

Waitaha Hydro Joint Empanelment Hearing –

Meeting Recording 2

13 February 2026, 02:53am

3h 2m 6s

MR

Marine Richarson 0:04

Juveniles from other catchments. Best case scenario population above the weir improves and more adults produce larvae that might contribute to the big pool. And and so it's actually really difficult question in my view to understand those long term effects in isolation, trying to take the broader view of.

Of what's happening in the system in relation to other systems is is is difficult to exercise. So in terms of long-term effects of the barrier.

In my view, my sense is that we're replacing a current natural velocity barrier with a physical barrier that is potentially able to cause delays to migration, but not necessarily fully block upstream migration.

So access to Kiwi flat would be possible for a good climbing species like Quaro. Would that influence the dynamics in the systems potentially and depending on conditions that site, it might be positive, neutral or negative. Safest, but in my view is neutral.

Like there's there's not going to be any consequence really on in the freight scheme of things on the quarrel, on the species.

In an ideal world, the species recovers and is not at risk declining anymore, and basically a global improvement of the species at the national level might contribute to an improvement at site as well based on recruitment subsidies.

I hope that makes sense. Yeah, I think it's a difficult question to answer essentially because this is the system is not insulated from other systems.

JM

Josh Markham 2:21

Yes, and that's right. But you know from a panel's point of view is we're assessing the application in front of us and the effects of the application and the idea is drilling into this comment is actually trying to understand.

MR **Marine Richarson** 2:29
Um.

JM **Josh Markham** 2:36
What those short, medium, long term effects are on the upstream quarry population is based on this application. So totally understand of all the global context that you talked about and that's really important, but it's about the effects of this.

MR **Marine Richarson** 2:48
So.
What?

JM **Josh Markham** 2:56
Alication.

MR **Marine Richarson** 2:57
Well, the the meaning of my answer I suppose is that the what would be observed in that system would mirror what is happening.
close by, essentially. So I would if I were a betting person, I would bet on the neutral effect.

VM **Vicki Morrison-Shaw** 3:24
Thank you. I think we've probably answered that. I'm just conscious of time. We've spent sort of still 45 minutes on five questions, so if we could move on.

JM **Josh Markham** 3:25
Yes. And I I think, yeah. Thank you. Yeah.
Yep.
OK, thank you. Question 26. Believe this is probably quite a quick question. Are you comfortable with the design of the fish pass being left to detailed design, Miss Murtree?

SM **Shelley McMurtrie** 3:53
Thank you, Commissioner Markham. I think this question was originally directed to

Doc, but I will answer that anyway. I am comfortable with the design being left to detailed design on the basis that there are consent conditions that require.

The design to involve a multidisciplinary team of specialists to work on that. There remains flexibility within the current design of the system to allow for the fish passage structure to be moved, altered, etcetera.

So it is not stuck where it is. That flexibility is important because that will allow the specialist to dive into the detail and tease out those different factors and.

Also on the basis of what the system is and what that fish passage structure needs to do, which is to get Kawaro, allow Kawaro to continue to move into Kiwi flat in the absence of trout getting in.

Thank you.

JM Josh Markham 5:06

Thank you. Mr. Richardson, do you have anything to add to that?

MR Marine Richarson 5:11

No, that was essentially the the notes that I that I had taken. I'm comfortable with it provided there are good practice, good conditions and the possibility to adapt to what is observed and modify as needed.

JM Josh Markham 5:21

Hmm.

OK. And Mr. Morgan, just rounding out question 27 on the same vein, do you have any further comment?

PM Paul Morgan 5:36

Just in terms of I guess reiterating one of my, I guess the themes of my response in this regard and that's that to me to to have a an effective solution for fish passage and this doesn't just relate to the.

Intake structure, but also issues like the the tail race and also that I guess that the river between those two where there's changes. To me it's really important that there's an integration of the design.

And that it's not, you know, that fish passage isn't a clip on or add on to the end or and it doesn't really just apply to the environmental aspects of it. Also it's the same when we consider cultural elements of design that you know, doing it at the end isn't

the right way to do it for it to be meaningful.

You know it has to be throughout the process to to to have an influence on coming up with the best solution. Otherwise you risk the problems that are seen at many other sites where it's it is just an afterthought and it's quite hard to get it.

Things to to work because you don't have the opportunity to change some fundamental things that that will improve it. So I guess that's my main comment in that regard.

