also, significantly, bat habitat.

MS COCKERELL: We can provide you with a copy of those conditions, the decision, as well as this report that is about to be released.

COMMISSIONER WASLEY: Okay. Thank you.

COMMISSIONER LOVELL: Just coming back to some more questions --

MR MAKGILL: Can I just -- I am making a legal comment here that the conditions were based off Southern Links in order to integrate. That has been looked at. It is all part of an integrated approach.

COMMISSIONER WASLEY: Thank you.

COMMISSIONER LOVELL: Now, Ms Pryde again suggests that it will take upwards of 50 years to get to a replacement habitat. You disagree with that. Do you have a timeframe? If it is not 50 ...

MR BLAYNEY: Fifty years is probably related directly to the creation of roosts within vegetation, how long it takes for knotholes and cavities to form. We consider that the creation of shelterbelt-like features could be significantly faster than 50 years. We have proposed a range of species that grow very quickly, many of them native. We have not designated what exotic species we may include or if we will include them yet, but if we were to use those fast-growing species you could get up to 4 metres within four to five years.

COMMISSIONER LOVELL: That is a good point. A question I asked (inaudible) is that the maintenance period for planting, under the conditions, is five years or (several inaudible words).

MR BLAYNEY: Yes.

COMMISSIONER LOVELL: Do you think that is sufficient?

MR BLAYNEY: That condition covers just the establishment vegetation. There is also a requirement for an ecological monitoring and management which includes a restoration plan, and that restoration plan would cater for beyond the five-year period. The five years is a very important milestone to ensure that you are heading towards restoration and achieving the vegetation cover that you want, but it is not the end of the implementation.

COMMISSIONER LOVELL: I believe one of the questions I had was that you did refer in your evidence to the Gully and Esplanade Reserve Vegetation Management Plan and provision for subsequent maintenance. Could somebody please point that out to me?

MR BLAYNEY: Are you looking for the condition or the paragraph that I refer to it?

COMMISSIONER LOVELL: No, the condition. I have the paragraph.

MR BLAYNEY: So the condition in 79(f) and (inaudible) concerns the (inaudible) set of conditions. It also relates to 79(b) around long-term maintenance and retention of large trees, and (h). There is a bit of a set there.

COMMISSIONER LOVELL: How long is the plan intended to last for?

MR BLAYNEY: There is no specific timeframe stated within the condition. We would have to follow best practice restoration protocols so I would expect that it would go for -- actually, I would not want to put a year timeframe on it because it would be an ongoing management of the (inaudible).

COMMISSIONER LOVELL: So beyond five years that is contemplated --

MR BLAYNEY: Certainly beyond five years. I do not think you could achieve what we are suggesting in five years and that is consistent with what Dr Parsons suggested around best practice for restoration of forest ecosystems.

COMMISSIONER LOVELL: That is what I was wondering.

MR MAKGILL: Can I add one thing? This is why I suggested and I discussed with Adare the belts and braces approach of a guarantee to the Council for performance, because of the timeframe involved with implementing the management plan. It is a long-term thing.

COMMISSIONER LOVELL: You commented about the design (several inaudible words) approach and that no one else has done from a practical design perspective. Did you mean domestically or internationally? Are there examples around, other than the natural examples that you have identified? I am just wondering if there are any thoughts or design processes that have been completed.

MS CUMMINGS: Clarifying that you mean to enrich that habitat specifically?

COMMISSIONER LOVELL: Well, I mean to ensure we understand the effectiveness, as much as we can, of the design that you are suggesting.

MR BLAYNEY: So what we are proposing implementation-wise has been done all over the landscape. Shelterbelts and the restoration of forest ecosystems have occurred throughout the Hamilton area.

COMMISSIONER LOVELL: I was just talking about the -- I think you were talking about the edge versus, I think, the (inaudible) suggestion of a large ...

MR BLAYNEY: Are you asking me whether anyone's created edge habitat specifically? The question around the uncertainty that may have been put forward through other sets of evidence is that no one has done it specifically for the purpose of creating that habitat.

