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Event:	Mount Messenger Bypass Hearing	
Date:	2 August 2018 (Day Two)	
Before:	Mr S Daysh	- Hearings Commissioner
Witnesses:	Mr A McEwan	- Freshwater Structures
	Mr P McCombs	- Transport
	Mr M Copeland	- Economics
	Ms W Turvey	- Social
	Mr G Lister	- Landscape
	Mr D Ellerton	- Noise
	Dr R Clough	- Historic Heritage
	Mr G Ridley	- Construction: Water
	Mr M Neale	- Ecology: Freshwater
	Mr N Singers	- Ecology: Vegetation and offset calculations
	Dr C Watts	- Ecology: Terrestrial invertebrates
	Dr J McLennan	- Ecology: Avifauna
Also present:	Mr D Allen	- Solicitor for NZTA
	Mr T Ryan	- Solicitor for NZTA
	Mr P McKay	- Hearing manager
	Ms R McBeth	- Reporting officer, New Plymouth District Council
	Ms K Hooper	- Reporting officer, Taranaki Regional Council
	Mr J Winchester	- Advisor

THE COMMISSIONER: Kia ora. Kia ora, everyone, and thank you for the mihi. This is day 2 of our hearing. One of the things I was supposed to mention yesterday, which I will do now, is that with the microphones and everything the hearing is being recorded, just so everyone is aware of that. It is really just as a record for myself for referring back on decision-making, just checking on anything that has been given in evidence. I just wanted people to be aware of that. I think back with you, Mr Allen.

MR ALLEN: Thank you, sir. We are all ready to go with our first witness, Mr McEwan, who is giving evidence on freshwater structures, drains and culverts.

THE COMMISSIONER: Great, thank you. Welcome, Mr McEwan.

MR MCEWAN: Thank you, Commissioner. I will start with my summary of evidence. My role on the project is design -- drainage design team leader. I have held this role since March 2018. My position comprises delivery of design for stream diversions and culverts under the proposed realignment of State Highway 3 road drainage system and treatment of rainfall run-off. Drainage design of the culverts and streams includes making appropriate provision for fish passage.

My evidence, which is supplementary evidence, addresses the updated position in respect of structures associated with the project that interact with the fish -- sorry, with the freshwater environment, including bridges and culverts, and in particular the refinements to the project design in that respect since the Transport Agency's evidence was filed on 25 May.

Going through the background, refinements to the design of a number of the project's freshwater structures have been made since the Transport Agency's evidence-in-chief was filed on 25 May. These changes have been made primarily to seek to improve the provision of fish passage, taking into account the New Zealand Fish Passage Guidelines for Structures up to 4 Metres, which was published in April 2018.

Design philosophy and approach. Fish passage design philosophy comprises consideration of the relative priority level for fish passage, as assessed by the project freshwater ecologist Mr Keith Hamill in the supplementary evidence, existing site characteristics and constructability. I refer to Mr Hamill's supplementary evidence in terms of the ranking assigned to the various culverts. In selecting the design

solution, costs were also taken into account. I took advice on costs from the project team.

The Fish Passage Guidelines, which is the 2018 guidelines, have been taken into account in developing the design changes. The Fish Passage Guidelines provide the five-tier hierarchy of design solutions listed below in order of preference from most to least preferred. So the top of the list is a bridge and second is culvert, stream simulation - that's where you're trying to create a stream within a culvert - culvert as a single barrel circular or box culvert, hydraulic design, followed by a culvert, multi-barrel culvert - so that's where you've got a series of two, three or more culverts in a row - and lastly, a ford over a multi-cell culvert.

Page 2. Generally, bridges, which is level 1 of the fish passage design hierarchy, are extremely expensive and only considered where costs are not likely to be significantly greater than alternative solutions. High and moderate priority streams were considered for stream simulation, level 2 of the fish passage design hierarchy. Low priority streams were considered for upgrading to hydraulic design, which is level 3 on the fish passage design hierarchy. These low priority streams were not considered for stream simulation design based

on their small catchment size and therefore lower ecological value and smaller culverts required.

Then on to the design description. Changes in design approach have been made to eight culverts following the process described above. Culvert 19 has been removed from the project and I've just got a footnote for that. So there is -- sorry. Referring to the drawings gives you an indication of what the culverts' numbering system is in relation to what we're talking about. So I hope that, Commissioner, you've had the chance to look at those drawings and understand where they are. If you feel that you need to --

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THE COMMISSIONER: I think if you could show me on the drawing.

MR MCEWAN: By all means, yes.

THE COMMISSIONER: Yes, that might be a useful way of just orientating myself. I have flicked through the drawings, but it will take me a while just to get orientated. So if you could do that just on the main plan, that would be really helpful.

MR MCEWAN: I will do that now. So starting at the north end of the job, we've numbered the culverts from 1 from the north end of the job on this. So culvert 1 is located -- is there. It's just before the connection with the alternative State Highway 3. And culvert 2, similarly right at the intersection and we work our way through. This is culvert 3 right here.

THE COMMISSIONER: Yes, so just highlight the areas where changes have been made perhaps to the particular culvert.

MR MCEWAN: The first one we're talking about is at culvert 12 that's located here. So culvert 12: a bridge solution has now been adopted.

THE COMMISSIONER: That is where the new bridge is?

MR MCEWAN: That's where the new bridge is.

THE COMMISSIONER: Yes, and we saw that on that Humphrey flyover yesterday. Were you ...?

MR MCEWAN: Yes, that's obviously here. So that was there. The ones where they're providing stream simulation for are culvert 9. This was previously a multi-cell or multi-barrel culvert,

we've made that now a box culvert or arch culvert for stream simulation. The other culvert is - I'm just trying to find it - down here. This is culvert 18. So it's just immediately north of the connection back to the newer line that connects to the existing line.

THE COMMISSIONER: Sure.

MR MCEWAN: And then we've got culverts 8, which is there, 14 and 16, which is in this large fill on the immediate south side of the tunnel. So we've improved there by increasing the size of the culverts, in some cases reducing the gradient and designing for hydraulic design. Culvert 15 is a particularly special case. So that's on what we call fill 12, which is the large fill immediately north of the tunnel. And that culvert is approximately 250 metres long and the alignment needs to be confirmed to just finalise that length. The diameter of that pipe is kept at 2.5 metres in line with that and we've designed that in accordance with the hydraulic design, but we haven't increased the diameter of that one.

THE COMMISSIONER: Okay.

MR MCEWAN: And there are other numerous ones that we've improved the gradients and the culvert embedment.

THE COMMISSIONER: Okay, thank you.

MR MCEWAN: If you want me to carry on from ...?

THE COMMISSIONER: Yes. I think so, yes.

MR MCEWAN: Potential design changes have been considered, taking into account advice from Mr Hamill. The revised design makes the following changes:

For culvert 12, a bridge solution has now been adopted in order to minimise loss of vegetation and better provide for fish passage in this relatively high ecological value location. The location of the bridge is at chainage 2400 of the proposed State Highway 3 alignment. The bridge solution is of a comparable cost to alternative design solutions at this location.

Culverts 9 and 18 serve large catchments and have been assessed as high priority culverts for fish passage by Mr Hamill. These culverts are relatively short, being less than 50 metres in length, and can be installed with gradients of 1 per

cent or less. This achieves the second most preferred fish passage design solution under the Fish Passage Guidelines.

Culverts 8, 14, and 16 are moderate to low priority fish passage culverts. These culverts have been made larger, grades flattened and embedment of culvert increased to achieve hydraulic design of fish passage. This solution is the third most preferred solution under the Fish Passage Guidelines.

Culvert 15 has had its embedment at the outlet increased from 20 to 25 per cent. This culvert has been sized for hydraulic design of fish passage.

Culvert 17 has been made larger to increase the culvert diameter to achieve 1.3 times the existing bank stream -- sorry, existing stream bank full width. Now that criteria is one of the criteria set in the Fish Passage Guidelines. The proposed culvert gradient of 14 per cent is based on the existing stream gradient. I note that due to the steep grade, hydraulic design for fish passage cannot be guaranteed.

On to page 3, paragraph 9. Culvert 15 is a special case, being assessed as a high-ranking culvert for fish passage at least 250 metres long and 2.5 metres in diameter. Constructing

a stream simulation solution and ensuring stream simulation is maintained for the life of the project would be very difficult. Culvert 15 has therefore been sized for hydraulic design of fish passage, the third most preferred option under the Fish Passage Guidelines. In the circumstances, I consider this to be an appropriate design solution. For completeness, I note that constructing a bridge would be extremely expensive, in the order of $15 million or greater, and therefore a bridge solution was not seriously considered.

It is my opinion that design of these culverts is appropriate for the provision of fish passage, taking into account the site conditions, the culvert lengths and ecological advice provided by Mr Hamill.

I've got a clarification. I omitted to specifically mention in my evidence the minor amendments made to other culverts. The gradients for culverts 1, 3, 5 and 6 have all been reduced to achieve better provision for fish passage. Culverts 1, 3, 4, 6, 20 and 21 have all had embedment increased to 30 per cent, also for improved fish passage design. These culvert design changes are in addition to upgrading culverts 8, 9, 12, 14, 15, 16, 17 and 18 for fish passage, as specifically referred to in my evidence.

I've got some corrections. I note that drawing number MMA-DES-DNG-C0-DRG-1010 at volume 2 of the AEE report incorrectly stated the diameter of culvert 11 as being 750 millimetres. This is an error and the diameter of culvert 11 should read 900 millimetres.

In table 2 of appendix 1 from my evidence, I stated the diameter of culvert 18 to be 1,650 millimetres. This is an error and the diameter should read 1,350 millimetres.

And lastly, at footnote 7 in my evidence, I referred to an indicative cost to construct a bridge that would be in the order of $10 to $15 million. The cost there should be amended to in the order of $15 million or greater, as stated under paragraph 9 above in this highlights package.

THE COMMISSIONER: Thank you, Mr McEwan. I do have a couple of questions. The first one is about the new Fish Passage Guidelines.

MR MCEWAN: Yes.

THE COMMISSIONER: They only came into being in April 2018?

MR MCEWAN: Correct.

THE COMMISSIONER: This may be a better question for Mr Hamill and you can tell me that. Were the new guidelines a driver for the reconsideration of these culvert designs or was it a wider look at the fine design that has led to the redesign of some of these?

MR MCEWAN: Well, those Fish Passage Guidelines were a driver following a submission by the Department of Conservation.

THE COMMISSIONER: Okay. Do you know - and again, Mr Hamill can probably tell me - if discussions with the Department of Conservation have been held in person with these designs, are you aware, or ...?

MR MCEWAN: Yeah, if you can talk to Mr Hamill.

THE COMMISSIONER: All right, I will do that. I did have a question of clarification in your evidence. You talk about iris-type baffles and spoiler baffles.

MR MCEWAN: Yes.

THE COMMISSIONER: They are terms that I am not that familiar with. Could you explain the difference?

MR MCEWAN: Yes. So a spoiler baffle is an arrangement of blocks that are set into the base of the culvert. And so the dimensions of those spoiler baffles are -- if I recall correctly, are 120 millimetres by 120 millimetres high by 250 millimetres deep and they're staggered. So you might have, for example, four in a horizontal alignment, if you like, and then followed by three then four then three. So the purpose of the spoiler baffles is to provide some assistance and some areas for fish to swim short distances and hide as they can. So that's -- if that's clear enough, sir?

THE COMMISSIONER: That is clear enough, yes.

MR MCEWAN: Iris baffles are essentially like a -- you can consider them to be like a weir baffle but not exactly the same as that, so they sit as a vertical wall, if you like, but they're actually shaped so they bolt to the base of the culvert again. But they've got vertical slots and they're flexible

pieces of material so they can actually move in relation to each other.

THE COMMISSIONER: All right.

MR MCEWAN: Does that sort of make sense? If you want, I can draw it on the whiteboard.

THE COMMISSIONER: I do not think it is particularly important.

MR MCEWAN: Okay.

THE COMMISSIONER: It is just those terms. I just wanted some clarification on those and I am just looking at your evidence for any other questions.

MR MCEWAN: I think Mr Hamill may be providing a commentary on spoiler baffles versus iris baffles.

THE COMMISSIONER: All right. I can ask about that, too, yes. Have you read the section 42A report from the councils and do you have any outstanding matters that they have raised in terms of your particular issues?

MR MCEWAN: I have briefly glanced through the sections that I thought were relevant and I didn't note anything of major concern.

THE COMMISSIONER: No, I had a look as well and I could not see anything. So I just wanted to double check with you.

MR MCEWAN: Yes.

THE COMMISSIONER: Yes. Thank you, Mr McEwan. That is all I have for you.

MR MCEWAN: Okay, thank you.

THE COMMISSIONER: Thank you.

MR ALLEN: Thank you, Commissioner. The next witness is Mr McCombs on traffic design and transport.

THE COMMISSIONER: Good morning, Mr McCombs.

MR MCCOMBS: Good morning. Do you have a copy of my highlights?

THE COMMISSIONER: I do.

MR MCCOMBS: Shall I read those?

THE COMMISSIONER: Yes, please.

MR MCCOMBS: Mr Commissioner, I have been engaged by the agency to advise it on the traffic and transport effects of the project. I prepared the strategic transport assessment for the project and I also reviewed the traffic and transport assessment.

As to its local context, State Highway 3 to and from the north serves the key strategic purpose of connecting the Taranaki region through to the Waikato. As Taranaki's only arterial connection to and from the north, SH3 is of particular importance to the economic wellbeing and wider future of Taranaki. The route connects Taranaki's oil and gas, agricultural, forestry and engineering products and expertise through to the main economic and transport hubs at Hamilton, Tauranga and Auckland. These connections are vital to Taranaki's ongoing economic performance. I think it's quite important to note that this project's included particularly in the RLTP as a key regional and inter-regional priority.

Continued strengthening and growth of the Taranaki economy and population has steadily added pressures and exposed shortcomings within the northern arterial roading connections serving New Plymouth and the wider Taranaki region. With continuing traffic growth and growing reliance on the route, there's an increasingly evident need to attend to the inadequacies and vulnerabilities of the Mt Messenger portion of the route in carrying freight and serving Taranaki's current and future needs.

THE COMMISSIONER: Mr McCombs, just back to paragraph 3. RLTP means Regional Land Transport Plan?

MR MCCOMBS: Yes.

THE COMMISSIONER: That is right. Thank you.

MR MCCOMBS: Existing corridor. The shortcomings of the existing corridor arise from fundamental road design problems that are especially evident in the length between Urenui and Piopio where the narrow widths, steep grades, lack of passing opportunities, rock falls and a poor safety record cause closures and an overall inferior performance that's inconsistent with its wider strategic role. These limitations affect both

the existing Awakino Gorge section between Awakino and Mahoenui and the Mt Messenger length between Uruti and Ahititi that is the focus of this hearing.

The practical limitations and vulnerability of the Mt Messenger length of State Highway 3 have long been recognised with road closures brought by rock falls, landslips, vehicle breakdowns and crashes. In its present form and reflecting the nature of the terrain, the existing road has steep grades, a narrow width, a winding alignment with tight curves, restricted forward visibility and limited overtaking opportunities. There are significant lengths with no or only limited shoulders that allow little room for error, breakdowns or passing and bring a particular vulnerability to closure from crashes and weather-related events. The existing physical limitations imposed by the existing two-lane narrow tunnel and its approaches at Mt Messenger and the single-lane tunnel at Awakino, although upgrades for that section have been approved, physically constrain maximum load sizes.

The project. The project will establish a new 6 kilometre length of SH3 between Uruti and Ahititi, replacing the existing highway at Mt Messenger and overcoming its inadequacies with a

new alignment with the following traffic and transport key benefits:

A reduced average journey time saving of 4.1 minutes for light vehicles and six and a half minutes for heavy vehicles.

More and safer passing opportunities. That's improved forward visibility and opportunities along the whole length, excluding the tunnel of course, versus the current substandard passing and climbing lanes.

And greatly improved reliability with reduced use of alternative routes, which add significantly to travel times, with less closures from slips or crashes and reduced maintenance requirements.

There's further benefits in a shorter length of 6 kilometres versus 7.4; improved safety; wider lanes and wider shoulders; improved road geometry with eased curves with a design speed of 100 kilometres an hour where many curves currently have an advised speed down to 25 kilometres; and ensuring that trucks can keep within their lanes around the curves. There are a series of curves in the current road alignment, including at the tunnel, where trucks have to track

across into the opposite lane); improved forward visibility of 150 metres or more versus the current down to 30 or 40 metres. And the summit of the road itself is reduced by 79 metres and flatter grades where we have a maximum of seven and a half versus the current maximum of 12 per cent; and 1.6 kilometres, being steeper than 6 per cent compared to the 4.8 kilometres on the present highway. Reduced journey times for over-dimension loads by enabling such loads to use State Highway 3 as opposed to a significantly longer journey through Whanganui. Reduced driver frustration through all these benefits; reduced vehicle operating costs and carbon dioxide emissions; and safer provision for active modes such as cycling and improved access to walking tracks.