JM **Josh Markham** 6:55

OK. Thank you for that. Also, thank you for the patience of all the other specialists on the call while we navigated that really detailed section. Thank you and thank you for the specialists and putting into that. That's that's fantastic and there's a lot of information to mull over for us as a panel.

Just handing it back over to Madam Chair. Thank you.

VM **Vicki Morrison-Shaw** 7:15

Yep. So tautoko that it was really long, but it was really helpful. So thank you. We're now moving on to the third issue, which is sediment and then that will be led by Commissioner Cousins. And I understand he's just going to reorder. I think the first three questions might be asked at the end of that section instead, but I'll let him. Speak to that if we could just, I'm conscious of time and if we can just keep the answers to the specific questions. If you have thought about that and you're going to answer it later, fine to just say, look, I'll answer that later in that question or if you've already answered it, you can say I've answered that.

In response to question, whatever number it was, and we can leave that at that, that will just help us to to move a bit quicker. Over to you, Commissioner Cousins.

TC **Tony cussins** 8:06

Thank you. So the reordering there, what I'm going to suggest here is that questions 28 through 31, we'll push those to the end, the rationale being that we're going to look at some of the actual technical effects.

And those relate to management plans and conditions. So with that, I'll move directly to question 32 that reads in paragraph 3A of Doctor Clooney's response notes that the CFD morphodynamic model.

of the intake, approach channel and upper gorge area will occur at detailed design

phase. What level of confidence does Dr. Clooney have that the final design will effectively manage sediment loads through the system and via the desander?
So over to you, Doctor Clooney.

DC **Dougal Clunie** 9:05

Thank you. So, so I have a high level of confidence that the final design will effectively manage sediment loads through the system. I believe the necessary components to allow effective sediment management have been included in the preliminary design.

And there's this plan for sediment modeling of Kiwi flats and detailed safety modeling of the intake area to allow refinement and optimization of the sizing and shaping of those components, and in particular refining the operational regime of the sluice gate.

And so.

Yeah, follow, follow, following such a regime and adapting it through operation will ensure this effective management. I also I take confidence from the review and statements of Doctor Tom Jacobson with his report appended to Roger Griffith's response to this week, which records his high confidence.

TC **Tony cussins** 9:41

Thank.

DC **Dougal Clunie** 9:59

That sediment management can be effective.

Um.

TC **Tony cussins** 10:04

OK. And then your comments would relate to the descender speak and operations as well.

DC **Dougal Clunie** 10:12

Yeah, I have high confidence the descend design will be effective again with with the plan descend, the flushing system being backed by Doctor Tom Jacobson, expert with significant international experience in that.

And maybe to conclude, I'd say that the management of sediment, it is a critical, it is

critical to the operational performance of the scheme. This is a risk that's that's well understood by the applicant. I mean they have every incentive to to ensure that that this confidence is subjected to a rigorous assessment in the next stages of design and then proven.

TC **Tony cussins** 10:49

Thank you, Doctor Clooty. I'll, I'll ask both Mr. Morgan and Doctor Cunnercliffe to to respond to your comments there and also to address the particularly your response to that question. Thank you. So potentially Doctor Morgan, sorry, Mr. Morgan first. And the in Doctor Tanniclove.

PM **Paul Morgan** 11:14

Yeah, I I don't probably have anything specific to add. Um, Commissioner Cousins.

TC **Tony cussins** 11:20

Thank you, Dr. Tanniccliffe.

JT **Jon Tunncliffe** 11:25

Yeah, I suppose we'll get into further details in some of the questions further down, but I suppose I am interested in the the evolution of the system over time as the as the basin fills and material is brought up to the grade of the.

Of the weir, just how much management will be required to shape the channel and what?

What? Um.

Manipulation of the morphology is required to maintain the.

The the channel design over these phases of filling and eventually bypassing across the weir.

TC **Tony cussins** 12:22

Thank you. Do you have any response to those comments, Doctor Clooney?

DC **Dougal Clunie** 12:30

Yeah, like like I said, we will get into a bit more detail in further questions it looks, but but the scope of what what can be managed by this slow scape in operations at at the Headworks are limited in extent. I mean that we're.

They will only affect.

Sediment aggregation within that local area, 10s of meters, I guess.