COMMISSIONER LOVELL: That was what I was getting to. So, no one has done it but you are confident that (overspeaking)

MR BLAYNEY: But it has --

COMMISSIONER LOVELL: -- those natural environments, it is done by nature?

MR BLAYNEY: Almost by default, the creation of shelterbelts and similar landscapes throughout the landscape has created that habitat. I do not think that the intent behind the creation is important in demonstrating that it has been effective. They have created it. The bats have used it. We intend to create similar features. We consider that the bats also use it. Our intent is for that to happen.

COMMISSIONER LOVELL: On that basis, if you are saying that the bats are using the existing framework, the shelterbelts and

things like that, when you look at, for example, the intent around biodiversity and the not yet confirmed National Policy Statement around biodiversity, that contemplates as a goal and an objective no net loss and preferably positive outcomes. Are you saying that what we have at the moment, the bats use it and it is fine, and what you are doing is actually going to be an improvement? So, it is a positive outcome that would be positive to biodiversity?

MR BLAYNEY: Yes. There is a second increase in area and extent that we are proposing. We are protecting the edge habitat along the river, which is one of the primary measures that Ms Cummings has referred to. Also the east-west shelterbelt. Most of the edges in the proposed development area are retained and we are doing as best we can to add as many edges, buffered from the disturbance of urbanisation, within the area that we can have. We have also proposed to do significant revegetation within the gully at the southern end of the site. We also have a significant increase in the indigenous vegetation that would be present.

It might be worth going and having a look at that. We have a table demonstrating ...

DR FLYNN: While he does that, I just wanted to reiterate the point that you made, really. The short answer, in a sense, is yes. The current situation is a depleted landscape that the bats are using because they do not have anything better, to some degree, and the opportunity is to provide better connectivity and more tailormade habitat for them.

MR BLAYNEY: It is paragraph 51 in my evidence-in-chief.

DR FLYNN: What did I say? I said that the short answer is yes, that the current habitat for bats is relatively depleted. They are using features that are not ideal for them in some contexts or not sufficiently connected, and they are not using some of the features that are because they are not so well connected. This gives an opportunity to restore and enhance those connections and provide more habitat.

COMMISSIONER KNOTT: Just on that theme, in terms of the east-west shelterbelt, what in particular makes that attractive? Is it the type of vegetation? Is it the height of the vegetation? Ms Cummings?

MS CUMMINGS: I would point you to figure 14, if that is possible.

(overspeaking)

COMMISSIONER WASLEY: While that is coming up, we can pause with you for a moment and I will go back to Mr Blayney. On page 10 of your evidence-in-chief, figure 1, you talk about SNAs and on that figure there is 54, an SNA along the edge of the site and the Waikato River. In terms of vegetation in that SNA, do I take it that because it has an SNA, that is protected?

MR BLAYNEY: That the vegetation is protected?

COMMISSIONER WASLEY: Yes. Because it is an SNA, is there protection of the vegetation in terms of its removal or changes, as it currently stands?

MR MAKGILL: Excuse me, sir, I think that is a planning question.

MR BLAYNEY: I think that is a planning question.

COMMISSIONER WASLEY: Okay. Well, who is going to answer it? Mr Serjeant?

MR SERJEANT: We have two SNAs that border the site: SNA 54, which runs from midway through the site down to the top of that southern gully, and a very, very small patch of SNA 48 that comes into the northern part of that site. Under the provisions of the plan, in those two areas and effectively along the right period edge, we are not removing any vegetation at all. We are not touching the SNAs.

COMMISSIONER WASLEY: No, I appreciate that. I just wanted to be clear on what the SNA means in terms of the vegetation that currently exists.

MR SERJEANT: Right. You are to avoid the characteristics of the SNA that contribute to its significance, which is the vegetation therein by definition. It is protected.

COMMISSIONER WASLEY: While you are on your feet, between SNA 48 and SNA 52, looking at Mr Blayney's figure 1, I take it therein there is no SNA and therefore there is no particular protection or requirement?

MR SERJEANT: No, not out of the District Plan.