On to strategic benefits. As the only direct arterial highway connection to and from the north, enhancing the safety, resilience and journey time reliability of travel on State Highway 3 will benefit the whole of the Taranaki region, and in particular the growing proportion of heavy traffic carrying freight to and from key economic and transportation hubs to the north. The project will match the form of the road to its modern-day function and ensure that it can accommodate ongoing future growth.

The existing State Highway 3 corridor north and south of Mt Messenger follows relatively open rural valleys. The project area itself lies within the steep hill country at the Tongaporutu River, extending south through the pastoral flats of the upper Mimi valley. At a national level, the project strengthens Taranaki's connection to the national network, assists growth and economic development, and improves safety for all of its users. In terms of the wider travel demands it serves, this project markedly strengthens Taranaki's key regional connection to and from the north, and greatly improves its resilience and reliability.

There have been a total of 1,194 submissions, including 16 late submissions, which were received with respect to the project, of which the vast majority are noted as being in support. Eighteen opposed and three were neutral. Those in opposition challenged the ability of the corridor, including the new tunnel, to carry large loads, considered the new route through the valley would not be ideal in terms of safety, and queried why passing lanes are not provided. As I have detailed in my evidence, it is my view that the new road will provide increased safety, amenity and resilient outcomes for the corridor and the design, as proposed, is appropriate for the traffic volumes and composition anticipated along the route.

Those submissions in support addressed the potential for active modes such as cycling and improved access to walking tracks to be considered and acknowledged the project's contribution to growth and community benefits, improved production, safety, resilience and efficiency for the region. A common theme of the submissions in support was the acknowledgement for wider regional strategic benefits of the project, going well beyond the immediate 6 kilometre length of the project area itself.

Turning to the 42A report, as I have detailed in my evidence and in particular response to the section 42A report, first the 1.2 metre wide shoulder in the new tunnel is confirmed as complying with the Building Code, provided no more than 170 people are in the tunnel at any one time. And in that respect, I have assessed the peak occupancy of the tunnel as 65 persons at any one time, taking into account peak traffic flows and the capacity of a tour bus. And thirdly, ice and black fog have not been identified as a cause factor in any reported crashes along the route. I note, lastly, that the section 42A report concludes that the improved geometrics, straighter alignment and provision of increased shoulders will improve the safety of State Highway

3 at Mt Messenger and expresses confidence in the agency's ability to manage any operational concerns that may arise.

Summarising, it's my view that the project will deliver improved safety, resilience and efficiency outcomes for the State Highway 3 corridor and enable economic growth opportunities for the region through improved confidence in the corridor performance.

THE COMMISSIONER: Thank you, Mr McCombs. Can I just ask you a question about your 12(b) in your summary evidence, about the star rating for safety? Can you just give me some information about what it is? Is star 3 the high level? What is the range?

MR MCCOMBS: It's in the middle.

THE COMMISSIONER: It is in the middle.

MR MCCOMBS: It is one of five, yes.

THE COMMISSIONER: So five is star --

MR MCCOMBS: Yes, it's the best.

THE COMMISSIONER: Yes.

MR MCCOMBS: The existing route is classed as a rating of two.

THE COMMISSIONER: Two.

MR MCCOMBS: And that's not regarded as satisfactory for a regional route of this kind. These are broader categories, sir, and -- but the shift from star rating two to star rating three is regarded as important and is called for in the national strategy for state highway network in this region.

THE COMMISSIONER: So what features of this section of highway bring it down from a five to a three? Is it just generally the --

MR MCCOMBS: Well, it's not a motorway.

THE COMMISSIONER: Yes. So five would be a motorway?

MR MCCOMBS: Yes.

THE COMMISSIONER: Is that the way it works?

MR MCCOMBS: Yes.

THE COMMISSIONER: Okay.

MR MCCOMBS: So star rating three is what you would expect to find for state highway rural arterials that are important to a region. And this length, as is probably obvious falls short of that target.

THE COMMISSIONER: Currently, as it stands. Yes, all right.

MR MCCOMBS: It doesn't sound much, shifting from two to three. I agree with that. But in the context in which these policies are set nationwide it's regarded as quite important.

THE COMMISSIONER: Certainly. I think your evidence is very clear. I do not have many questions at all. So I have read that, certainly with interest. We do have this matter, which Mr Doherty has raised for AOCOM(?) on behalf of the New Plymouth District Council and I would be remiss if I did not put his questions to you.

MR MCCOMBS: Yes.

THE COMMISSIONER: Firstly, 206 of your evidence-in-chief. This is where you talk about the 1.2 metre shoulder. I just wanted to clarify in my own mind the driver around the Building Code. You have said that it is designed in accordance with the Building Code. What is the Building Code trying to achieve? It is not a traffic safety issue, is it?

MR MCCOMBS: No.

THE COMMISSIONER: Can you just enlighten me on that, Mr McCombs?

MR MCCOMBS: Well, my understanding of it, sir, is that the Building Code application occurs in these circumstances in providing for a place of public - I was going to use the word "assembly" - but where the public are in the event that the tunnel is shut or some event occurs, which causes a queue of traffic in the tunnel itself, perhaps a fire, perhaps crash, something of that kind. And the Building Act, as indeed for this chamber itself, requires properly-dimensioned egress routes in the design. In this chamber, there are several egress routes that are labelled and similarly in the tunnel, which is regarded as a structure, the egress routes have to be clear and of

sufficient dimension to enable the people who might be there to leave safely.

THE COMMISSIONER: All right.

MR MCCOMBS: So what I've done is I've assessed the situation where the tunnel might be, for some reason, blocked by an avalanche or a fall or something at one end. I've pictured a situation in which the arriving traffic stream continues to accumulate so that the tunnel's full of stationary traffic, including a tour bus. I can then determine how many people would be involved when the fire brigade arrives and tells everyone to get out. And that leads to this piece that I've set out here in my evidence.

THE COMMISSIONER: So the --

MR MCCOMBS: It may seem somewhat artificial in one sense, but in another sense this could be quite real.

THE COMMISSIONER: But the 1.2 metre wide shoulders --

MR MCCOMBS: Yes.

THE COMMISSIONER: -- that meets a requirement of the Building Code in your view?

MR MCCOMBS: Yes.

THE COMMISSIONER: In terms of safe egress if there was a closure and people had to get out and exit the tunnel?

MR MCCOMBS: Yes.

THE COMMISSIONER: That is the driving force behind the Building Code requirements?

MR MCCOMBS: That is one of the requirements, yes. It may just be helpful if I just, if I may, ask -- mention that this matter of the shoulder width is also referred to in paragraphs 224 and 225 of Mr Ken Boam's evidence.

THE COMMISSIONER: Yes.

MR MCCOMBS: And it may just be a useful reference for you to have.

THE COMMISSIONER: Yes. I think I did ask Mr Boam about that and I have certainly read his evidence.

MR MCCOMBS: Yes.

THE COMMISSIONER: Back to Mr Doherty's 30 July letter, he had a particular question for you:

> "It would be helpful if Mr McCombs could explain how the proposed carriageway configuration with a shoulder of 1.252 metres satisfies the Transport Agency's functional requirements of operation, safety and maintenance."

So he is not talking about the Building Act.

MR MCCOMBS: No, he's not.

THE COMMISSIONER: He is talking about the Transport Agency.

MR MCCOMBS: No, he's not.

THE COMMISSIONER: Do you have any further commentary on that?

MR MCCOMBS: Well, yes, I might remark. The standards he's referring to might be categorised as for the guidance of wise men. In this particular case, the shoulder widths along all the

route outside of the tunnel match that expectation. Within the tunnel, however, there is always an issue of whether the shoulder width can be over -- well, you've heard mention by Mr Boam, wider than 2 metres, in which case it might be mistaken for a traffic lane, or narrower than 1 metres. And around the world, there's a lot of debate about these particular dimensions. Having had some experience in that and discussed it with other colleagues, the 1.2 metres that's been chosen in this design is, in my view, both appropriate and correct.

THE COMMISSIONER: Thank you. That is your evidence?

MR MCCOMBS: Yes.

THE COMMISSIONER: Thank you very much. All right, Mr McCombs, I have finished my questions. Thank you very much.

MR MCCOMBS: Thank you.

MR ALLEN: Thank you, Commissioner, and before I even turn around we have Mr Copeland already at the table. So the next witness for the agency is Mr Copeland on economics.

THE COMMISSIONER: Thank you very much. Welcome, Mr Copeland.

MR COPELAND: Thank you. I'll just read my highlighted statement.

THE COMMISSIONER: Thank you.

MR COPELAND: The Transport Agency has engaged me to prepare evidence assessing the economic effects of the project. My evidence considers the economic impact of the project, including (a) the costs and benefits associated with the construction of the project; and (b) the ongoing economic effects of the project once it is completed.

The Transport Agency is progressing a series of improvements to State Highway 3 north of New Plymouth between Mt Messenger and Awakino Gorge, namely the State Highway 3 improvements investment package. The project is the most significant of three sections of route improvements, proposed as part of the investment package. It involves the section of corridor in the vicinity of Mt Messenger between Uruti and Ahititi.

My evidence principally addresses the economic effects of the project as a standalone project, but it is also important to

consider the project in the context of the total State Highway 3 improvements investment package. The key observations and conclusions of my evidence are:

Enabling people and communities to provide for their social, economic and cultural wellbeing and health and safety, the efficient use and development of natural and physical resources, and opportunities for economic growth and employment are relevant considerations under the RMA.

The key drivers for the New Plymouth District economy are oil and gas exploration and extraction, manufacturing and services provided to the oil and gas, agriculture and agricultural product processing activities within the wider Taranaki region. The key drivers of the Taranaki economy are agriculture, manufacturing, including agricultural product processing and the heavy engineering industry, and the oil and gas industry.

South Highway -- State Highway 3 north of New Plymouth is a significant transport link for Taranaki's oil and gas, heavy engineering and agricultural product processing industries. For the oil and gas Sector, since shipments by sea transport of LPG to the north of New Plymouth are not now possible due to

Auckland's Manukau Harbour no longer being dredged for use by Holcim's cement vessels, they must go by road. State Highway 3 is also important for providing access to the Maui pipeline for repairs and maintenance, while LPG shipments by road via State Highway 3 provide a back-up source of fuel for gas customers in the top half of the North Island in the event of a Maui pipeline failure. State Highway 3 is also important for transporting a number of the oil and gas sector’s inputs into the region, including hazardous chemicals.

For the heavy engineering sector, some of Taranaki’s heavy engineering products are exported out of the region by road transport via State Highway 3. The sector is also reliant on State Highway 3 for transporting inputs into the region. A feature of this industry's inputs and outputs are the number of oversized loads that need to be carried. Improvements to State Highway 3 are expected to enable this route to be used for such loads, increasing local firms' competitiveness with Auckland, Waikato and overseas competitors.

For the agriculture sector, whilst the bulk of dairy and meat products produced within the Taranaki region are exported by rail, State Highway 3 to the north is still important for some dairy product exports, livestock transportation, poultry

exports and inputs to the dairy, meat and poultry production and processing industries.

During the project's three-year construction period, expected to be mid-2018 to mid-2021, there will be additional expenditure, employment and incomes for Taranaki businesses and residents. This includes both direct and indirect or multiplier economic impacts. The project is expected to lead to 148 additional jobs, $11 million per annum in additional wages and salaries and $66.2 million per annum in additional expenditure on goods and services purchased from local Taranaki businesses.

When completed, the project will lead to reductions in vehicle operating, travel time and road accident costs and improvements in route resilience, benefitting local residents and businesses and visitors to the New Plymouth district and wider Taranaki Region. For businesses, savings in vehicle operating, travel time and accident costs and improvements in route resilience result in increased productivity and increased business competitiveness. For residents, the traffic-related benefits of the project will produce cost savings, improved personal safety and enable the freeing up of time for other productive or leisure activities.

The project will also contribute a range of additional economic benefits including improvements in trip time reliability. Trip time reliability benefits relate to the savings in time that are made when motorists perceive a reduction in the likelihood of delays as a result of road congestion, road accidents or other incidents, which lead to variability in travel times for particular journeys. When this occurs, time is wasted by allowing for such events, even when they do not occur, and unproductive time is wasted at the destination. The project, in conjunction with other improvements on State Highway 3 north of New Plymouth, is expected to provide improvements in trip time reliability.

Increased regional economic growth. The project will increase the attractiveness of the New Plymouth district and wider Taranaki region for business and residential development, as well as improve accessibility for visitors. Therefore, the project is likely to result in increased levels of economic activity within the district and region from greater economic activity and population growth.

Generated traffic. Improvements to the route are likely to generate additional leisure trips by residents and visitors, while greater route resilience and trip time reliability in

particular will improve the competitiveness of Taranaki-based businesses and the attractiveness of the region to locate new businesses or expand existing businesses, generating additional traffic benefits.

Potential travel benefits. Potential travel benefits relate to the benefits to residents and businesses from knowing a trip can be made, even when no trip is undertaken. In cases where route resilience and trip time reliability are significantly improved, there are likely to be some potential travel benefits from the project. There are benefits to businesses and residents from a reduction in feeling isolated, even when trips are not undertaken. For example, residents through more reliable road access to Waikato Hospital and Auckland Airport and for businesses from more reliable road access for "just in time" deliveries of spare parts for machinery.

Specific road user benefits for Taranaki businesses. Unexpected delays on State Highway 3 north of New Plymouth can lead to significant additional costs as a consequence of:

Truck drivers being unable to complete New Plymouth-Auckland return journeys within daily maximum allowable driving

hours per day. This requires sending replacement drivers to complete journeys or extended delays while drivers are required to rest.

Trucks arriving in Auckland too late to avoid the congestion-free period on Auckland's commuter routes, should they exist at any time.

And thirdly, over-sized loads associated with Taranaki's oil and gas and heavy engineering industries being required to use the much longer alternative routes. The Taranaki branch of the Road Transport Association has estimated that additional costs of using State Highway 4 instead of State Highway 3 is $824,000 per day of closure for heavy commercial vehicles.

Lifeline economic benefits. State Highway 3 provides an alternative north/south route when other routes, eg, State Highway 1 and State Highway 4, are closed. Although the concurrent closures of State Highway 3 and the alternative routes may occur infrequently and for only limited duration, the economic impacts of such concurrent closures may be significant, given that it will affect much wider route catchments than just those of State Highway 3 when other routes are open.

Also, State Highway 3 north of New Plymouth provides an alternative to rail transport between Taranaki and the top half of the North Island, including the ports of Auckland and Tauranga. To this extent, the project increases the overall resilience of the state highway and rail networks in the central North Island.

The project will not result in negative economic externality effects. A small number of local property values may possibly be negatively affected by the project. However any such effects are a reflection of, and not in addition to, the intangible impacts of the project covered in the assessment of environmental effects and in the evidence of other technical experts.

The project will have significant overall net positive economic benefits for the New Plymouth district and the Taranaki region.

As discussed in my evidence, the positive economic effects of the project have been highlighted in submissions and in the section 42A reports of both the Taranaki Regional Council and the New Plymouth District Council. In particular, I wish to highlight that over 1,100 submissions in support of the project

were lodged, with many of those from individual submitters and organisations, referring to the economic benefits the project will bring. And secondly, the New Plymouth District Council section 42A report gives "significant weighting" to the economic benefits of the project.

THE COMMISSIONER: Thank you, Mr Copeland. I just have three questions for you. The first relates to paragraph 51 of your evidence-in-chief. Do you have that there?

MR COPELAND: Yes.

THE COMMISSIONER: You talk in that section about present value terms, the project having time savings of $44.8 million, vehicle operating costs of $19.9 million, et cetera.

MR COPELAND: Yes.

THE COMMISSIONER: What time period are those calculated over, Mr Copeland?

MR COPELAND: That would be over a 40-year time period, including the construction period.

THE COMMISSIONER: Okay.

MR COPELAND: And it's the -- that's the technique used by the -- just recommended by the Transport Agency in evaluating projects.

THE COMMISSIONER: Okay. So that is a 40-year time period. Thank you.

MR COPELAND: Understand that that doesn't mean to say the benefits wouldn't flow on subsequently.

THE COMMISSIONER: After that, yes. No, I understand that. No, that is helpful, thank you. In paragraph 55 of your evidence, again you comment on this. I think it is in your paragraph 5(f)(ii) and (iii) at the top of your third page. You make some comment about how this project will, in your opinion, lead to potential for greater economic or business opportunities, more visitors, increased attractiveness to locate new businesses. Given that we are looking at a four to six-minute shortening in time and a slightly less tortuous route, how have you come to that conclusion? Is that just a general feel-good factor? Is there anything empirical behind that?