TC **Tony cussins** 12:54

Yeah. Well, we'll, yeah, definitely be looking at that aggregation issue in subsequent questions. So thank you for that. So moving to question 33, Doctor Clooney again notes that in Appendix C and we have referred to that previously that sluicing operations will be refined through detail.

LCFD morphodynamic modeling of the intake and gorge area to be undertaken at detailed design phase. So this question relates very specifically to the effects that are envisaged in the application. So then reads what confidence.

Do you have Doctor, Doctor Clooney, that effects in the Widaha River resulting from sediment management will be consistent with the application? That is the effects that are envisaged in the effects envelope within the application.

DC **Dougal Clunie** 13:51

Thank you. Yep. So, so I have a very high level confidence that the refinement of the flushing and solution and operation facility management will not result in effects outside of those assist in the application. So the effects assist to upstream degradation.

Effects the set primarily by the the weir crest. I don't consider that management of sediment down at the slew scape within that intake channel will affect the extent of aggradation on the flats.

Similarly, the effect of continuity of sediment passage into Morgan Gorge is not dependent on sluicing operations. So these operations ensure the operational effectiveness of the scheme.

But.

Regardless of what's done, the sediment will keep coming and if it's not effectively passed through that intake channel, it passes will all pass over the weir.

So there, in my opinion, there won't be a change in that then the continuity of sentiment passage into the into the gorge.

TC **Tony cussins** 14:45

Yep.

DC **Dougal Clunie** 14:51
Uh, maybe this is the.

TC **Tony cussins** 14:52
Yeah. So what? Yeah, what? Sorry, you go ahead.

DC **Dougal Clunie** 14:55
OK, so the third effect maybe is the sediment load through the desander and flushing downstream and I believe the affected sediment load in the desander is well understood and this sufficient capacity within the desander to allow flexibility in its flushing operation to deal with the variability in sediment load and hydrology.
And.
As such, effectively send the flushing will remain consistent with those in the application.

TC **Tony cussins** 15:24
Thank you. I'll ask Mr. Morgan to comment on that response 1st and then Doctor Tunncliffe.

PM **Paul Morgan** 15:35
Yeah, I think a general Dr. Cliff is going to be able to answer the bigger picture stuff better than I am. My, I guess my concerns always through this process have been more, not so much the wider impacts of sediment in terms of design, but how, you know, how specifically, how.
Course sediments can be managed, you know, around and within the intake area rather than I guess the the wider effects, which I think Dr. Tony Cliff can answer better.

TC **Tony cussins** 16:04
Thank you, Dr. Tunncliffe.

JT **Jon Tunncliffe** 16:08
I guess I would just say that I'm I'm flying blind without seeing the the modelling. It's it's an exceedingly complex dynamic that's that's occurring there. There's also a

matter of wood and other debris that that's moving through the system.

Um.

Um.

Yeah, I mean, I I guess it's uh.

We would have to get more into the details of the backwater effect that's occurring as water level goes up that encourages some deposition that that's as evidenced by the the the.

Drapes of sand, the bits of sand delta that are left behind from from previous events and so as we're reducing the gradient of the that lower part of the flats.

Yeah, it'll be important to think about how that's how the intake is is dealing with that.

Change in depositional regime and and what sort of interventions are required to to maintain the passage of of the material.

TC **Tony cussins** 17:25

From Doctor Tannicliiff and Mr. Morgan, Doctor Clooney.

DC **Dougal Clunie** 17:33

Yeah, no, thanks for those comments. I I just note that that in in future design phases there is sediment modelling of the wider Kiwi flats planned which will be crucial in in understanding the sediment load and the timing of those loads through the sort of flood cycles at the intake for the design of that.

Of sediment management locally at the intake.

TC **Tony cussins** 17:53

When would you expect that to be undertaken and at what phase?

DC **Dougal Clunie** 18:00

The very next one. Hopefully this this application proceeds.

TC **Tony cussins** 18:07

Yes.

DC **Dougal Clunie** 18:08

But it's it's, yeah, it's a key input into this, the safety modelling that we've been talking about providing the detail down at the Headworks.

TC **Tony cussins** 18:18

Thank you.

So moving on to the next question, Ben, and this is quite quite a meaty one, it reads in regard to Associate Professor Tunnicliffe's position on underestimation of bedload rates in paragraph six of his.