MR BLAYNEY: That is probably also something that I can address. The vegetation between those SNAs is predominantly non-native vegetation and it is pest plant dominated. That would also explain the mapping and extent of the SNAs currently protected in the District Plan.

COMMISSIONER WASLEY: Thank you. Ms Cummings, you were going to ...

MS CUMMINGS: Yes. To answer the question before about the specific characteristics of the east-west shelterbelt, in my opinion I think --

FEMALE SPEAKER: Sorry --

MALE SPEAKER: Sorry, I think we actually need to know exactly what plan you would like up.

MS CUMMINGS: Figure 14 in the figure list.

MALE SPEAKER: That is the one you wanted? That one?

MS CUMMINGS: Yes.

MALE SPEAKER: No, we are aware which one. It is just that the administrator is unable to find it at the moment.

COMMISSIONER WASLEY: Perhaps while that is being sourced, Commissioner Lovell has another question and we could carry on.

COMMISSIONER LOVELL: (inaudible) in terms of the delivery of positive outcomes, conditions 94 and 96 set out a list -- do not worry, I am not asking a planning question.

MR MAKGILL: Sorry, ma'am, I just did not hear the conditions you were referring to.

COMMISSIONER LOVELL: Conditions 94 and 96.

MR MAKGILL: Thank you.

COMMISSIONER LOVELL: Condition 94 refers to the integration of the southern (inaudible). I was looking at the notes on the objectives of that, the intent of it being that it would achieve no net loss of terrestrial wetland and stream biodiversity and, specifically with bats, aim to enhance long-tailed bat habitat (inaudible), in integrating with some of those key -- those would be the goals you would be aiming for?

MS CUMMINGS: Yes.

COMMISSIONER LOVELL: In light of what we have just discussed in terms of the improved quality of habitat, do you think that we will reach the no net loss position?

MR BLAYNEY: Yes. I would probably refer back to paragraph 51 of my evidence-in-chief that we were trying to get to before. You will note that I have given some summaries of the vegetation in its current state, the vegetation potentially lost, the indigenous dominated vegetation proposed to be planted and the vegetation post-development.

We are almost doubling the amount of indigenous -- well, actually most of the vegetation remaining is not indigenous dominated vegetation. Most of it, 11.28 hectares of it, is low value, dominated by non-indigenous vegetation only, and we are proposing to add 16.59 hectares of indigenous vegetation. The area of extent of habitat is significantly increased, in my opinion. We are also, as mentioned several times previously, tailoring certain aspects and areas of the mitigation to replicate features that long-tailed bats prefer.

COMMISSIONER LOVELL: Are you contemplating a net loss situation for bats? Is that something you can?

DR FLYNN: My consideration is that through the conditions that we have put forward we are offering the vegetation retained on the site and it will allow continual use of that vegetation by the bats. As Mr Blayney has pointed out, there are areas of exotic ornamental trees that will be removed but they will be replaced with significantly more quantum of particular created habitat for bats and indigenous habitat.

COMMISSIONER LOVELL: Then of course it brings us back to the point of the process that you are taking with the roosting trees and (several inaudible words) injury, as it were, issues that were raised in terms of Ms Pryde's evidence and the evidence of others in terms of urbanisation and risk.

My question is: at the end of that, taking the whole view of the evidence we have been provided, expert evidence and things like that, do you have confidence that the mitigation is as good as you can get in terms of heading towards no net loss?

DR FLYNN: Yes. I also think it is important to contextualise this. There are the points that have been alluded to in terms

of existing protection of riparian habitat, the formal protection of trees in the landscape. What this does provide is more long-term certainty, a clearer strategy for managing risk to the bat populations that we currently do not have at the moment. The pest management strategy is to remove all of those pest plants from the riparian margin, for example. That might be a good outcome in terms of restoration of indigenous vegetation in the long term but it would be a very poor outcome to prioritise that for this site for bats. Having a really clear plan that protects those functional values ...