MR COPELAND: Nothing empirical from me but I'm not alone. So it just makes me feel not quite so bad about that, you know. In this extent, there quite an extensive study done by the New Zealand Institute of Economic Research for Venture Taranaki, which I think is referenced in my evidence, and they reached the same conclusions. With respect, I accept your point about four minutes on a slightly better route. I think it's probably more important the perceptions of road closures or reduced road closures, again looking at this project in the context of a total package on this route. And I would see those factors as being more significant than a four-minute saving.

THE COMMISSIONER: Yes. So it is that perception of stronger links and more reliable, resilient links and those sorts of things --

MR COPELAND: Yes. As part of this --

THE COMMISSIONER: -- which would lead to increased business confidence and --

MR COPELAND: -- as part of this exercise, I went and spoke to just a handful of the major manufacturers who are associated with the agricultural sector, Fonterra, Silver Fern Farms and

Tegel. And it was certainly hammered home to me by their operations people how important this route was and how they felt the shortcomings of the route affected their businesses now.

THE COMMISSIONER: Yes, and we have had submissions from transport operators and others, suggesting they feel very much the same. I was just trying to get some sort of context behind that.

MR COPELAND: And also before I clear, with respect to tourism, tourism is a really small component of the Taranaki GDP, the gross domestic product, at the moment. But there certainly has been noises by others suggesting that may be the saving if the oil and gas sectors does not continue in the longer term.

THE COMMISSIONER: And better --

MR COPELAND: And so again, things like route closures and what have you are not -- that's of more importance than saving four minutes on a bus trip. So whether a tour operator can reliably send visitors down here.

THE COMMISSIONER: Okay. All right, thank you for that. Finally, just in terms of the other routes that have been looked

at, I do not think you had any involvement in the MCA looking at other routes? Have you looked at the different --

MR COPELAND: I did attend the workshop but, no, economics per se wasn't a determining factor. I think it would be fair to say that my evidence assesses the economic benefits of doing the project versus not doing any project, as opposed to selecting between alternatives. So all the alternatives, so long as they have similar savings and travel time, accident reductions, improved resilience, trip time, reliability, would generate the same economic benefits of the sort that I've assessed.

THE COMMISSIONER: Okay, yes.

MR COPELAND: There are other reasons why various other experts have chosen between the alternatives.

THE COMMISSIONER: Okay, I think you have answered my question before I even asked it.

MR COPELAND: Sorry.

THE COMMISSIONER: No, I really just want to get a handle that in economic terms you do not see any difference between the

short list of alternatives. It was you assessing the project and it is not alternative-bound or specific.

MR COPELAND: No, I mean, obviously if we had a shorter route then there would be greater travel time savings, lower construction costs, increased vehicle operating time savings. But I just reiterate, I think that with respect to this particular project resilience and trip time reliability, and perhaps not dismissing accident costs either, so long as an alternative, are more important.

THE COMMISSIONER: Okay. Thank you very much, Mr Copeland. Thank you.

Thank you, Ms Turvey. I think you have produced evidence-in-chief and you do not have any supplementary or rebuttal evidence, I do not think.

MS TURVEY: No.

THE COMMISSIONER: So if you could read out your summary statement, that would be great, thank you.

MS TURVEY: Thank you, Mr Daysh. I prepared, alongside my colleague Stephanie Brown, the social impact assessment for the project. The assessment was undertaken on a regional, recognising the strategic importance of State Highway 3 to the wider community, and on a local scale. The area directly affected by the construction with surrounding area from Ahititi to south of Uruti, primarily using the assessment framework of the International Association for Impact Assessment; the Transport Agency's Environmental Management Professional Services Guideline and the Social and Environmental Management Form and the Social Impact Guide; social issues identified in review of literature; the wider statutory planning framework and policy environment relevant to the project; and community engagement, undertaken in respect of the project in 2016 and 2017, including public open days, targeted interviews and a survey.

Positive social effects. In broad terms, the project will bring a range of significant positive social effects through the construction of a much-improved State Highway 3 through the Mt Messenger area. These benefits will accrue at the Taranaki regional level and also for those living in the vicinity of the project. These include:

Positive social benefits related to transportation, connectivity and accessibility due to greater resilience and improved movement of people and freight.

Assisting residents to feel less isolated and improving outsiders' perception that the region is difficult to access by upgrading one of the worst sections of the main link to Taranaki from the north.

Improving resilience by reducing actual and threatened road closures, which will in turn provide a social benefit to residents, given the critical reliance on Waikato Hospital and related health infrastructure and for groups such as sports teams travelling outside the region.

Reducing the frequency and duration of road closures, which will lead to improved reliability of the route, and will in turn lead to increased business confidence and potentially investment and economic growth in the region, as outlined by Mr Copeland this morning.

Increasing competitiveness for the Taranaki region due to an improved State Highway 3 being able to be used for oversized loads and a higher degree of certainty that the road will be

open, thereby improving accessibility and increasing flow-on economic benefits. Both Mr McCombs and Mr Copeland highlighted earlier on improving the competitiveness of Taranaki-based businesses and the attractiveness of the region to locate new businesses or expand existing businesses due to greater route resilience and trip time reliability; and increasing the attractiveness of the New Plymouth district and the Taranaki region for businesses and residential development, as well as improving accessibility for visitors.

Social benefits can be expected to flow from these economic benefits, particularly the retention of businesses in Taranaki, and encouraging the establishment of new businesses. This level of stability thus enhances employment opportunities and aids in retaining the region's growing population, which in turn leads to the maintenance and upgrading of social infrastructure such as houses, recreation areas and community facilities. Increased liveability then itself becomes a factor in retaining skilled technical and professional people in the region.

Adverse social effects. There will be some limited adverse social effects at the local scale on the small number of people living in the immediate vicinity of the project. Mr Napier yesterday explained that there are eight private properties that

will need to be acquired, in part for the project, temporarily during construction or permanently, and that excludes the Ngāti Tama land. Agreement has been reached for the permanent or temporary acquisition in respect of four of these properties, while active negotiations are ongoing in respect of the others.

Discussions are ongoing with Mr and Mrs Pascoe. The Pascoe house will not be able to be lived in during construction and the Pascoes have previously communicated to the Transport Agency they do not wish to stay on site during construction, which has an adverse effect on their lifestyle and wellbeing. Mitigation options are limited, but could potentially involve temporary relocation during construction, and post-construction relocation of the existing home or construction of a new home. Other than land issues, adverse social effects will occur primarily during construction of the project.

In response to submissions, I have reviewed the submissions from the State Highway 3 Working Party, the New Zealand Automobile Association, Taranaki District, the Heavy Haulage Association, Steven Barham, Christine Brown and the "form" submissions of over 1,100 parties. These submitters, along with 20 others who did not submit "form" submissions, are in support of the project. The submitters consider that the positive

effects of the project, for example, improved safety and resilience and journey time and reliability, will contribute to improved social and community effects. The submissions reviewed illustrate an overwhelming desire to see the project constructed, given the significant benefits.

I have also reviewed the 20 submissions in opposition. A very small number of these submissions, those made by J Washer and R Newman, are concerned about the impacts on directly affected landowners, in particular, land that is needed for the project. I note that the Public Works Act 1981 addresses the matter of property compensation. However, I acknowledge that such processes can create concern and anxiety and accordingly a number of key mitigation measures were recommended, and have been incorporated into proposed conditions.

With response to New Plymouth District Council section 42A report, the 42A report identifies impact on the Pascoe family, who have very strong linkages to the land, as well as the potential impact on social cohesion on the local community. The Pascoes clearly have a strong affiliation with their land and any loss of land will have an impact on their way of life, including the disruption of relocating during construction.

As above, I understand that discussions are ongoing between the Pascoes and the Transport Agency as to how the Pascoes will be accommodated or relocated. If the Pascoes return to live in the same location, the operational noise effect that would be experienced has been assessed as minor, and any amenity effects could be mitigated by landscape planting. If the Pascoes' home was relocated or rebuilt elsewhere on the property, any social cohesion effects would be temporary given they would be return to their land.

In terms of mitigation, the key mitigation measures in respect of social effects have been incorporated into the proposed conditions, primarily through the construction environment management plan, and include:

Ensuring that good information is available to affected individuals, local community groups, in particular schools, recreational users and the general public. A public information strategy should be prepared as part of the consent application and this should identify the various communities of interest and how construction information will be provided. Provision has been made in the draft conditions contained in the section 42A report prepared by council regarding the -- communications and public liaison, complaints and construction environmental

management plan. I support the inclusion of these conditions to this effect.

Development and implementation of relevant construction management plans, as referred to in the various specialist reports and evidence. Management plans have been prepared for consideration through the hearing process.

A community liaison person should be appointed by the Transport Agency for the duration of the construction phase. This person should be the main and readily accessible point of contact at all times for persons affected by the construction and operation of the project.

At all times during construction work, the Transport Agency should maintain a permanent register of any complaints received alleging adverse effects from or related to construction of the project.

Involving schools and the community in the construction process through regular talks, and engaging schools in the process by providing access to ecologists and other specialists.

Overall, the project has significant social benefits to the region in terms of way of life, growth and development and wellbeing. Furthermore, the minor negative social effects on the small local population can be appropriately avoided, remedied or mitigated.

THE COMMISSIONER: Thank you, Ms Turvey. I did note a few questions in your evidence-in-chief, which I will go to, but you may well have answered them in some of your summary notes. So we will go through those. Your paragraph 31 of evidence-in-chief is regarding the Pascoes. You say that the house will not be able to be lived in during construction. In your understanding, is that because of adverse effects from noise, in terms of amenity effects, noise, heavy traffic movements. Is that the reason why it cannot be lived in?

MS TURVEY: Yeah, it's an amalgamation. It would not be a pleasant living environment during the construction.

THE COMMISSIONER: Their access would be interrupted and ...?

MS TURVEY: Yeah, and noise factors and obviously there would be some degree of amenity, structure, personnel ...

THE COMMISSIONER: All right, okay. Paragraph 59, you use the term "anxiety effects" and how the CEMP can be used to deal with those through communications plans. I think in section 15 of your summary, you even actually talk about some of those types of things. Have there been additional matters added in to the CEMP conditions dealing with those issues?

MS TURVEY: There's been numerous discussions through the process where I have reviewed all of the specialist reports and we have had involvement in the preparation of the consent conditions. And I've also agreed with some of the additions of -- where New Plymouth District Council suggested in the section 42A report. So I'm confident that those -- the amenity, air quality and noise vibration issues can all be addressed in those construction environment management plans and the suite of management plans.

THE COMMISSIONER: Yes, and what about the complaint procedures and the community liaison? Those have all found their way into the latest set of conditions, as I understand it?

MS TURVEY: Yes, and I'm satisfied that, in addition to the conditions, we propose some additional ones that are submitted.

So I'm satisfied that there's a robust package of conditions to address those concerns.

THE COMMISSIONER: All right. I did have a further on your paragraphs 80 and 83. I will just look at those now for your evidence-in-chief. No, I think you have actually dealt with you in your summary. So thank you very much, Ms Turvey. I have completed my questions.

MS TURVEY: Thank you.

THE COMMISSIONER: Thank you. We are doing reasonably well, Mr Allen, I think.

MR ALLEN: We're doing very well, and the next witness is Mr Lister on landscape.

THE COMMISSIONER: Good morning, Mr Lister.

MR LISTER: Good morning, Mr Daysh.

THE COMMISSIONER: Proceed with your summary statement.

MR LISTER: Okay. I'm a principal of Isthmus and my practice is providing landscape input to the project and I am overseeing this work. I might add there I must pay tribute to the work of Mr Bruce McKenzie and Ms Lisa Rimmer, who are doing the heavy lifting in the project. This includes input to the consideration of alternatives, the selection of the preferred route, and highway alignment and design, and mitigation measures as described in the Landscape and Environmental Design Framework, the LEDF.

Landscape input to the project is being undertaken in collaboration with other disciplines, particularly civil engineering and ecology. It is also being undertaken in collaboration with Ngāti Tama, which to date has included input to route selection, design and rehabilitation measures. Ngāti Tama and the alliance have developed an approach to further give effect to principles set out in the LEDF, including cultural expression artworks, naming, and involvement in the implementation and management of the environmental mitigation works, and these matters are given effect to by condition 4. And that's condition 4 in the conditions attached to Mr Roan's supplementary evidence.

My evidence refers to a site visit on 28 February this year. At that time, I was unable to visit the Mimi River tributaries because of myrtle rust disease, which had been recently identified in that area. But I've subsequently visited these tributaries and the southern and northern portal sites on 20 July.

Now just describing the existing landscape setting, Mount Messenger area is steep, bush-clad, heavily dissected, papa hill country, and this country must necessarily be traversed by State Highway 3 between Taranaki and Waikato. In effect, it forms something of a barrier between these regions. The existing highway follows a winding route over a saddle immediately below and to the southeast of Mount Messenger/Parininihi. The proposed bypass follows a lower route by way of a tunnel beneath and slightly further to the southeast of the saddle, linking tributaries of the Mimi River and the Mangapepeke Stream valleys. The area west of Mount Messenger, through which more direct alternatives were considered, has considerably higher landscape values. It is identified as an "Outstanding Natural Landscape" in the draft District Plan.

I consider the following attributes of the project alignment and design help avoid and minimise potential adverse effects:

First of all, the alignment follows the topography, linking north and south valleys, separated by a narrow ridge. Secondly, the tunnel keeps the alignment at a relatively low elevation, reducing visibility and retaining the integrity of the leading ridge. Commissioner, I've got a 3D printed model of that section of the highway, which I might bring out --

THE COMMISSIONER: Sure, thank you.

MR LISTER: -- which illustrates that aspect of it. So it illustrates the existing -- this is south to north, illustrates the existing route of the saddle and the tunnel, which is just off the edge, and the proposed route through there with the -- this is the largest --

THE COMMISSIONER: The large fill.

MR LISTER: -- large fill.

THE COMMISSIONER: Yes. I thank you.

MR LISTER: Just in terms of that point, of the alternatives considered, the option E was the one that had the lowest vertical elevation by quite a margin.

So returning to paragraph 7(c), the highway will be "embedded" in the landscape through such measures as the tunnel, the high proportion of box cuttings and the alignment along the edge of the Mangapepeke Valley. Visibility of the route is restricted to a small number of properties. It will be mostly experienced by its future travellers for whom it will be a scenic section of the highway. And finally, while the bypass alignment will have easier grades and higher design speeds, it will nevertheless retain the impression of a border between Waikato and Taranaki, which has been referred to as "the jaws of Ngāti Tama".

Nevertheless, any major highway project is likely to have adverse landscape, visual and natural character effects, the potential for which is increased by the steep in this instance by the steep, bush-covered hills in the Mount Messenger area. Because of this context, the project will require considerable earthworks, clearance of indigenous vegetation, stream diversions and major structures such as the bridge and tunnel.

I consider the adverse effects that are not able to be avoided or minimised by the alignment and design will be appropriately remedied and mitigated through the proposed measures, including the following:

The offset planting, in particular the restoration of the Mangapepeke Valley to a natural system, comprising replanted stream, kahikatea wetland forest, and bush and I've set out the quantities there. Those quantities relate to the whole project, not just in Mangapepeke Valley.

Secondly, fine-tuning the alignment and using steep MSE fill batters to minimise encroachment on significant trees and vegetation. MSE is mechanically stabilised earth.

Adopting steep cut batters that echo the typical cliff faces in the area’s papa rock and avoiding benching, and promoting the natural revegetation that is common of such faces.

Naturalising those stream diversions that are not otherwise able to be avoided.

Contouring and revegetating surplus fill disposal sites.

Refining and simplifying the suite of highway furniture, the barriers, signage poles, lights, bridge barriers and so on, in order to reduce visual clutter.

And restoring access to the Department of Conservation estate, particularly through a realigned "Kiwi Road track" from the pull-off area on the existing State Highway 3.

So my conclusion on landscape, visual and natural character effects. I consider that implementation of such measures will mitigate adverse natural character effects to the point where they will be "moderate" in magnitude overall, and will mitigate adverse landscape and visual effects to the point where the residual effect will be "moderate-low". There will also be some positive landscape effects arising from the scenic nature of the corridor, and the rehabilitation of the Mangapepeke Stream.

So turning to matters raised in submissions. Several submissions did not agree with the route selected. From a landscape perspective, the proposed route is preferable. In particular, the area west of Mount Messenger – and Mount Messenger/Parininihi itself – by that I mean the maunga have higher landscape values, including identification as ONL in the

draft District Plan, that would result in greater adverse landscape effects.