Response Doctor Hicks states that no bed load rates have been used in the intake engineering design to the stage that it's currently progressed and that bed load transfer is to be included in the CFD modelling. What are the implications of this absence in terms of effects assessed in this application?

And does the sensitivity analysis, and I'm referring here to Doctor Hicks's sensitivity analysis, adequately address any uncertainty regarding underestimation of bed loads?

So potentially we'll we'll put that question to Doctor Hicks first.

Are you with us, Doctor X? Oh, yes.

No problem.

MH **Murray Hicks** 19:44

I I I think the the two issues here and.

I might return to Doctor Clooney for the one around the implications of around the intake design the.

I do believe, Tony, that the sensitivity analysis point that you raised is refers to my. Assessment of the amount of.

Fine bedload gravel and sand that gets delivered down Morgan Gorge.

At times when the flow in the abstraction reach is down at its base level of 3 1/2 cumecs. So this is really assessing how much.

Gravel and Sam dribbles down under the almost baseline regime when much of the borders going through the power station. So in that context I use.

My estimates of suspended load and scaled them to give a bed load proportion equivalent and in the process of doing that I undertook a sensitivity analysis of actually increasing the bed load proportion by a factor of 10.

And so in that context.

I I'm quite confident that even if the initial estimate of bed load was underdone, um,

that the sensitivity analysis would cover what bed load went down under that situation.

TC **Tony cussins** 21:40

Thank you. Yeah, I yeah, I think that addresses that question from that perspective, yes. And came to hear from Doctor Clooney just on the the first part of that question. I think if you've you've put that across to him.

DC **Dougal Clunie** 21:58

Thanks. So the first part of the question, the what is the implication of the absence of?

This can be like leave on the the applications.

So the majority of bid load will pass over the weir into less air extend through the intake channel on the sluice gate. So more bid load means more more bid load through those two passengers.

I see the question of bed load quantification as an operational issue rather than an effect based issue. So certainly if there's if there's more bed load, there's more more potential for that to a grade at the at the approach to our intake channel.

Which will pick the.

The necessity of the operation of the sluice get the necessary duration that's open for and the frequency that that's used, for instance on on rising floods as well as receding floods. So yeah, that definitely has an impact.

On the operational side, but I don't see an effect having an impact on the the wider scale effects, wider area effects that have been assessed by.

TC **Tony cussins** 23:13

Thank you. And just as a supplementary question to that, I'm just wondering what your comment would be on the level of intervention required or mechanical intervention that will be needed to manage accumulated sediment?

There's been various comments and and statements which are all helpful. I I just wonder if you could expand on that for the benefit of the panel.

DC **Dougal Clunie** 23:35

Mhm.

VM Vicki Morrison-Shaw 23:41

I think we might be coming to that in terms of the excavation of material section. Is that or are we talking to, yeah, so.

DC Dougal Clunie 23:47

Yeah, there are a number of questions. There are a number of questions on that later, but.

TC Tony cussins 23:48

Yeah, I suppose, yeah, that that's that's correct. But the focus here is about the the design. So yes, we can come back around to that again as well, but in terms of operational aspects, but just in regard to the design and the fact that the the bed boat rates haven't.

Been included in the modeling as yet, so that that was really just a specific aspect for the moment.

DC Dougal Clunie 24:17

Yep. So.

So yeah, OK, bid bid load rates may potentially affect the.

The number of times that that intervention, mechanical intervention is required to to help the so same flushing system along and that's the the need for mechanical intervention will be will be variable to deal with the variable variable hydrology. Variable sediment loads in the system. For example, if there is a big big slip within the catchment, they've elevated sediment loads for the following months or years. So that.

Yeah, and inherently there will be.

a variable and adaptable need to perform mechanical intervention.

And the the exec get loader rate will have an influence on that.

TC Tony cussins 25:05

OK.

Thank you. Perhaps just go to Doctor Tunncliffe first on this question and then Mr. Morgan.

JT **Jon Tunncliffe** 25:19

So just to clarify it, it wasn't entirely clear in the documentation, but it it it seems like there's berms that will be maintained and and constructed to to focus the flow. And so in terms of rebuilding those after the, I mean the Canyon becomes completely inundated and so I imagine you have dilation of the gravels and you know that it's a difficult structure to to maintain in that environment and you also have ecological, you know that the fish considerations with. Containing berms, do you see that as being a a major main part of the maintenance issue or maintenance regime?