COMMISSIONER LOVELL: That probably brings me on to another point around management. Of course, one of the threshold pieces around management is that you have sufficient evidence on risks, which you then develop through plans. Are you confident that you have sufficient, given some of the questions that have been raised by the experts, around -- some risks(?) have been acknowledged in terms of the organisation(?) but also around planting and (inaudible). Are you confident that when you take that management approach (several inaudible words) the precautionary approach?

DR FLYNN: Yes.

MR MAKGILL: Excuse me. Can I just point out that there is no difference between a precautionary approach and adaptive management? Adaptive management is a precautionary approach tool.

COMMISSIONER LOVELL: I am coming to that in terms of (overspeaking)

MR MAKGILL: Okay. I am just clarifying that point.

DR FLYNN: Yes. So, adaptive management is management where you have a clear understanding of what your uncertainties are, the things that you cannot predict because you are predicting future outcomes, and having the strategies to deal with those uncertainties, monitor and respond before it is too late to do anything. Yes, in my opinion that is very clearly set out in the conditions and so I am confident in that approach.

COMMISSIONER LOVELL: Coming back to (several inaudible words) precautions, the Council have raised in their evidence a suggestion around having conditions which would allow for - I think this was the comment in Mr Serjeant's report - "ad hoc reviews". Given we are talking about a high-risk species, given we are looking for an adaptive management process and

recognising that the approach at the moment is consultative, if there is a trigger, if something happens that creates a risk to the bats, should we not have a condition that allows the Council or somebody to step in rather than waiting, for example, for two years for monitoring information to come in? How is that addressed if we do not have a specific condition?

MR MAKGILL: I just want to point out that this is the evidence that Dr Parsons provides specifically in relation to bats but I understand that Dr Flynn can answer that question in terms of adaptive management approaches, in terms of ecology.

MS CUMMINGS: I am more than happy to answer if Dr Parsons (inaudible).

COMMISSIONER LOVELL: Give us your answer.

DR FLYNN: I suppose, in my opinion, the plan that we have essentially creates opportunities for the regulator to step in because the monitoring is being undertaken. You need the trigger. The monitoring will detect the trigger and then there are processes in for review in terms of what the next step is.

For example, light monitoring identifying that the buffer was not creating the light filtering that was expected. I believe that it will. It is my opinion that it will. That would require a review of whether more needs to be done in terms of more buffering, additional planting or artificial screening material being installed to make the buffering more effective, for example. There are specific responses that can be put forward to deal with those specific uncertainties.

It is not really a case of having to require the regulator to step in and put in an abatement notice on that basis. That is not a particularly useful strategy because that is a strategy that says, "If something happens, we will all just stop and think about what to do". That is not adaptive management.

COMMISSIONER LOVELL: Okay. Condition 97, two-yearly monitoring provided to the Council. If something happens six months into a term of two years and is a trigger, how would you deal with that in terms of this condition that the Council be provided that information a year and a half later? How would (several inaudible words)?

MR MAKGILL: I think we are getting again into Dr Parsons' -- Dr Flynn has a lot of experience with adaptive management across a

whole lot of ecological areas but if you want specific responses to bats, Dr Parsons is the person to ask.

COMMISSIONER LOVELL: Ms Cummings can also address it.

MR MAKGILL: Sorry. You addressed it in terms of your evidence as well?

MS CUMMINGS: In terms of my experience with adaptive management, these triggers put in place and when something is triggered, it also goes to ...

DR FLYNN: That is right. That is a good point. If something comes up in the process of monitoring that is a concern, my expectation is that that would be communicated to the Council.

COMMISSIONER LOVELL: I guess I am asking where that is. Would that be identified in the consultation process?

MS CUMMINGS: Yes, generally included in the detail of the plan.

COMMISSIONER LOVELL: Just a final point. Around the pest control point, which was (inaudible), as I understand it the suggestion was that we have pest control. I do note that in

terms of the explanation(?) document, the Southern Links have a requirement for pest control for 20 years.

Acknowledging the comments you made around needing wider input and the attempt by the applicant to actually start to engage on that, do you think we need anything beyond what is in the current framework? I am recognising the detail you gave me in terms of the pest control provision and the Gully Vegetation Management Plan but in terms of wider pest control, if we are integrating (several inaudible words), should we be looking at something in terms of a condition that provides for pest control? I acknowledge what you are saying in terms of the wider but should we not start somewhere?