Some submissions are critical that the proposed tunnel will perpetuate constraints on oversized loads caused by the existing tunnel. And while transport matters are addressed in other evidence - you heard from Mr McCombs that the tunnel will in fact accommodate oversized loads - from a landscape perspective, the tunnel reduces potential adverse effects by allowing a lower elevation route and retention of the natural ridge. And the Department of Conservation submitted that, despite its support of the proposed route over other options, there will nevertheless be significant adverse effects on the natural environment and the proposed conditions are inadequate. Now while there is overlap with landscape, the matters raised by the department principally relate to ecology and have been the subject of further work between the department and the agency or the alliance and are addressed by other witnesses.

Now turning to the matters raised in New Plymouth District Council section of the section 42A report, Mr Bain reviewed the landscape aspects of the project on behalf of the district council. He agrees that the route selection has had proper regard to landscape matters. He does not dispute the overall

level of landscape and natural character effects stated in the Landscape Assessment. And he considers the effects would be appropriately addressed through the proposed mitigation measures. However, while he considers the measures proposed in the LEDF are "exemplary in their range and quality", he does not consider they are adequately given effect to by the conditions. I agree with Mr Bain and consider this can be addressed as follows.

Now firstly, in my evidence I recommended the name "ecology and revegetation management plan" would be more -- would more accurately describe the purpose of the misnamed "ecology and Landscape management plan", the ELMP. Now text has been added to the front of the ELMP to clarify that its focus is ecology and revegetation matters and that the LEDF remains the overarching framework that guides not only the ELMP, but other aspects of the detailed design, including earthworks, structures, highway furniture, and cultural expression. And the LEDF has effectively played this role to date.

Just by way of further explanation, changing the name of the report was problematic because of the number of references to it in other documents. So that --

THE COMMISSIONER: I thought so, yes.

MR LISTER: -- that horse had already bolted, unfortunately.

THE COMMISSIONER: Yes.

MR LISTER: Secondly, the LEDF is given effect to by changes to the conditions along the lines proposed in the section 42A report as follows:

Condition 8 of the conditions attached to Mr Roan’s supplementary evidence gives effect to conditions 1(a), 5 and 6 recommended in the section 42A report. It includes the LEDF with the list of the other management plans and requires works be carried out in general accordance with the LEDF.

Condition 25 - and once again, this is conditions attached to Mr Roan's supplementary evidence - gives effect to condition 32 recommended in the section 42A report. It requires that the LEDF inform the detailed design and lists elements relevant to mitigating landscape, natural character and visual effects. The list has been fine-tuned to, first, avoid unnecessary duplication of ecology and revegetation matters already covered in the ELMP. Secondly, to recognise that fill batters may be

either contoured or formed steep so as to minimise footprint. And that's particularly around sort of the trees and significant vegetation areas. To include matters not covered in the section 42A report list such as "cultural expression and kaitiakitanga". And fourth, to exclude items such as walking access through the tunnel which is not to be provided for safety reasons, or provision of access to the Mount Messenger track which is not affected by the project.

Then finally, condition 26 of the conditions to Mr Roan's supplementary evidence gives effect to condition 38 in the section 42A report. And it requires a peer review of the detailed design by a suitably qualified and experienced landscape architect, and written confirmation verifying that the design is in general accordance with the LEDF.

THE COMMISSIONER: Thank you, Mr Lister. Just referring to those condition changes, there seems to be quite a lot of movement in the conditions in this area, Mr Roan's evidence. So that's directly in response to the contributions from the district council and --

MR LISTER: Yes, those ones that I through are directly relating to the section 42A report.

THE COMMISSIONER: You have had input to looking at those and agree with those, by the look of things?

MR LISTER: Yes, I provided the text for them.

THE COMMISSIONER: The actual text comes from you. Thank you. Have you had a review of the latest commentary from Mr Bain in the revised or updated section 42A report from the district council?

MR LISTER: Yes, I have.

THE COMMISSIONER: Is your read that there is nothing further that he is concerned about from his role. Is that how you have read that?

MR LISTER: That is my -- that's my understanding, yes.

THE COMMISSIONER: Okay, so there are no residual issues that you are aware of from a landscape point of view?

MR LISTER: No.

THE COMMISSIONER: All right. I have read your evidence-in-chief and I did have a few queries along the way. So perhaps going to 40(c) of your evidence - I think that is on page 12 - and this is the rock drape issue, which was not something that is favoured from you from a landscape point of view. You were here when Mr Symmans talked about it yesterday?

MR LISTER: Yes.

THE COMMISSIONER: Is your view that that is a necessary and reasonable construction response and in terms of landscape effects is to be anticipated?

MR LISTER: I'm not sure -- just explain the question again?

THE COMMISSIONER: Yes. I think previously there was some doubt about whether the rock drape would need to be used.

MR LISTER: Yes.

THE COMMISSIONER: I think Mr Symmans has done some further work and has now confirmed in some areas they will be required.

MR LISTER: Yes.

THE COMMISSIONER: Does that change your view of your landscape assessment of the project?

MR LISTER: No. This was a -- so the LEDF refers to the rock drapes and its preference is for them not to be there and for work to carry on to minimise them. And that work has carried on in the interim since the detailed design has carried on. And those -- and I'm aware that the amount of rock drape has been reduced significantly and that that work is ongoing to minimise that as much as possible. And that's involved changing the profile of the cuts to widen the area at the bottom for rock fall. And also looking at that in conjunction with the nature of the roadside barriers, in some cases using concrete barrier rather than Armco or wire rope. So that adds an extra protection and the trade-off is that you can do away with the rock drape in some places.

THE COMMISSIONER: Yes, all right. I am looking at paragraph 46(a) and this is the views in the Mimi Valley landscape. You note the new alignment is in the same hill face as the existing highway and comparatively will the visibility and visual effects of the proposed alignment in this valley be greater or lesser than the existing highway in your view?

MR LISTER: Sorry, say it again.

THE COMMISSIONER: You say it is on the same hill face.

MR LISTER: Yes.

THE COMMISSIONER: Your opinion of the visibility and visual effects of the proposed alignment in terms of the existing highway, it's going to be greater or lesser in that valley?

MR LISTER: What I'm saying there is that the road, the hill face on which the road is being aligned, is already influenced by the character of the existing roads. So that reduces the potential impact of the road on that aspect and it's a point (Overspeaking)

THE COMMISSIONER: That point there, just for clarification. Thank you for that. I will just look through. This term "the jaws of Ngāti Tama", is that around how the portals might be able to be developed in terms of some cultural expression perspective? Is that what that is about?

MR LISTER: I think the phrase refers to, you know, the longstanding position of Ngāti Tama as the kind of defenders or the gatekeepers of Taranaki and refers, as I understand, to the nature of the land itself and the warrior skills of the iwi. And it is being reinterpreted in the tunnel portal so that will be given effect to first of all by having the northern portal quite different to the southern portal. The southern portal is friendly and the northern portal is facing the Waikato.

THE COMMISSIONER: I understand.

MR LISTER: And those designs are being worked through, but concepts that I have seen include things like sentinels, which reflect the warriors, and treatment of the portal that reflects te wero, the challenge, so that, you know, in an abstract sense people approaching from the north will be challenged and then accepted into Taranaki.

THE COMMISSIONER: Have those designs been prepared by Ngāti Tama or within your firm in consultation? What is the process?

MR LISTER: In collaboration.

THE COMMISSIONER: Collaboration.

MR LISTER: So there are some iwi designs shown in the LEDF, but those have been taken much further since the statement.

THE COMMISSIONER: All right. I saw those. I just wanted to see that. Yes, that is helpful. Thank you, Mr Lister. That is all I have for you.

MR LISTER: Thank you.

THE COMMISSIONER: I think, Mr Allen, that is probably a good time for a break.

MR ALLEN: It is.

THE COMMISSIONER: Fifteen minutes in my experience is always a little bit tight. So could we just have 20 minutes and come back at --

MR ALLEN: That's good and we're slightly ahead of time so ...

THE COMMISSIONER: Yes, very good. So be back at 10.50 am, thank you.

MR ALLEN: Thank you very much, sir.

(Adjourned until 10.50 am)

MR ALLEN: Thank you, Commissioner, and the next witness is Mr Ellerton on noise and vibration effects.

THE COMMISSIONER: Thank you. Morning, Mr Ellerton.

MR ELLERTON: Morning, sir.

THE COMMISSIONER: Just carry on with your statement.

MR ELLERTON: Thank you. I reviewed the relevant materials and prepared my evidence on noise issues following my colleague Shaun King's preparation of the environmental noise and vibration assessment and the construction noise management plan for the project. I read the documents and reports Mr King prepared. I agree with the conclusions reached in the noise and vibration assessment and the measures set out in the construction noise management plan.

Operational Noise. Predicted traffic noise generated by the Mt Messenger Bypass project will comply with NZ Standard

6806 without any specific acoustic mitigation. Overall traffic noise effects are therefore considered acceptable. Potential traffic vibration effects at all dwellings will be negligible.

Construction noise levels at the small number of nearby dwellings are predicted to comply with the daytime criteria set out in New Zealand Standard 6803. However, I note construction work at night will require particular attention to be paid to the house at 2397 Mokau Road, which is in close proximity to a spoil disposal area. Noise mitigation such as a solid site hoarding and appropriate onsite management to avoid unnecessary noise will be required if the dwelling is not rented and/or occupied by the Transport Agency during the construction period. I also note that night works in close proximity to other dwellings will require management measures to ensure adverse effects are mitigated as much as practicable. Construction vibration levels are predicted to comply with the Transport Agency guidelines, which are deemed acceptable. A construction noise management plan has been prepared as part of the assessment of environmental effects and will be implemented for the construction phase of the project.

I am not aware of any submission that raises noise issues other than in general and non-specific ways.

Section 42A report. There are no issues of any significant disagreement raised by the New Plymouth District Council reporting officer in respect of construction or operational noise or vibration issues. I note that the reporting officer has recommended that the reduced hours and days of operation of the spoil area be extended to include public holidays, and the Transport Agency agrees to this measure, which is included in Mr Roan's supplementary evidence. I agree with the conclusion of the New Plymouth District Council reporting officer that consent should be granted with the noise-related conditions proposed by the Transport Agency, and including the reporting officer's recommendations.

THE COMMISSIONER: That is very short and sweet. Thank you.

MR ELLERTON: Yes.

THE COMMISSIONER: Yes, I did have a couple of questions in relation to your evidence-in-chief, Mr Ellerton. Can we go to paragraph 40(c) for a start?

MR ELLERTON: 40(c), sir?

THE COMMISSIONER: Yes. You are talking about 3072 Mokau Road.

MR ELLERTON: I'll just have to check we've got an up-to-date version of evidence here. Sir?

THE COMMISSIONER: Yes. I 3072 Mokau Road the Pascoe property?

MR ELLERTON: It is, sir, yes.

THE COMMISSIONER: In this paragraph, I think you are talking about operational noise, so once the road is operational. Is that correct?

MR ELLERTON: Yes.

THE COMMISSIONER: You refer to noise increases, 3 dBA and 17 dBA respectively, in terms of some facades and 12 dBA at different facades of that dwelling. What is your overall conclusion in terms of adverse effects on that property?

MR ELLERTON: The overall conclusion is that there won't be any adverse effects from the operation of the state highway. The change in noise that I was referring to is just because the road

orientation compared to the house layout is obviously quite different to the existing layout.

THE COMMISSIONER: Yes, all right, but at 40(c)(ii) you talk about 17 dBA being:

> "More than a doubling of loudness and overall is considered a substantial increase in traffic noise to these facades."

Even with that conclusion, you are saying that there are no adverse effects on that property?

MR ELLERTON: That's right, yeah. So that's a commentary on the increase in noise to that façade because of the effective realignment of the road. Conversely, the façade that was potentially receiving that noise is now a decrease of up to 12 dB. So --

THE COMMISSIONER: So it is a switching of ...?

MR ELLERTON: Yeah, switching of facades that's been receiving the noise.

THE COMMISSIONER: Okay.

MR ELLERTON: But the overall conclusion is that at a noise level of 54 decibels - that's a category A road in terms of New Zealand Standard 6806 - which has an upper limit of 64 decibels. So the predicted received noise level is 10 decibels lower than --

THE COMMISSIONER: Lower than that overall?

MR ELLERTON: Yeah.

THE COMMISSIONER: Okay. Thanks for that clarification. Page 44, paragraph 44, and I think we are talking about the same house, 3072 Mokau Road. Your working assumption is that that property will not be occupied. So you have not actually done an assessment because of that during construction?

MR ELLERTON: Yeah.

THE COMMISSIONER: Yes. Getting back to conditions, if that was occupied, I suppose it is a property-related effect and whether conditions need to deal with that, I am not quite sure what the agency's position is on that, given that there does not seem to be an agreement with that property owner at the moment. Would

your evidence be that if that property was occupied, there would be adverse effects from construction noise?

MR ELLERTON: If the property was occupied, the noise mitigation measures implicit in the construction noise management plan would kick into effect and be able to reduce the noise received at the house. So it is doable.

THE COMMISSIONER: It is doable in terms of mitigation?

MR ELLERTON: Yeah.

THE COMMISSIONER: All right, thank you for that. Okay, paragraph 50, moving location. So this is 2397 Mokau Road. I think this is construction noise again, possibly using noise barriers. Is that conditioned or is that part of the construction noise management plan that would kick in that type of response if that was required?

MR ELLERTON: It is conditioned in the construction noise management plan, from my recollection. This is the property at the other end of the proposed works and there is also a chance that that property will be rented by the alliance for the duration of the construction works. And that's the ifs/maybes

kind of part with regard to the conditions relating to noise at that house and then for whether or not night time use of the spoil deposit unit can be used.

THE COMMISSIONER: It is a night time issue?

MR ELLERTON: Yeah. So if the alliance rents the house, then obviously there won't be any issue. If the property's still rented and occupied, night time use of the spoiling area won't occur, but some mitigation will be required in terms of that, yes.

THE COMMISSIONER: All right. Yes, thank you. I think my last question: you have seen the latest 42A report from the district council. I think you confirmed in your summary statement that you do not think there are any outstanding noise issues from the council's perspective. That is your understanding?

MR ELLERTON: That's correct, sir.

THE COMMISSIONER: All right, thank you. Thank you very much.

MR ELLERTON: Thank you, sir.

THE COMMISSIONER: Short and sweet.

MR ALLEN: Thank you, Commissioner. The next witness is Mr Clough on heritage/archaeological matters.

THE COMMISSIONER: Dr Clough, is that right?

DR CLOUGH: Correct.

THE COMMISSIONER: Yes, thank you. Welcome, Dr Clough. Could you just read your statement?

DR CLOUGH: Yes. My evidence discusses the potential effects of the project on historic heritage, archaeology and built heritage, as well as measures being adopted to address potential effects. I give a brief history -- a brief summary of the historical background from the project area and the wider north Taranaki region to give a sort of reference point for the project.

The archaeological background. The initial work was carried out -- the initial desktop was carried out by Opus and we've subsequently built on that report. The desktop identified some 20 recorded archaeological sites within about 7 km of the

project area. The nature of distribution of archaeological sites, and in fact most areas around New Zealand, is that they are coastal. One of the early routes of that was a coastal option. This is before the real long list was formed. But, it soon fell away for effects on various criteria, but archaeology certainly would have been one of them because there are pa sites and settlement sites all up and down the coast. Up and down the Kapiti coast and every other coast.

Moving inland, we really only have a couple of -- well, one recorded site, Makuku Pa, and another recorded location of ancient gardening at Ngā Oko Oko which is adjacent to Makuku Pa at the southern end of the route in the Mimi Valley.

So, the conclusion of the background study, really the shortlist options, there were no known sites were affected. But, the presence of -- given the nature of archaeology, it's rather a bit disguised, that the presence of archaeology in the southern end in particular, gave rise to the potential for archaeological effects and hence we are able to sort of refine our focus in terms of the actual field work. So, there were risks but no known effects at the shortlist stage.

Results of the field survey. Mr Lister referred to the jewels of Ngāti Tama. In my NCA presentation, I referred to this being tiger country, and I think they have a similar sort of sense to them. It was a job that I willingly gave to my team. My knees wouldn't take it. But here I'd like to thank Ngāti Tama because Conrad O'Carroll acted as a guide to my team and co-author Kim Tatton. And Kim reports that basically without Conrad, she doubted if she would have made it out alive. I'm still not forgiven.

It's rough territory. As I say, the focus of settlement or intensive settlement was on the coastal plains and near navigatable rivers. But, the inland would have supplied a source of raw materials, and certainly there's a lot of early trails and pack tracks and bridle trails. I feel that there's unlikely to have been any significant occupation in the upper Mimi Valley and the Mangapepeke Valley because of the frequent flooding and sort of steep inaccessible valley sides. They are currently sliding all over the place and they came out rather muddy from that survey.

During the survey, they identified the remains of a historic pack track on the saddle ridge line just above the two valleys. It's located on private land to the south and above

the driveway access off the rest area, which was formed in -- the rest area was formed in the 1930s. There could be further evidence of the pack track outside of the project footprint. They detected about 500 metres remaining of the pack track when it drops down into farmland.

We also had an additional look, there was an information request from the council regarding the possibility of roadside hills that were dug away to provide road metal in 1909, but we found no evidence of those along the road. Probably because the road over the years had been widened and any of that evidence likely to have been removed. No Māori archaeological sites have been identified within the footprint, either through historical information, previous investigations or field inspection.

Assessment of effects. The pack track and earlier sections of road alignment would ideally be avoided by the proposed construction of the project. But, if not, any effects can be appropriately mitigated through archaeological recording under the provisions of the HNZPTA.

Both sites potentially meet the definition of archaeological sites under the Act. The safe approach is to assume an authority from HNZ would be required to modify them.

However, they are of limited to moderate archaeological value and historic heritage significance.

In my report, I actually questioned their true archaeological nature because roads and tunnels have been -- yes, they were constructed prior to 1900 originally, but the reality is the tunnels is what extended out, the roads are regraded and so there's not really a lot of archaeological information remaining there. But, technically they are pre 1900 so we take a cautious approach. There is still at least a recording of their location and the original route to be achieved.

While no Māori sites have been identified, the fact that the sites were recorded, particularly in the southern area, it's possible that unrecorded remains may be exposed during development. I consider this a low possibility given the steep rugged terrain covering much of the route, and the fact that the remainder of the route is within low-lying valley floors prone to flooding.

The possibility of unrecorded archaeological sites can be provided for under the Transport Agency's accidental discovery protocols B45, and they can be modified as appropriate in

consultation with Ngāti Tama. This would ensure that appropriate actions are taken and relevant organisations informed in the event that archaeological sites or kōiwi or taonga are encountered during works. However, as recommended in my assessment, the Transport Agency has applied for an archaeological authority under HNZPTA to cover all works undertaken for the project as a precautionary measure and to avoid delays through unidentified subsurface features being exposed during construction.

The project will remove the existing road over Mt Messenger from the State Highway network and this will avoid further widening of the existing road and potential removal of the Mt Messenger tunnel, which is preferable from a heritage perspective. However, the bypass will make the bypass section SH3 redundant and therefore ultimately compromise its heritage values if options for adaptive reuse such as walking or cycle routes are not considered as part of the State Highway revocation process.

Response to section 42(a) report. My evidence responded to a query around the house and various buildings on the Pascoe property at the northern end of the Mangapepeke Valley that are located within the project construction corridor and will be

removed. Background research and field inspection provided no evidence that any of these buildings have any particular heritage values, or that they date much earlier than the 1940s.

Conclusion. Taking all of the above into account, I concluded in my evidence that the potential adverse effects of the project and construction on archaeological sites and historic heritage will be minor.

The relevant proposed designation conditions and the implementation of accidental discovery protocols and an archaeological authority, which will include an approved archaeological management plan, will ensure that any adverse effects are appropriately managed and mitigated.

THE COMMISSIONER: Thank you, Dr Clough. I read your -- I have ready your evidence-in-chief with interest. Thank you for your summary. Just out of interest, I suppose, there was a question from the District Council to you about the papa kilns. Can you explain what they are and what they were used for?

DR CLOUGH: The production of road metal. Essentially, they are burning the papa to break it down and use it as road surfacing. So, roadside kilns, basically. They were crude things, not full

constructions. A bit like the old brick kilns where you're piling wood and everything over the -- between all the bricks and lighting it. It's essentially a similar sort of crude kiln.

THE COMMISSIONER: Is that just to make the papa more friable for use as road metal?

DR CLOUGH: Yes.

THE COMMISSIONER: Interesting. Thank you. You talk about the archaeological -- sorry, the accident discovery protocol.

DR CLOUGH: P45.

THE COMMISSIONER: P45. You say it is modified as appropriate in consultation with Ngāti Tama. Has the protocol for this project been modified or had Ngāti Tama input? Do you know the status of that?

DR CLOUGH: I'm not sure where we are with that, because the P45 itself is ... someone here may be able to clarify. The P45 is a working ... it’s being worked on. Well, certainly we've been inputting into it and getting responses back and comments back

from various stakeholders. So, I'm not quite sure whether it's a finished piece of work or not.

THE COMMISSIONER: But there is an accident discovery protocol as part of the conditions suite?

DR CLOUGH: Yes.

THE COMMISSIONER: I will have to check with Mr Ryan.

DR CLOUGH: But, the other thing, of course is the archaeological management plan, which has been prepared. I do have a copy of it. That also includes, for Heritage New Zealand processes, it also includes accidental discovery protocols and that will override the P45.

THE COMMISSIONER: I just have not got to reading all of the details of that in the conditions. But, I just wanted to see whether you knew whether the one that is in the conditions ...

DR CLOUGH: No, I'm not sure how it's been modified as yet. But, certainly the Ngāti Tama have seen the archaeological management plan as part of the application to Heritage New Zealand.

THE COMMISSIONER: All right, I might have to follow up with Mr Ryan about the status of the accident discovery protocol.

Just in terms of the application to Heritage New Zealand, that has been made. Is that in process?

DR CLOUGH: Yes. Well, it's been accepted by Heritage New Zealand. I can't remember whether it's been granted. Once it's accepted, it's a fairly straightforward process and it will be granted.

THE COMMISSIONER: Okay.

DR CLOUGH: There are no real issues here so it's a formality.

THE COMMISSIONER: Sure, thank you. My last question is about your paragraph 14 of your statement. You talk about the bypass section of State Highway 3 becoming redundant. I had understood from the other evidence that would need to remain open.

DR CLOUGH: Sorry, paragraph 14 of my summary?

THE COMMISSIONER: Yes. I thought the concept was that would need to remain open for access to one of the properties. Is that not your understanding?

DR CLOUGH: I actually don't know the answer to that. It's just the process here in terms of revocation removing it from State Highway status and decisions need to be made at that time as to what function it may serve.

THE COMMISSIONER: All right. So, you are not aware of its long-term use?

DR CLOUGH: No, and it would be dealt with in that process. I mean, there may have been more advanced discussions which some of my colleagues could update you on that issue.

THE COMMISSIONER: I thought I heard evidence yesterday that it would need to remain open, but Mr Allen can just clarify that.

DR CLOUGH: I think we're leaning in that direction, that would be the preference.

THE COMMISSIONER: Okay, all right, thank you very much Dr Clough.

Mr Allen, just on that point, maybe you could check on that. It was my understanding from evidence that it would ...

MR ALLEN: We were just talking about that, sir, and we'll get back to you on it.

THE COMMISSIONER: Thank you. Mr Ridley, I think. So I see you have all been given a maximum of four pages for your statements. Just for the NZTA team and the witnesses, I am finding these statements very, very helpful because the evidence has been moving through various stages. This brings it together right up to date so it is very helpful to me so I would like to thank you for doing this.

Mr Ridley?

MR RIDLEY: Thank you, Commissioner. Good morning. I'll just read through my highlights package paragraph 1. Process and project. Along with my colleague, Sharon Parackal, I prepared the Construction Works Assessment Report for the project. I was also part of the MCA process for the project where specific construction water management issues formed part of the overall route selection options assessment.

I am familiar with the project site and the existing State Highway 3 alignment. As part of the Construction Works Assessment Report development, I have visited the site including with staff and representatives of TRC and also the Department of Conservation. The Project is approximately 6km in length, with an earthworks volume of approximately 890,000m^3 over a total area of approximately 36 hectares including the early stages of works. Importantly, this project is not large from an earthworks area perspective and is representative of a small to medium earthworks project

I thought I'd just expand on that, Commissioner, if I may and just compare it to a few other projects that are going on in the New Zealand context at the moment. I will just mention briefly the Huntly project is something in the order of 3.5 million cubic metres of fill. I'm not sure what their total area of earthworks is, but in May this year they had 118 hectares of earthworks open. Transmission Gully 200 hectares of earthworks, 6.5 million cubic metres. Puhoi to Warkworth about 8 million cubic metres of cut, over 189 hectares of earthworks. And the Warkworth to Wellsford project, which is currently going through a consenting phase, 280 hectares of earthworks and about 12 million cubic metres of cut.

Obviously we're not that sort of scale. When we're talking about this project, we've got a 36 hectare earthworks footprint.

THE COMMISSIONER: Can you take me through those numbers again? Huntly Bypass was how many hectares?

MR RIDLEY: Apologies, I went through that quite quickly. I'm not sure of the total hectares for Huntly is from a consenting point of view. But, in May this year they had 180 hectares open.

THE COMMISSIONER: I am familiar with these projects so it is just good to get the comparisons. Transmission Gully was 200 hectares?

MR RIDLEY: Transmission Gully, it might be 190 to 200 hectares.

THE COMMISSIONER: Yes. Puhoi to Warkworth was 189.

MR RIDLEY: And Wellsford at the moment is varying between 280 and 320, but it's significant.

THE COMMISSIONER: Thank you.

MR RIDLEY: Paragraph 3: As stated in my rebuttal evidence, in my opinion the construction water management plan framework and monitoring programme for the project are robust. Together they represent a thorough and appropriate approach to construction water management on the project.

I consider that Mr Duirs is overstating the erosion and sedimentation risks associated with the Project, and I do not think he provides a balanced view with respect to the overall approach that will be applied.

Finally, I confirm that while the Project has recognised risks, these risks are clearly identified and accounted for within the approach taken, including through best practice construction water management, and a robust and full monitoring regime. I do not consider this Project is a particularly risky one in construction water terms. Overall, I reiterate my opinion that the erosion and sedimentation effects of the project will be negligible.

Water quality was observed during site visits to the Project site where deposited sediment was observed at the banks and base of the Mangapepeke Stream, and also in the Mimi

wetland. It is assessed that during periods of rainfall, water quality declines within the upper stream catchments due to increased suspended sediment loads from natural erosion of the stream beds and banks and some erosion of the surrounding soft papa mudstone including stock and pest induced erosion. Water quality baseline monitoring commenced in November 2017. When considering wider catchment and marine environments and assuming the full potential earthworks area is open at any one time - very unlikely to occur - back calculating potential sediment yield - for an annual event calculated from other projects - with the flows for the Tongaporutu Catchment this equates to an increase in sediment concentration of approximately 0.68 g/m^3 in the river flows at that point. For the Mimi Catchment, this equates to an increase in sediment concentration of approximately 0.66 g/m^3 in the river flows at that point. Both of these increases in sediment concentration are considered negligible and any resulting increase in total sediment concentration from expected background is unlikely and unable to be detected.

Earthworks: On a catchment basis the project earthworks equate to 7.4 per cent of the total area immediately upstream of the Project in the Tongaporutu Catchment and 1.2 per cent of the total area immediately upstream of the project in the Mimi

Catchment. The earthworks themselves will be undertaken in various stages in a lineal fashion for the main alignment in addition to spoil stockpile locations. The risk from the earthworks themselves can be reduced by progressively stabilising as works proceed and implementing best practice erosion and sediment controls including by reducing slope length as much as practically possible through the provision of contour drains across cut slopes while earthworks are occurring.

With respect to progressive stabilisation, this is reflected within the requirement that exposed areas, which are not actively worked, cannot be left exposed for more than 14 days.

Calculated annual sediment yields compared to potential background yields for the project and catchment --

(Break in audio recording)

(A short adjournment)

MR ALLEN: Sir, the next witness is Dr Neale, on freshwater ecology.

THE COMMISSIONER: Thank you. Dr Neale, I think you have a statement of evidence and a rebuttal statement as well. I've read those; and if you could take us through your summary that would be appreciated.

DR NEALE: Thank you, sir.

My name is Martin Neale, I'm a freshwater ecologist. I was engaged to peer review the freshwater ecology aspects of the Project in June 2018. I had no involvement with the Project prior to this time and I have simply just been requested to provide evidence on behalf of the Project and, as you note the comment, I didn't submit evidence at the time of the evidence-in-chief but at the time the supplementary evidence and rebuttal.

In this capacity, I reviewed the freshwater assessment reports, in particular AEE, the freshwater ecology report and freshwater ecology addendum, the relevant chapters of the Ecology and Landscape Management Plan and evidence prepared for the hearing by Keith Hamill, on behalf of the Transport Agency, and Dr Thomas Drinan, on behalf of the Department of Conservation.

My initial review which was undertaken at the time or post the evidence-in-chief exchanged on the 25th of May, at this time the documents I reviewed contained a comprehensive assessment of the freshwater resources in the Project area. Given the complexity of the Project and the uncertainty in the Project footprint at that time, the work provided an appropriate assessment of the potential effects of the Project, and outlined a package of proposed mitigation and offsets that should effectively manage the effects of the Project.

In my opinion, the assessment to assess and manage the freshwater effects of the Project was generally appropriate, but I did identify a small number of issues that required clarification or amendment to better manage the environmental effects. The most important of these were (a) the SEV values provided to some culverts required modification to account for fish passage issues, (b) the application of the SEV and the ECR towards stream diversion required clarification about the value of the ECR, and, finally, (c) the stream maps to be effected by the Project were inconsistent in some of the Project documentation.

My commentary on the updated freshwater assessment was post my review and associated with the evidence of 17th of July.

Following my initial review there was a number of changes in the freshwater assessment that were described primarily in the supplementary evidence of Mr Hamill. I supported these changes which included: (a) the removal of the need for two culverts, (b) reducing culvert gradings, increasing culvert diameters and increasing culvert embeddedness, (c) revision of SEV scores assigned to some culverts, (d) increase in monitoring efforts to assess the effects of the Project.

My overall comments on the proposed offsetting package. In my experience, there is a high-level aspect of this offsetting package that is unusual for a development project and offers some benefits that are not fully captured within SEV/ECR framework. That the proposed offsetting streams are all downstream of high quality streams with largely native forest catchments means the benefits of the restoration activity are far more certain to accrue. The benefit of stream restoration in areas downstream of native forest has been demonstrated to result in greater responses in both fish and invertebrate communities. This is a key factor, in my opinion, that the freshwater offset package should provide a net improvement in ecological functioning in the medium to long-term. I subsequently produced a statement of evidence summarising my review on the 17th of July 2018.

In response to the Department of Conservation freshwater evidence, Dr Thomas Drinan provided a statement of evidence on behalf of the Director General of Conservation on the 24th of July. I have drafted a rebuttal statement in response to some of the issues raised by Dr Drinan in his evidence. This rebuttal covers three key areas, the first of which is screen values and proposed mitigation.

Whilst there is a degree of agreement about the relatively high values of the freshwater resources within the project area, there remains some technical points of disagreement amongst the freshwater experts. These points relate to how the values of the streams are assessed and the manner in which the SEV and ECR tools are utilised for this project. I support the approach taken by Mr Hamill when using the SEV and ECR tools, and explain my reasoning in terms of the two major points of disagreement below. The first of those is the value assigned to the culverts in those calculations.

Mr Hamill has assigned SEV scores in the ECR analysis to allow the calculation of the required quantum of mitigation required to offset the Project's impacts. Dr Drinan disagrees with these values and recommends that culverts are given no

value in the ECR calculations. I prefer Mr Hamill's approach, as the scientific evidence indicates culverts do have some functional and biodiversity values. In addition, one of the key concerns of Mr Drinan - food web effects - is likely to be of low importance in the small forested streams affected by the Project.

On the importance of headwaters, again, there appears to be general agreement among the freshwater experts that headwaters are important to the ecology of stream systems. Mr Hamill has accounted for headwaters streams in his assessment by treating them in the same way as non-headwaters, effectively assigning equal values to headwater and non-headwater streams. In contrast, Dr Drinan suggests that headwater streams are more important and recommends that they are given greater weighting in the assessment. Again, I prefer Mr Hamill's approach on this issue as the scientific evidence indicates that headwaters have similar functional and biodiversity values as non-headwater streams. In addition, Dr Drinan partly relies on a study with a methodology that is heavily biased towards an outcome that would place greater value on the headwater streams.

In terms of my overall conclusions; overall the documents I have reviewed contain a comprehensive assessment of the

freshwater resources in the Project area using a range of appropriate techniques. The freshwater resources in the Project area are generally of high quality. Recognising this is a complicated project, with some residual uncertainty about the footprint, the work provides an appropriate assessment of the potential effects of the Project on these freshwater resources. I support the transparent approach taken in Mr Hamill's assessment, which describes all of the potential effects, identifies which of those can be managed through mitigation and describes those effects that require environmental compensation.

The proposed package of mitigation and offsets has been informed by the application of the SEV and ECR tools, which indicates a quantum of stream restoration to offset impacts of 8,455 km. In addition, that the stream restoration is to be carried out downstream of native forest catchments means the benefits of the restoration are a far more certain to accrue. When these additional benefits are factored into an overall assessment, it gives me confidence that the freshwater mitigation and offset package should provide a net improvement of ecological functioning in the medium to long term.