DR FLYNN: I am just finding the condition.

MR MAKGILL: Is it a question as to conditions that Mr Serjeant might be able to help with, I am wondering?

DR FLYNN: I just know I have seen it in there somewhere and I am just trying to find it.

COMMISSIONER LOVELL: I am happy for you to find it. It is just a question I have. A lot of the overall conversation and

evidence was just saying that one of the key issues for bats in terms of longevity is around pest control, so that is probably something we should be ...

MALE SPEAKER 1: Yes. It obviously depends on what the condition that (inaudible) have relates to.

COMMISSIONER LOVELL: It was actually quite onerous. I am certainly not suggesting necessarily that, but I do reflect that a number of these conditions are reflective of a designation involving (inaudible), some of them but there is also that one. So, I am just asking, in terms of things, where does that fit?

DR FLYNN: Under condition 70 or 70(c):

> "All management plans shall include as relevant ... the nature of any weed and/or pest control considered appropriate."

The enhancement or mitigation of planting areas does leave the door open for the management plan to incorporate including pest control.

COMMISSIONER LOVELL: But you do not necessarily --

DR FLYNN: Well, right.

COMMISSIONER LOVELL: (several inaudible words)

DR FLYNN: No. My concern is that if pest control measures are required, stipulated, there is a performance measure that would be required as part of that that the applicant could not hope to necessarily achieve without that more co-ordinated effort. Also, frankly, I do not particularly approve of pest control which kills a lot of animals for no particular gain. We have to be ethical about our approach to these things. I think pest control is a priority but not just for the purpose of killing animals, so --

COMMISSIONER LOVELL: I am mindful of the (inaudible) in terms of the broader approach to cats, given we are talking about a (inaudible) area.

DR FLYNN: Yes. I think that the pragmatic approach is to protect bats by providing roosts that are protected. The limitation, as I understand it, from banding any existing trees because of the structure of those trees, particularly multi-stemmed and closely packed along the riparian margin, for example. So far, putting bands in those trees would not be practical but artificial roosting is. You cannot protect all

the roost sites on the site by doing that but any enrichment through artificial roosting could be managed in that way.

COMMISSIONER LOVELL: (overspeaking)

MS CUMMINGS: I would say, in terms of that biology perspective, that they forage on the wing and so are not vulnerable to predation during their nightly activity. It is (several inaudible words).

COMMISSIONER WASLEY: Ms Cummings, did you want to --

MS CUMMINGS: Yes.

COMMISSIONER WASLEY: **B**efore we forget that.

MS CUMMINGS: So, the question was, "Why is that particular shelterbelt special?"

COMMISSIONER KNOTT: Yes, related to the nature of the vegetation, the height, etc.

MS CUMMINGS: Okay. It is my opinion that the species complex does not impact on why the bats are using it. The mature

stature probably does but the key reason is that, as you can see from the wider area, there was actually full vegetative connectivity from the Waikato River via our site and then along various shelterbelts to the Mangakotukutuku Gully, which is a key habitat for the population as a whole. It is not necessarily the characteristics of the shelterbelt itself but it is the location and the fact that it is part of a fully vegetated corridor, in my opinion.

COMMISSIONER KNOTT: So, moving off the subject site and obviously heading west in terms of those existing shelterbelts, what would happen then if they were removed? Do the bats still find their way into the valley? What is the impact in terms of that connectedness of the vegetation corridor?

MS CUMMINGS: I think that if those shelterbelts were removed then the corridor on our site would no longer be used for dispersal, in my opinion, and I think that all we can do given we cannot control offsite is provide a framework that can be applied to future developers through the resource consent process.

COMMISSIONER KNOTT: I guess taking that forward though, looking at that other diagram which we had up which had all the lines

showing routes between spaces, is there an alternative which you think they may use or is the whole thing shut down for those bats that are currently using that route if we are unsuccessful in maintain that east-west link?