That concludes my statement, sir, I'm happy to answer any questions.

THE COMMISSIONER: Thank you, Dr Neale. Just in relation to that last point -- and I think it just repeats your point in paragraph 7 of your summary statement. Is it your opinion that the restoration programme will provide an overall net improvement, so more than no net loss -- we are talking about an improvement in the freshwater situation in the Project area with the proposal?

DR NEALE: I believe so, sir. The strict application of the SEV tools would give us a mitigation length of about 8.1 km --

THE COMMISSIONER: Yes.

DR NEALE: -- and so the current mitigation proposal for the Project is closer to 8.5 km. I think, if we rely on framework, there is an additional body of restoration effort over and above what is required for land and loss. And also that framework, as I said in my evidence, does not exclusively capture the benefits of the location of the restoration so I think that gives me an added confidence on top of those calculations, that there should be an improvement in the long-term.

THE COMMISSIONER: So your opinion is move from no net loss through to a net improvement?

DR NEALE: Yes.

THE COMMISSIONER: With some margin but not a huge margin, is that what I am hearing you say?

DR NEALE: There is some margin, yes.

THE COMMISSIONER: Okay. Thank you.

Your paragraph 10, there has been a debate between Dr Drinan and Mr Hamill about the application of SEV and the ECR tools, you talk about that there. Your own experience in utilising these tools, what is your experience?

DR NEALE: I sat on the Panel of freshwater experts that developed and refined the SEV tools, so they were originally published in 2006 and have been in active use in Auckland since 2008 and use around the country has gradually increased. Essentially through a previous role, I was the custodian of the SEV project as a scientist at the Auckland Regional Council when it was commenced, so I have used it quite extensively and I have

reviewed the application of SEV in, I would probably say, hundreds of applications over the past ten years. So I am very familiar with how it works and how it should be used.

THE COMMISSIONER: So hundreds of applications, you have used it?

DR NEALE: Yes.

THE COMMISSIONER: Yes.

DR NEALE: I have reviewed it. One of my previous roles for Auckland Regional Council was to review these assessments as they came in.

THE COMMISSIONER: All right.

DR NEALE: But I have also obviously I have done -- carried them out before.

THE COMMISSIONER: And to your knowledge, you mentioned that it evolved in Auckland, and I was aware of that as a technique; you say it is widely used around New Zealand now?

DR NEALE: Yes, sir.

THE COMMISSIONER: Is there any competing or different or better assessment tool that you are aware of for New Zealand situations?

DR NEALE: I think the SEV is the most established framework. One of the reasons we developed it was, prior to that everything was argued on a case-by-case basis so there wasn't a framework that we could have those debates around. So essentially that is what it has been done and, to my knowledge, there is nothing else in the freshwater environment in New Zealand. It was modelled on a system developed by the US Army Corp of engineers so it is extensively used in North America -- well, a similar system.

THE COMMISSIONER: Thank you. We have heard today from Mr Hamill that he -- and you have agreed with him, that the culverts do have some values. He mentioned to me today that he has assigned it a .23 as a factor. Do you agree that is the right order?

DR NEALE: Order of magnitude?

THE COMMISSIONER: Yes.

DR NEALE: Yes, yes. So I stated in my rebuttal evidence, I think, that these debates were had in Auckland for a little while and the Regulatory Department of Auckland Council now specify all Councils were assigned a score of .2 to give everybody clarification on how they're going to be treated going forward. And, in this application, Mr Hamill has used .23 and .15, depending on the nature of this passage in the culvert.

THE COMMISSIONER: All right, so different types of culverts have different scores assigned to them?

DR NEALE: Yes. I think the .2 standard score is a measure for convenience but that is in the right order of magnitude.

THE COMMISSIONER: All right. In paragraph 12 you talk about the study Dr Drinan relies on in terms of the headwater values and importance. Can you tell me about that study and what were the problems with that study from your perspective?

DR NEALE: Sure. I talk about it a little bit more extensively in my rebuttal evidence. That was some work that Mr Smith from NIWA did on behalf of the Waikato Regional Council, looking at

the difference between aerial phases invertebrates and headwaters and non-headwaters of the same streams --

THE COMMISSIONER: That was in Mokau catchment?

DR NEALE: No, not that bit, it was done between -- yes, sorry, it was the Mokau catchment, I'm getting my stages confused. That is correct, yes. So the main stream of the Mokau with some of the tributaries.

THE COMMISSIONER: Yes.

DR NEALE: And because of the size of the main stream you could not use some of the sampling techniques that were used in the headwaters, so the headwaters had much greater sampling effort applied to them. So they had two types of invertebrate traps that operated 24 hours a day; whereas the main stream had a light trap that operated and was only effective during the hours of darkness, so there is quite a heavy shift in sampling effort -- or bio sampling effort between those two locations. So it's not unexpected that if you put more effort into sampling something you would find more invertebrates and more species.

THE COMMISSIONER: Yes, all right. So that was the bias you were talking about?

DR NEALE: And that was recognised by the Northland reports where they talked about it.

THE COMMISSIONER: Okay. I am just looking at the comments I made on your statements, so if you would just bear with me for a moment I'll see if there is anything else.

Okay, you have come in late into the Project as an experienced peer reviewer. Your overall conclusion about the restoration of assessment and effects on freshwater and the restoration programme as offsetting compensation; I have asked you about your level of -- you agree with Mr Hamill. In terms of your level of confidence of that -- your judgment, out of ten, are you highly confident or are you in that high confidence level that --

DR NEALE: I am not saying high confidence. These are ecological systems so we can never be absolutely certain; but in terms of what I have seen and putting this in the context of previous applications as well, I am confident that this

offsetting package -- well, highly confident that it will give us a good outcome.

THE COMMISSIONER: So on a scale of one to ten where are you sitting?

DR NEALE: I would probably say around an eight.

THE COMMISSIONER: An eight?

DR NEALE: Yes.

THE COMMISSIONER: Okay, thank you. And I will just have a check on your original evidence as well; so, again, I will just go to that. I have got all these statements marked-up online so I don't have to carry wedges of evidence around, so it just takes me a while to move between them.

All right. At paragraph 17 of your statement of evidence -- it is really the same question I asked Mr Hamill and I think he is coming back to me about the fact that some of the culvert designs have not been finalised so is there a process in the management planning process to guarantee that that is properly done and checked and perhaps certified? I think you made the

comment that they continue to be reviewed as final project design is confirmed, so I just want to check the mechanism in the management plans are appropriate for ensuring that?

DR NEALE: Sure, and I think Mr Hamill and Mr Milliken have been working on that.

THE COMMISSIONER: Yes, so you made the comment in your opinion you think there is a clear process of design, checking, finalisation of appropriate outcomes?

DR NEALE: Absolutely, and I see evidence of that between my first review and my second review in that the need for some culverts has been removed -- the culvert design has changed as the footprint has changed, and most of those will have been in a direction of positive environmental perspective.

THE COMMISSIONER: Yes, I think you comment that on your paragraph 5 of your statement that as the design is being finalised, improvements are being made is an active improvement process.

DR NEALE: Yes.

THE COMMISSIONER: All right. So, thank you, your evidence was very clear and well put so that is all I have. Thank you, Dr Neale.

DR NEALE: Thank you.

MR ALLEN: Thank you, sir. The next witness is Mr Singers on vegetation and the offset calculations as well.

THE COMMISSIONER: Yes, good afternoon, Mr Singers.

MR SINGERS: Good afternoon, Commissioner. I have prepared a range of technical reports on vegetation effects, and that started in January for the preliminary report and the AEE evidence and the supplementary evidence twice, and the rest will be rebuttal evidence, and I have also contributed to ELMP.

I have visited the site of the Project area on over 30 days so I have looked at all five routes and with the current route, I have walked the entire length apart from a couple of very steep gullies, so I can say I have been over the entire area.

THE COMMISSIONER: And just on that, the expanded PMA area, are you reasonably familiar with that area as well?

MR SINGERS: So I am familiar with the Mimi catchment part of it, and I mentioned in my most recent rebuttal evidence that I mapped that area -- that 360, I used a desktop analysis to do that expanded area, so I am only familiar with approximately hectares of that area, but used three sets of data to create the map of the wider area.

THE COMMISSIONER: Okay, thank you.

MR SINGERS: Potential ecosystem classification was used as a framework for descriptions of ecosystem diversity and loss, and the Project will result in the loss of 31.676 hectares of indigenous forest and secondary scrub. Now to just highlight this point; in the AEE -- that was prior to going to surveying private land, that figure was higher and then it included pasture because we thought there were some ecological values on that pasture. This figure does not include that pasture and rush land after the supplementary report and I went onto that property and surveyed that. So I just wanted to highlight that point.

THE COMMISSIONER: Because that pasture area did not have values?

MR SINGERS: Yes, the exotic dominant pasture, rush land farm land habitat, okay?

THE COMMISSIONER: I understand.

MR SINGERS: It is important to recognise that 17.891 hectares of that area is the additional works area and for the purpose of the consent it has been assumed that this will be cleared. This scenario is, however, not expected to occur because there has been more refined mapping; for example, in access roads and constraints that were put in the ecological management plan.

So four ecosystem types are affected along with many vegetation communities, and I highlight that in Table 1 of my evidence-in-chief. The areas of highest ecological value are the areas dominated by Kihikatea Forest in the Mimi and Mangapepeke catchments, and the Tawa and Rewarewa Kamahi Forest in the Mimi catchment. And that is the area adjacent to the Parininihi Block where there has been some spill-over in management benefits.

In much of the Mangapepeke catchment the vegetation is of a comparatively lower ecological value having been subjected to

vegetation clearance from agricultural development on private land, and severe browsing by introduced livestock, pests -- and especially possums, cats or goats, pigs over the entire catchment.

I am specifically talking about the four different types of ecosystems, on the valley floors prone to flooding, the kahikatea, pukatea ecosystem-type curves, there is about 2.629 hectares of habitat affected, and this equates to around about .59 per cent remaining in the ecological district. And I have used a map that I have generated for the Taranaki Regional Council with potential ecosystems of that region to calculate that figure.

THE COMMISSIONER: So that is .59 per cent of that type of ecosystem?

MR SINGERS: Remaining in the ecological district.

THE COMMISSIONER: Yes.

MR SINGERS: Yes.

THE COMMISSIONER: Okay, of the kahikatea/pukatea ecosystem type?

MR SINGERS: Yes. And so this ecosystem is nationally threatened, there is less than 2 per cent remaining. It is the places where farms work and it makes sense. It is better represented in North Taranaki with 7.6 per cent, and that is basically because of the two large examples which I mentioned in my evidence-in-chief, and for the reason -- because it is there, I summarise it today. So there is approximately .684 hectares of forest and in the Mimi catchment there is a very small area of .159 hectares and that has got high ecological value, especially because it contains swamp maire; and in the Mangapepeke there are four separate examples which amount to .52 ha. These stands are all grazed and they have limited under-story vegetation.

I just want to highlight that there is about two hectares on private land that were visited in the supplementary report stage, and the intent is to avoid the clearance of these and these have been highlighted in the Ecological Management Plan, so you may just find some changes that reduce that figure.

The remaining value four vegetation communities are all in the Mangapepeke and they are what we call tree land, and essentially trees in pasture or trees in rush land habitat. They have been included because they are a significant because that ecosystem is rare. They are either kahikatea, moribund pukatea - and I call them moribund because they are quite small trees and have suffered - they are suffering canopy collapse and you might have seen some dying trees in the headwaters of that valley and often with tree fern. There is also some areas of manuka scrub on the valley floor that are included, and all of these areas have an understory of rush land, pasture grasses and sedges, which are predominantly introduced species.

THE COMMISSIONER: Mr Singers, can I just go back to the start of your paragraph 10? So that WFA ecosystem type, that is the same type you are talking about in paragraphs 8 and 9, is that right?

MR SINGERS: Yes, you are correct.

THE COMMISSIONER: Okay.

MR SINGERS: So I have used that in a hierarchical setting so the ecosystems here and the communities sit underneath them, so

they are at different states based around degradation, really; but they sit in that court.

THE COMMISSIONER: Thank you.

MR SINGERS: So most of the hill country forest, which is 19.738 hectares from the Mangapepeke Stream and it is approximately where the Ngāti Tama boundary is, which is that line on the map there. I could show you if you want me to show you?

THE COMMISSIONER: Yes.

MR SINGERS: I mentioned there is an ecological boundary with the hill country. So there is hard beech that comes here and then south of that there is no beech forest, and from there it becomes a hard beech tawa by the forest and south bits of Tawa Pukatea.

So the predominant is 19.738 hectares from that south boundary conforms to that tawa, kohekohe, rewarewa, hinau, mokau forest, and then the beech forest, there is 8.90809 ha, but most of that is secondary so it is the -- you might have seen it in a helicopter, it is manuka, tree ferns and secondary vegetation.

So in comparison to the loss of vegetation with these ecosystems amounts to .11 per cent and .09 per cent of the total remaining in the ecological district. And at the very top of the Mangapepeke catchment there is a small area of cliff vegetation as well, which is .4 of a hectare. So if we classify that structurally there is about 23.876 hectares of forest and then there is 1.363 hectares of mixed native exotic tree land -- so that is the valley floor communities I was meaning before, and then there is 6.445 hectares of secondary native prominent scrub. So most of this habitat is significant as defined under the District Plan.

The Project also will result in the loss of a small number of at risk threatened plant and that is a small daisy that lives in the tops of trees, it is called kohurangi, and there is 28 swamp maire trees in the Mimi part of Kahikatea Forest.

The overall unmitigated effect of the Project on vegetation is significant because of the scale of vegetation loss, its composition, its structure -- being older, complex forest ecosystems, ecosystem rarity and because some of the effects inherent. Mr MacGibbon summarises the restoration package in depth; however, I will provide a summary for vegetation and how this relates to the offset calculations.

So, firstly, the pest management area was chosen to be like-for-like, so that is for the areas that we lost we find the area that -- actually the same ecosystems and the same communities were both present, and that is centred around the Mimi and then it was expanded out to the core Mt Messenger Conservation area. So it is now 3,650 hectares in size. I just want to highlight, I determined a core area as being approximately 900 hectares where any pests, specifically feral ungulates, would be below the target levels within three years and that would result in habitat which is healthy and functioning, and this was used in the biodiversity offset calculation. I did that just as a comparison with the original offset calculation as being, what would be reasonable if you actually choose your target levels to be able to compare gains in the ten years? So that is 900 hectares of 3,650.

So the core area includes 27 hectares of valley floor kahikatea forest, and that is the Mimi catchment; 704.5 hectares of that tawa podocarp which is W13, and 171.9 is the tawa beech forest.

The biodiversity for counting models developed by the Department of Conservation in 2014 and has been used as a

decision support tool to assist in forming an amount of biodiversity offset required for vegetation. More specifically, the model has been applied to calculate what level of offset is required to achieve no net loss in vegetation values within ten to 15 years.

I really want to highlight this point. All aspects, when I have used the model, have been acquired in a precautionary and conservative manner, and this is described in my evidence-in-chief at point 172. In the model using integrated pest management in like-for-like habitat, an area of 230 hectares is required to offset the loss of vegetation communities for W8, W13 and W14, with an identified target unit in the Mimi catchment. No net loss by year ten and net gain by year 15. However, I identified that piece-management would not benefit kahikatea, and in valley floor that is the dominant tree. They do not regenerate in response to possum control or goat control -- they are non-palatable anyway. So to offset the loss of those, if the kahikatea trees were put into the model and a further six hectares of restoration planting is proposed.

The model was then run for a larger 900 hectares core area over a ten year period, using identical values for improvements and ecological integrity; so that is the improvements that you

get from goat control, possum control etc. And the updated piece-management area at year 10 predicts the biodiversity gains to be significant for the core area.

The model uses a currency called net present biodiversity value to compare losses and gains, and the impact of the Project was calculated as a negative 25.81 net present biodiversity -- so that is a loss; and by comparison at year 10 the loss it calculated was a positive 39.36.

THE COMMISSIONER: And is no net loss a zero?

MR SINGERS: A no net loss is a zero, yes.

THE COMMISSIONER: Okay. So the MPBV at 39.36, that assumes the larger area that has now been --

MR SINGERS: That assumes a greater biodiversity value.

THE COMMISSIONER: Yes, but that is relating to the increased area?

MR SINGERS: Absolutely, yes.

THE COMMISSIONER: And that is a gain over that no net loss line?

MR SINGERS: That is a gain, yes. So this strongly suggests that there will be a significant net biodiversity gain for vegetation from 900 hectares of integrated pest management intended to high ecological integrity. The Project directly trades off area of habitat, there will be a loss, for an improvement in conditions. And measured in these terms the Project will result in a potential maximum loss of 31.676 hectares and improved conditions over 900 ha. And so for every hectare loss that is 28 hectares that will be managed towards high ecological areas.

However, in almost the entire 3,650 hectare PMA I expect that possum browsed canopy tree species such as northern rata, thin-barked totara, tawa and kamahi to improve in condition and that is based around the management approach, which is the eradication of toxins and all of the ground work, and this should reduce the mortality of these trees. These improvements in forest health will flow through the wider ecosystem and provide a greater amount of resources from flowers and fruit for native wildlife.

I also expect that there will be benefits to the Paraninihi. If you look on that map behind you there, when all that area in red is managed it effectively becomes a goat and a possum buffer to the black area which is Paraninihi -- that sort of stops some of the westward migration of goats and possums, which will make it easier to manage those pests at Paraninihi.

So goats have been continuously managed at Paraninihi for over two decades and on the western side parts are now goat free. So it is my expectation that with the same amount of effort that has been continued in the last 20 years, the goats could be eradicated through the eastern side of Paraninihi leading to better conservation there as well, and that would not happen without the Mt Messenger project. This will likely result in the recovery of browse species such as plants like king fern which is highly palatable to goats and pigs.

And so in summary for these reasons, it is my opinion the mitigation and offset package would result in significant positive benefits for vegetation and flora within the wider Mt Messenger Paraninihi area in ten years' time.

THE COMMISSIONER: Thank you, Mr Singers. I will perhaps start with the same sort of question I gave to Dr Neale about the

level of confidence. You have talked about using precautionary and very conservative numbers, although it seems you have been very careful. Is that a fair summary of the work you have done?

MR SINGERS: Yes. So in the biodiversity offset calculator you have to apply a level of confidence, and for pest management it is an activity that we do routinely across ecosystems and we know that it responds in positive biodiversity benefits; and for those activities in the tawa and beech forest-type communities I was very confident. However, in the valley floor communities there is so little of it there has been limited examples where there has been a pest management plot. And it is more of a case of that there is a lack of data, really, than a no confidence. So I reduced the confidence in the model to moderately confident, I think it was -- I'll have to look, but I reduced it down for that reason.

But, if we come back to it, do we know how to do pest control to achieve low targets? Yes, we do. And do we expect that to result in benefits for vegetation? Absolutely. So I'm confident in that regard.

THE COMMISSIONER: Okay, thank you. Some discussion in the Wildlands' reports and elsewhere about the significant trees and what are significant trees for protection.

MR SINGERS: Yes.

THE COMMISSIONER: Were you responsible for that work?

MR SINGERS: Yes, I was. I will just refer to my evidence-in-chief, I have got a note here. So in my evidence-in-chief, in points 222-230, I cover this. Identification of significant trees was a voluntary compensation and the reason I identified that was large trees and many trees, they play an important component in a forest; so to then compensate for their loss we make a call that we needed to actually then replant those back into the landscape. So I came up with a methodology that is set out AEE, and then as I went through I applied that methodology to the trees. I'll just go to it because they just highlighted -- if you just give me a minute?

THE COMMISSIONER: Are you looking at one of the reports, Mr Singers?

MR SINGERS: I was just going to look at where I picked up on these points, actually. They identified a range of trees that they thought should have been assessed for a number of reasons, and I identified that I thought the kohekohe should be included as a significant tree based on the criteria that I came up with. The reason I have not included it was because it is now so rare in that forest; and I only found three individuals, where in previous plot data from the 1950s it was a common tree. I just sort of discounted it, really, so I recognise that if we would find it then we would apply that same process to those trees. So that has been fed through into the ELMP and it has been included as another species, and if we do find kohekohe then we will add in 200 trees for that species as well.

THE COMMISSIONER: Okay. Now I am just opening your rebuttal evidence, just bear with me for a moment. So in terms of the other ecologists from the Department of Conservation and Wildlands, my read of your evidence and theirs is that there is not a lot of disagreement in this vegetation area, is that your --

MR SINGERS: I think with the Department, yes, there is almost agreement in the sense of the assessment of the effects.

THE COMMISSIONER: Yes, because you have used that model that they are very supportive of.

MR SINGERS: And I also think it is because they have spent time actually in among the Mangapepeke in a field visit, and actually saw the degradated state of that area.

THE COMMISSIONER: Yes.

MR SINGERS: There is some disagreement with the New Plymouth District Council cultures in that space; there is a lack of evidence of the poor ecological condition and in my evidence-in-chief, points 214 and 215, I highlight a range of evidence that I used to make that assessment.

THE COMMISSIONER: Yes, but have you had a chance to read the latest Wildlands report?

MR SINGERS: I have got a memorandum sitting in front of me of the key points here. So I think it is a reiteration of the point that was made when it first came out, so my evidence-in-chief covers it.

THE COMMISSIONER: Yes, and that point concerns?

MR SINGERS: The point is a lack of evidence of poor ecological condition habitats east of State Highway 3.

THE COMMISSIONER: All right, so it is that comparative assessment that they do not necessarily accept that it has been proven?

MR SINGERS: Yes, and so I used a range of data from historical plot information; for example, in the 1940s to 50s there was a national vegetation survey and there were a number of plots in that area, and I have summarised it. I found that one of the dominant canopy trees at the time was kohekohe which is incredibly possum palatable and it was the dominant tree. And the time I spent in that east side of the road I saw three of those trees, yet in the plot we were talking about 50, you know, huge numbers. It would be so obvious to see if it was still there today; it has gone.

And the same sort of thing happened in the 1980s, there was a survey that went through -- a protective natural areas survey, and they did a range of plots in the Mimi catchment and that data is available. I looked at that, they had vegetation and that showed that there has been a decline of kamahi and it just

happens that Professor Bruce Clarkson recognised that in the 1980s and he mentioned it to me once, so I rang him up and he told me exactly where it was. So there was sort of this historical account and it is supported by plots in the area, and then when I look at it now today, some of those canopy trees are not there but what we see in their place is essentially tree ferns and nikau where there would have been a canopy of trees. And so that's really what I am seeing, instead of seeing palatable plants in the canopy I am seeing unpalatable things and the assumption is based on this plot and those observations, that that is the missing bit.

THE COMMISSIONER: Yes.

MR SINGERS: So that is sort of the historical account. But then in my observations I also undertook recce plots which is a qualitative assessment, and one of the key things that I identified was recruitment failure caused by goat prints. And I have shown some pictures, I have put some data in the back as an appendix, and as a comparison there is a PhD that was done in a similar sort of forest and they were finding 1200 seedlings of tawa, and that is one per 8 m squared; well I was going into the forest and I was barely seeing any. They had gone. It is a

stark difference. It is not a small difference, it is a stark difference between being healthy to being what it is today.

THE COMMISSIONER: All right. So you are confident that --

MR SINGERS: I am very confident there is significant pest impact in those forests, and there has been history of it.

THE COMMISSIONER: Yes. All right. Okay, well I think I have got my way through my questions for you, so thank you very much, Mr Singers.

MR SINGERS: Yes.

MR ALLEN: Thank you, sir, the next witness is Dr Watts on terrestrial invertebrates.

THE COMMISSIONER: Thank you. Welcome, Dr Watts.

DR WATTS: I am invertebrate ecologist at Manaaki Whenua Landcare Research, Hamilton. Since November 2016 I have provided expertise on terrestrial invertebrates within the Project. My participation in the Project has included carrying out a desktop assessment which was followed by field work and

surveys between February and December 2017. From this work I have gained a comprehensive understanding of the terrestrial invertebrate community and their values within the wider project area. I am just going to start by outlining some of the terrestrial invertebrate investigation knowledge aspect.

Initially I carried out the desktop assessment based on detailed literature and database review and discussions with experts. I made field assessments of habitat quality for invertebrates of two of the different alignment options including the alignment now proposed for the Project. A more detailed field assessment was carried out in October to December 2017. Three types of invertebrate sampling occurred, including malaise traps to collect flying insects inhabiting the foliage; so these malaise traps are sort of like open-sided tents that insects fly into. The second was pitfall traps to sample the ground dwelling faunas; we basically put cups in the ground. And then the third was below ground sampling focusing on earthworms, so this basically involves digging holes.

Invertebrate sampling occurred within 11 plots which were ten by ten metre squared placed within the Project footprint where sites could safely be accessed in areas of native forest and scrub habitats.

Terrestrial invertebrate investigation results. As with many parts of New Zealand little is known about the invertebrate fauna inhabiting the Project area and to the wider Mt Messenger area. The desktop review found 179 invertebrate taxa recorded in the general vicinity of Mt Messenger. These records included only three important records of invertebrate taxa, though as discussed in my evidence it is not clear that these three species are currently present in the Project footprint. While observing the habitat quality for invertebrates I conclude that the ecological condition of the forest within the Project footprint is considerably poorer, with fewer palatable plant species, less diversity of ground cover plants and sparse leaf litter compared to the nearby Parininihi to the west of the existing State Highway 3. This is probably due to the absence of consistent animal pest control and the presence of grazing stock.

THE COMMISSIONER: Dr Watts, just on that conclusion, was one of the areas that you did your original assessment on to the west -- you have looked at both sides?

DR WATTS: Yes, so I have walked the original -- I think it was MC23, so that is through basically the Parininihi Block.

THE COMMISSIONER: Yes.

DR WATTS: And then I have walked -- apart from areas that are not accessible, I have also walked the current footprint.

THE COMMISSIONER: So you have looked at both east and west?

DR WATTS: Yes.

THE COMMISSIONER: In the same conversation I have just been having with Mr Singer is about the quality of the --

DR WATTS: Yes, that's correct.

THE COMMISSIONER: Yes, all right, thank you.

DR WATTS: The late 2017 sampling programme provided a snapshot of invertebrate species actually present within the Project footprint. The one month sampling period is a routine period and was appropriate to obtain a robust dataset.

The survey found 17,417 invertebrates from 439 taxa. It was a diverse fauna dominated by native taxa from a range of

trophic groups. The invertebrate fauna is considered typical of communities impinged in native forests of the southern North Island and northern South Island, and this sentiment was also echoed when I spoke to the experts in different taxa groups.

Two species of peripatus: peripatoides suteri and peripatoides novaezealandiae, were found within the Project footprint. The record of 3 specimens of peripatoides suteri, classified as "vulnerable" on the IUCN Red List of Threatened Species, in two plots is important. However, neither of these species have a threat classification under the New Zealand Threat Classification System. Accordingly, a draft Peripatus Management Plan - chapter 10 of the ELMP - has been prepared. The plan outlines a recommended procedure for pre-translocation survey in "high-risk" habitat areas, site preparation, translocation timing, peripatus and habitat transportation, and the re-positioning of peripatus-occupied material.

THE COMMISSIONER: Just to break in there. That draft management plan, is that something you have prepared or worked on?

DR WATTS: Yes, that is correct.

THE COMMISSIONER: And, again, is that still a draft or has that been finalised ready to approve?

DR WATTS: It has been finalised.

THE COMMISSIONER: It has been finalised now?

DR WATTS: Yes.

THE COMMISSIONER: Thank you.

DR WATTS: Unmitigated effects assessment. My evidence outlines the unmitigated effects of the Project on terrestrial invertebrates, values as "high" combined with an unmitigated "magnitude of effects" assessment of "low" to "moderate" correlates with an overall level of unmitigated effects of "High" under the EcIA guidelines. The actual unmitigated effects of the Project on the terrestrial invertebrates are likely to be lower than what was assumed because, (a) the invertebrate fauna is representative of communities inhabiting native forests of southern North Island and northern South Island, (b) the ecological condition of the forest within the proposed route is considered poorer than compared to the nearby

Parininihi, (c) approximately only 1 per cent of the available habitat in the wider Project area will be affected by the Project, and (d) it is likely that most of the taxa affected by mammalian predation will already extinct in the Mt Messenger area.

Measures to avoid mitigating and offset potential effects on invertebrates. A range of measures to avoid, mitigate, minimise and offset potential effects on the terrestrial invertebrates have been put in place or proposed for the Project. These measures include pest control, habitat enhancement, restoration planting, as well as measures that specifically target invertebrates, including the Peripatus Management Plan. The proposed fenced enclosure is also likely to benefit invertebrates by removing mice as a predator within that particular environment. There is a strong correlation between the health of vegetation communities and the health of invertebrate assemblages, indicating that enhancements to habitat quality will benefit invertebrates. As outlined in my evidence, I support the mitigation and offset package which has been proposed which, in my opinion, represents a sound and appropriate response to the effects of vegetation removal potentially affecting the terrestrial invertebrate communities during the construction activities. As explained in my

evidence, I consider any effects of the Projects on invertebrates are likely to be negligible and may be positive in the medium term.

I would just now like to respond to some of the submissions and the section 42A report on the terrestrial invertebrate. I am of the view that during and post-construction monitoring will have little benefit. I support actions that prevent the introduction of invasive invertebrate species such as argentine ants, which are outlined in Chapter 11 of the ELMP. Concerns raised about the effects of invertebrate values in the Mangapepeke valley floor associated with vegetation type WF8, I note that WF8 habitat in this catchment is highly degraded from grazing and agriculture resulting in a ground cover of predominantly exotic brushes and pasture species. In addition, these induced pasture rush land communities are common throughout valleys of the north Taranaki and western Waikato.

The invertebrate species found in these vegetation types are commonly found and widely distributed. In my opinion, the planned where planting absent plant species to restore this habitat type currently in a highly degraded state and its invertebrate community will adequately replace the WF8 habitat being modified or lost.

My evidence responds to issues of risk to invertebrates arising from sedimentation that needs to be managed through erosion and sediment control, and that the proposed pest management may lead to mice plagues with unintended consequences for invertebrates. As explained in my evidence, those issues will be minimised through erosion and sediment control measures and mouse control is unfeasible over such a large area with difficult terrain at Mt Messenger. Gaps in the aquatic macro invertebrate community were addressed in the terrestrial invertebrate monitoring as malaise traps, so those are the ones that tend to collect the adults of freshwater taxa. Lepidoptera, so that is moths and butterflies, are closely associated with vegetation and they contribute to significant biodiversity in the Project area. No lepidopterists -- so that is the people that study moths and butterflies, were available to carry out the targeted survey within the timeframes of the Project. However, some sampling did occur as lepidoptera were common, so 422 specimens from six species were collected in malaise traps. During the field work in the Project footprint no signs of adult spoor larvae activity of the threatened forest ringlet were detected. The Wildlands invertebrate ecologist, Brian Patrick, and I agreed during formal meetings that the

forest ringlet is unlikely to be present in the vicinity of the Project footprint.

To address any adverse effects of the creation of a new forest edge, 3,845 metres, and general forest disturbance as a result of the road. Monitoring and response strategies put vespula and polistes wasps along the new road margin are discussed in my evidence. I would just like to make one correction in paragraph 10 of my evidence-in-chief I refer to three specimens of peripatoides suteri, this should read two specimens of peripatoides suteri.

THE COMMISSIONER: Thank you, Dr Watts. In your last statement you have talked about the 42A report. Is that the latest report that has just been released, the supplementary 42A report?

DR WATTS: Most of it. They bring up two concerns, I think, that need to be addressed: one was the lepidoptera surveys - and I have addressed that - and the other one was wasp management being extended to the full PMA. I am comfortable with wasp control occurring on the new forest edges because that is where the road is disturbing habitat and so wasps are most likely to prefer that habitat and have nests there. But in terms of wasp control in the full PMA area, they are a bit like

mice in the fact that we have difficulty in obtaining effective control over such a large area. For example, some latest work has been done in the beech forest in the South Island where they are looking at areas of 2,400 ha, so that is more than the area that we are looking at in this project. And, again, there is the difficulty of the terrain in the Mt Messenger area.

THE COMMISSIONER: And I do not think they had any particular concerns in the latest report?

DR WATTS: No.

THE COMMISSIONER: And the Department of Conservation, in terms of your sphere of expertise?

DR WATTS: Yes, I think Mr Edwards and I have come to an agreement around the issues that he had -- mainly around sedimentation and value for invertebrates in the WF8 habitat.

THE COMMISSIONER: Yes. I think you are perhaps less confident about the enhanced side of things than some of the other ecologists in your area. But you are definitely in the frame that with the restoration programme the Project will be able to deliver this no net loss position in terms of invertebrates?

DR WATTS: Yes, that is correct. And there is so much we do not know about invertebrates compared to the other fauna groups, but, yes, I am confident that this will be provided for.

THE COMMISSIONER: Yes. Okay, thank you very much, Dr Watts.

MR ALLEN: Thank you, Commissioner, the next witness for the Agency is Dr McLennan on avifauna.

THE COMMISSIONER: Welcome, Dr McLennan.