MS CUMMINGS: Absolutely there are alternative routes. If you refer to -- I think it might be (inaudible) evidence-in-chief, the diagram. Yes. It is the fifth figure. Also the provided map.

COMMISSIONER WASLEY: Just while that is being sourced, can I just have some general comment in terms of how adaptive bats are to the changes of the environment? I am interested in a summary statement around their ability to adapt when changes occur.

MS CUMMINGS: Yes. There is evidence, which is not based on any experimentation in terms of before or after urbanisation, that generally shows that bats seem to be less active around urban areas. But if you look at the detailed research that has gone on more recently, particularly the radio telemetry work that has been provided by the Southern Links (inaudible), one of the key areas, for example, is Sandford Park and also Fitzroy and Te Anua Parks which are further along, which demonstrates that provided that you have connectivity to key features then bats

will use essentially open space designed as parks, and that they are adaptive.

COMMISSIONER KNOTT: Those parks presumably are vested in the Hamilton City Council?

MS CUMMINGS: Yes, they are.

COMMISSIONER KNOTT: Earlier on you referenced that there were artificial roosts in the parks. Is that an activity that Hamilton City undertake in terms of providing artificial roosts?

MS CUMMINGS: It is my understanding that that was undertaken as part of Project Echo, which Hamilton City Council is a part of, and Waikato Regional Council and the Department of Conservation. It is a collaborative effort.

COMMISSIONER KNOTT: Okay, thank you.

MALE SPEAKER: Now, it is the ACCOM one.

MALE SPEAKER: It is not in the drawing set, it is in the --

MS CUMMINGS: Yes. It is in my evidence-in-chief.

MALE SPEAKER: Yes. We are having difficulties getting it open on the screen.

MR MAKGILL: Can I just make sure, because I do know that the other ecologists are here and I do think it is fair that they are able to see the maps.

COMMISSIONER WASLEY: Well, we can get some copies run off quite quickly in terms of a good old-fashioned hard copy. That is available, given the technological limitations.

MR MAKGILL: Can I just get a signal? Do the ecologists for the other parties that are here have the maps that have been spoken to, no or yes? No objections so I guess we carry on.

MS CUMMINGS: I could also talk generally to the area whilst referring to this. The map that was up before will suffice for that.

Essentially, this is not the full dataset. This map is from the first baseline report provided by ACOM and the second complete report is the one that we are working on, which has been referred to both today and yesterday, but this does show

that there are alternative corridors east between the Waikato River and west towards the Mangakotukutuku, and in fact they have not actually identified bats but in their (inaudible) sample they actually have used our site. I will say, given how fast bats fly, that it is actually quite difficult. Generally you do pick them up between habitats at their feeding time and then it is very difficult to track them while they are dispersing between those habitats.

But you can see that they are moving along the Waikato River further north of our site and then likely dispersing up the Mangakotukutuku to those key sites. It has been identified that they are dispersed up here and then they likely go up through here into Sandford Park, Fitzroy and Te Anua, and then along the Mangakotukutuku Gully. There are alternative options going north to access this area although it is a less efficient option for bats that do currently move through the site. There are also potential routes south of our site that then connect east-west and this is also unidentified on the map.

If we scroll down I can do that as well. A little further down, sorry. Yes, that would be good.

We can also identify, through the radio telemetry work to date, that bats appear to be moving through these vegetated areas. I do not know exactly what route they are taking but they do seem to be moving to a patch of vegetation further south, based on this map. Then presumably they could move back up the Mangakotukutuku.

COMMISSIONER LOVELL: Just one question more on that, just while you are talking about this, in terms of alternatives (several inaudible words) sufficient around looking at the cost of offsite habitat restoration or pest control and what we would do if that is not working. (11 seconds of inaudible speech)

MS CUMMINGS: It is my understanding that there are other very important habitats in the landscape.

COMMISSIONER LOVELL: Thank you.

COMMISSIONER WASLEY: I do not have any further questions on this today. Later on in the hearing, we will have you back. Thanks very much.

(adjourned)