DR MCLENNAN: Good afternoon, Commissioner. I was appointed by the Transport Agency in August 2017 to assess the ecological effects of the Project on avifauna. I have spent about five or six days in the Project area counting birds, and I have spent the same number of nights in the Project area counting kiwi. If I could first just describe in general terms the bird community in the Mt Messenger area?

The Mt Messenger community is typical of those in mixed habitats elsewhere in the North Island as indicated by the total number of species present, native species dominance, species abundance and trophic structure. The community is also typical

of those in mixed habitats in the North Island where pest control has been either sporadic or non-existent. It is overwhelmingly dominated by safe and secure species and has suffered the same degradation that Mr Singers has just described for vegetation. It does contain a number of threatened species but a number have also disappeared altogether.

So currently there are six resident native species in the bird community there; and they are North Island brown kiwi, fernbird, spotless crake, North Island robin, whitehead and pipit. There is also one native seasonal migrant, the long tailed cuckoo which comes here to breed over winters in the Pacific, and there is also one native occasional visitor, the black shag, which occasionally goes and feeds in streams in the Project area. They are the species with a threat ranking, and if you put a pin into a pictured forest anywhere in New Zealand you would come up with a very similar proportion of threatened species, if not the same ones. The critically endangered Australasian bittern may also visit the Project area occasionally, but it has not been seen there yet. The threatened kōkako is also a potential inhabitant of the Project area in the next decade or so if the newly established population in Parininihi expands eastwards.

The populations of fernbird and spotless crake are small and they are confined to wetlands in the Mimi catchment at the southern end of the alignment; and they are confined to about a six hectares patch, Commissioner, and that patch is outside of the Project parameter. The pipit is also rare in the Project area and it may be absent altogether: it has been recorded on the western side of Mt Messenger and that was in a previous survey on the 23 alignment.

The avian species of greatest conservation value in the Project area are North Island brown kiwi and North Island robin -- the former, because of its taxonomic significance, iconic status and extensive distribution in the Project area; and the latter because of the relatively high abundance in the Mt Messenger area. So the Mt Messenger area is close to the northern limited abundance of the North Island robin and normally you would expect species near the limited verge of terrain to start declining in numbers but North Island robin are still quite abundant in the area.

The Mt Messenger Kiwi belonged to the western subspecies of North Island brown kiwi confined to Whanganui and Taranaki. There about 7,500 Western brown kiwi, about 30 per cent of the national population of North Island brown kiwi estimated by the

Department of Conservation to number about 24,500. And along the six km length of the proposed alignment, Commissioner, we estimate there are about ten pairs that have territories which either straddle or abut this alignment.

But to move on to the potential effects of the Project on avifauna. Although the Project's potential effects range from very low to high in the absence of mitigation, offsetting and compensation, some potential effects were avoided by selecting a route that avoided habitats with high ecological values, by using bridges and tunnels to minimise the size of the footprint, and by selecting construction techniques that will help to reduce habitat disturbance.

And if we look at now avoiding this, these are pre-emptive measures to avoid construction effects on kiwi, and we are proposing that an intensive radio tracking -- tagging and tracking programme is undertaken to avoid these potential effects on kiwi. And this programme would involve mapping the territories of kiwi along the length of the alignment, determining which ones are potentially at risk of harm from vegetation occurrence in earthworks, monitoring potentially vulnerable individuals, including juvenile kiwi, when machines are working in those particular territories, and moving those potentially at risk individuals to safe places elsewhere in the

territories if it is necessary to do so. The programme would also involve uplifting eggs from nests that are at risk from being disturbed, hatching those eggs in a captive breeding facility and then returning the offspring to the wild.

THE COMMISSIONER: So those measures are all outlined in the Avifauna Management Plan, is that right?

DR MCLENNAN: They are indeed. So there are potentially some post-construction effects on kiwi too, and we propose to avoid them by erecting fences in places where we consider that they are necessary to keep kiwi off the road, and we will identify those places from the radio tagging tacking programme that I have referred to in paragraph 10 just above.

So the fences will either keep the birds off the road or they will guide the kiwi to culverts and allow them to pass safely under the road. And we have already heard from one of the previous witnesses that there are a number of culverts spread along the road and, in my view, more than enough to provide safe passage for kiwi.

THE COMMISSIONER: So kiwi will move through culverts?

DR MCLENNAN: I have seen them move through reasonably short culverts of two or three metres long, and I know that we are talking about culverts that are in some cases substantially longer. I suspect that they will move through them quite easily. The culverts are of an appropriate size and appropriate grade to allow that to happen and kiwi quite often forage in streams so they don't mind getting their feet wet. They will move up and down at normal flow levels and I can see the level of normal flow just by looking at the streams that are coming in already, and they would be routinely crossed by kiwi and I do not imagine them having trouble walking up those culverts.

THE COMMISSIONER: Okay, thank you.

DR MCLENNAN: If I can move on now to 12. Measures to offset residual adverse effects. Residual effects of the Project on avifauna include permanent loss of forest, wetland and farmland habitat, partial habitat severance, disturbance from construction activities, possible harm to eggs and chicks during vegetation clearance, disturbance from traffic and possible increased mortality from road strike.

The main offsetting programme proposed for avifauna is intensive pest control in the PMA, a 3,650 hectares treatment

area surrounding the alignment and Mr MacGibbon will tomorrow describe the detail of that. The proposed pest control programme will benefit predation limited native birds because it is large scale, and by large scale I mean that is by existing sanctuary standards. It is comprehensive because it has got multiple pest targets. It is intense because it combines year-round gradient control with periodic applications of 1080 and it is long-lasting in perpetuity information; now that combination is extremely rare currently on Mainland New Zealand.

THE COMMISSIONER: Are there any other examples that spring to mind for you?

DR MCLENNAN: It would be places like Cape Sanctuary in Hawke's Bay where there is an intensive programme supported by a fence but that is on a similar scale. But in most of the sanctuaries that I have referred to as a relative measure for scale, they would have either ground-based control or ground-based poisoning, but there are very few examples where a strong ground-based programme is supplemented by aerial 1080. So to answer your question, no, there are not many examples there are very few examples.

THE COMMISSIONER: Thank you.

DR MCLENNAN: If I look at the expected avifauna response, I think eight of the 23 native birds currently present there are likely to respond to intensive pest control, and they are: North Island brown kiwi, fernbird, North Island robin, whitehead, long tailed cuckoo, kereru, tui and bellbird. The first five of these respond to the threat status. A further four native species currently rare or absent altogether in the PMA, are also potential respondents if they move into there following the onset of predator control, and these are species that are still present in other parts of Taranaki but are locally extinct in the Mt Messenger area. And they include: falcon, kaka, rifleman and kōkako living next door. So if we look now at probably the magnitude and the size of the responses, tui and bellbird and long tailed cuckoo and whitehead should more than double in abundance in the PMA in the first decade of control, while Kereru are likely to increase by about 10 to 30 per cent, and I have estimated those responses from looking at equivalent responses in reserves elsewhere on Mainland North Island.

The kiwi population in the PMA is likely to double in the first decade of control from -- I estimate about 270 adults now to about 540 adults, but it will continue to grow after that; and in the following 20 years or so the population is likely to

increase by another 920 individuals before stabilising at about one pair per 5 ha. And that sealing density we now seldom see on Mainland New Zealand because the populations have been decimated by predators but we see exactly those sealing densities on offshore islands where predators have been absent for some time, and we know historically they were the sort of densities that kiwi formerly lived in those very same forests.

Juveniles will disperse out of the PMA in increasing numbers when the population in the PMA approaches the carrying capacity 20 or maybe 30 years after the onset of predator control. Now these disperses will help to restore kiwi populations in neighbouring forests. So the PMA is going to benefit kiwi in two ways: initially by growing the population within the PMA itself; and then later by providing colonies for the wider area. And this function will have a source population which will also apply to other threatened birds.

Commissioner if I can just point out, that for kiwi, they remain in their native areas until they get to a size of about one kilo and then some will stay and some will go, and there is debate with the Department of Conservation about exactly what proportion are going to be stayers or leavers. But the important point is that when they leave, they are at a size when

they can resist stoats; so they do go on and enjoy a long life wherever they settle because they have got past that important bottom leg in their life-cycle.

THE COMMISSIONER: So when they get to that size do they fight stoats off or ...

DR MCLENNAN: Yes, they can, they can fight stoats off, yes. And the change happens when they get to about 800 grams to 1,000 grams, and that generally occurs in about their first hundred days of life. So protecting kiwi is all about providing safe conditions for them in those first hundred days of life; and there is a little bit about providing protection there, obviously.

If I can talk about what the benefit/loss ratios of what the Project might be for avifauna. As we have heard from Mr Singers, we are going to lose about 31.6 hectares of vegetation and if I put that in terms of kiwi territories that is equivalent to about 1.5 kiwi territories currently. But that is currently spread across those ten pairs that I talked about; so it is shared among those 20 kiwi that are currently living along the length of the alignment. Restoration planting, mostly farmland, will eventually replace almost half of that and the

restoration planting should become suitable for occupancy by kiwi in about two to three decades time.

But if we ignore the restoration planting and just simply look at the theoretical loss of kiwi resulting from 31.7 hectares of habitat then it is those estimated three adults there now and their offspring that they would have produced over the next 30 years. I will just confine the comparison to 30 years, but it could have been 50 years, it actually does not make all the difference. Over a 30 year period the theoretical loss is about 22 kiwi. If you look at the theoretical gains I have already talked about potential increase in the PMA, but the gains outweigh what losses by about 55 to one and we would not expect this benefit loss ratio to change so long as pest control remains. And as we have talked about, the unusual feature about this project is that pest control is proposing to last forever.

The potential gains for kiwi resulting from pest control are especially large because the kiwi population in the proposed PMA is currently well below carrying capacity. The gains to the other potential respondents are likely to be more modest, in the range of 20 per cent to 100 per cent over the first five years of the programme. In all respondents, however, the gains in PMA

should offset the losses resulting from habitat removal in the Project.

If I can move onto post-construction monitoring. So post-construction monitoring of birds will be conducted in the PMA for 12 years at three-yearly intervals following the onset of predator control; and we have performance standards, Commissioner, for those eight species that we are monitoring, and we are saying that we are going to achieve a minimum 20 per cent increase in abundance of those eight species in the first 12 of the predator control programme. And the bird monitoring programme has been designed to detect a change of this magnitude, so we will be able to detect if we have achieved the performance standards that we have said we will aim to achieve.

If I can move now to responses to submissions. The matters raised by DOC in paragraphs 94 to 120 of my evidence-in-chief were resolved, with one exception; I did not agree with Dr Burn's view that the Project would have a high level of effect on bittern and a moderate level of effect on kōkako because the presence of bittern in the Project area is unconfirmed, and kōkako are unlikely to move into the Project area for some years to come. And again, in my rebuttal evidence, I refer to bittern

and try to distinguish between two possibilities, (1) we have failed to detect them; or (2) that they are not there; and I personally favour the second explanation for their absence in what we have found so far.

The matters raised by the officer in section 42A report are addressed in paragraphs 121 to 129 of my evidence-in-chief, and most of these matters involve points of clarification rather than points of opinion and I believe they are now resolved. And when I look at the summary of the most recent report I think that conclusion still holds but there are still some points of clarification that we need to address.

So responding to DOC's evidence-in-chief. In his evidence-in-chief, Dr Burns considers I have over-stated the benefits the PMA will produce for kiwi, and (2) that the apparent absence of bittern in the Project area is the result of retention failure. I have already addressed those. I do not agree with his opinion on both of those matters. And, in particular, Commissioner, I want to talk about the figure I used to estimate the likely growth of the kiwi population in the PMA. I used the figure of 6 per cent per annum and I obtained that from Dr Hugh Robinson, a kiwi specialist in the Department of Conservation, and I used that figure in exactly the same way that he had used it to

assess the likely population growth of kiwi in areas that are receiving a combination of trapping and poisoning, so I have simply taken that and applied that to the PMA and I think it is a very reasonable figure to apply.

Now I have already referred to bittern and, in particular, again, I do not agree with Dr Burns that detection failure is a better explanation of the absence of bittern in our accounts from the Project area than zero presence. There is a lot of bittern habitat in Taranaki and not many bitterns to go around.

THE COMMISSIONER: Just on the bittern topic, Dr McLennan, you mentioned in your rebuttal evidence on that point that ecologists have spent a lot of time in this area; not only you but other ecologists. Would other ecologists not maybe report of those types of things?

DR MCLENNAN: No. I hear what you are saying but in this case the team that has been involved in this Project, they will be quite capable of recognising bittern, and Mr Singers, who has spent probably more time in the area than anyone else, was the person who alerted my attention to the presence of spotless crag in the area. He is very capable of detecting bittern.

THE COMMISSIONER: All right. Can I just ask you first about the latest Wildlands report version, which I think is July, which came out with the New Plymouth District Council Updated section 42A Report? Have you seen that? They are still talking about kōkako in section 2.11.

DR MCLENNAN: Yes.

THE COMMISSIONER: I wonder whether you have looked at that and whether there is anything you think you should be doing with the avifauna management plan around kōkako?

DR MCLENNAN: Yes, I have seen that and if I could respond to that? So their concern is that some of the adult kōkako released in Paraninihi may eventually find their way into the Project footprint and, of those who do, some of them may stay in the territory. So we have included the kōkako in the latest version of the ELMP and people involved in the construction programme will be trained to recognise kōkako, and in the event of any of them being seen or heard DOC will be notified. And DOC will then make a decision about whether they leave them there or attempt to catch and remove them. So the concerns addressed by Wildlands are accepted and there is an appropriate response in the ELMP.

THE COMMISSIONER: So you addressed that particular issue, in your view?

DR MCLENNAN: Yes.

THE COMMISSIONER: All right, again, like the other witnesses, I will just go through my notes on your evidence just to see whether I have any other questions.

Oh, yes, this is your rebuttal evidence. I am looking at your paragraph 22, Dr McLennan. This is a paragraph that you have put in at the end of the adequacy of PMA for offsetting residual effects on kiwi.

DR MCLENNAN: Yes.

THE COMMISSIONER: And after you talk about the difference in opinion about your 6 per cent growth figure which you have defended and he has challenged?

DR MCLENNAN: Yes.

THE COMMISSIONER: But you make a statement here that:

> "Dr Burns and I may disagree on some matters of detail, but we do agree that the proposed 3650 hectares PMA will offset - compensate - the residual effects of the Page 6 Project on all forest-dwelling birds."

So that's your understanding of Dr Burns' position, as well as yours?

DR MCLENNAN: Yes, yes, absolutely. Because when I examined Dr Burns' concerns in relation to kiwi -- well, firstly I should just back up and say Dr Burns has agreed that the proposed package would benefit all birds with two possible exceptions: one was kiwi and one was bittern. So North Island robin, the only other species of main conservation interest was already accepted by Dr Burns as likely to benefit from the PMA. So when it came down to kiwi and the use of the 6 per cent growth figure, when I looked at Dr Burns' evidence he indicated that his only concern really was about what proportion of the young kiwi produced within the PMA were going to stay and contribute to subsequent population growth, or going to leave; and he provided his own assessment about what that proportion might be.

But it was quite clear from his evidence that he expected the predator control in the PMA would be more than adequate to reverse the current decline of kiwi and promote growth. And, in

fact, the figures that he gave in the absence of dispersal was his guesstimate at growth was between 8 and 25 per cent, more than the figure that I was using as an average. So for me then, the details about what proportion will leave and contribute to population recovery somewhere else was compared with stay, but we both agreed entirely that the PMA, the proposed predator control programme, will benefit all forest birds in the end.

THE COMMISSIONER: I will certainly get the chance to confirm that with Dr Burns in person next week; I had just saw that you had made that statement. I think you have covered everything I had, so thank you very much.

DR MCLELLAN: Thank you.

MR ALLEN: Thank you, Commissioner. As per our discussion earlier, that is the day's list. Obviously, I am in the Commissioner's hands but still of the position that we adjourn for now and come back tomorrow morning; but, obviously given it is three o'clock, if the Commissioner would like to have afternoon tea and come back and hear one more -- maybe two more, that is up to the Commissioner.

THE COMMISSIONER: There has been quite a lot of new information come in about the bat situation from the 42A report, so I want to re-read that overnight and I plan to do that, and certainly also on some of the conditions. So I would really like to use that time just to refresh myself on that. But, for example, if Mr Milliken was available today we could do him after afternoon tea, if that was possible?

MR ALLEN: We might do Mr Milliken tomorrow just so he can be involved in discussions in terms of what has come out of today?

THE COMMISSIONER: All right. So I think on that basis we will adjourn for the day now, and we will start again at 9 o'clock tomorrow morning.

MR ALLEN: Thank you.

THE COMMISSIONER: Thank you very much.

(Adjourned until Friday 3 August 2018 at 9.00 am)