VM **Vicki Morrison-Shaw** 26:00

Sorry, just to clarify, we want your response to the question rather than asking another question. Please, Doctor Tunncliffe.

JT **Jon Tunncliffe** 26:08

Very good. Yes, thank you.

Just to to raise the point that the construction and maintenance of the berms is another component of the project to be considered.

DC **Dougal Clunie** 26:25

Yeah, so, so in response to that did.

TC **Tony cussins** 26:25

Thank you, Watson.

DC **Dougal Clunie** 26:29

There there isn't a plan to to create berms to to channel the flow. So the there is a short permanent concrete training wall right at the head works there, but there there isn't an intention to to shape the river unnaturally upstream that with the addition of berms.

It's so mechanical intervention would be to to free up the the approach to that intake channel as needed and then to let the water do its thing and carve its own channel down there.

TC **Tony cussins** 27:00

Thank you. Mr. Morgan, do you have any any comment on that question?

PM **Paul Morgan** 27:05

Yeah, I I guess it does kind of then relate back to the an earlier um issue we discussed around preliminary design. Um that yeah, cause my my sort of feeling on this is that preliminary design is where you test.

Your concepts and you come up with a preferred solution that you then take to detail design. And so what's been presented is that that has happened. So I guess my concern is that given that a lot of this key sort of modeling of sediment hasn't actually happened yet.

To me, that would feel like it runs a risk that what you've got has still actually got to go through another stage of testing the what's proposed before you can actually be sure that it's actually going to be the right design.

To be to to be undertaken for detailed design. So to me, I I guess I'm questioning whether that means that that's really a preliminary design, that it's maybe still parts of it are actually really early earlier than that.

In the process.

DC **Dougal Clunie** 28:12

So.

TC **Tony cussins** 28:15

Your chance to respond, Doctor Clooney.

DC **Dougal Clunie** 28:16

Yes, so it's so that I I would answer that it is a very complex system. So to to properly understand the sediment loads and the the timing of these and and how that we dealt with is a big exercise.

That's it'll take, you know, extensive data collection, extensive modelling effort, um, and in my opinion that.

That sort of level of detail is not necessary to to assess the the effects of the scheme, so it's it's definitely necessary to.

To refine the operational needs of the scheme, but in terms of environmental effects,

those I think should be separated from the the the operational specific intake channel to keep that open.
That makes sense though.

TC **Tony cussins** 29:06

Yeah, that does. Thank you, Doctor Clooney. So I think we'll move on to the the next question, looking at a different matter.

Get This is at 35 Given the state of difficulty in predicting fine sediment deposition in the Wide Ha River channel, and this is referring to Doctor Hicks's paragraph 35, what mitigation measures are proposed as part of the monitoring and mitigation program?

Or Morgan Gorge Flushing. So that's a question for Doctor Hicks, I think.

MH **Murray Hicks** 29:49

Um.

Um.

Just as a I did notice that Mr. Ken Johnson had his hand raised before that last topic closed off. So I just wondered if he might have the opportunity.

TC **Tony cussins** 29:58

Odd.

Oh, look, let's, you know, let's go back. Yeah. Look, I'm a bit hamstrung. I can't see those. Um, yeah.

Was this hand up in relation to the previous question, Doctor Hicks, or this question?

MH **Murray Hicks** 30:15

I do believe it was.

TC **Tony cussins** 30:17

To the previous.

MH **Murray Hicks** 30:18

Yes.

JK **Jeremy Kent-Johnston** 30:19
I wanted to make.

VM **Vicki Morrison-Shaw** 30:19
Let's go and ask Mr. Kent Johnson.

TC **Tony cussins** 30:21
Yeah.

JK **Jeremy Kent-Johnston** 30:22
I wanted to make one clarification there. The preliminary design did include 2D modelling of the entire Kiwi flat area through a range of gates. The purpose for doing that was to estimate velocity and thus shear stress through the gates and estimate the gates sediment transport.
Capacity. There was no sediment in the 2D modeling, but it allowed us to understand the velocity profiles across the gates, maybe an area of influence in this sort of thing. So as far as the gates are concerned and the location of them.
There has been robust engineering done and quite a quite a lot in fact. And and so my view is I'm very confident that we can achieve these velocities and these shear stresses at the gates.
And from there, I think you're in a good one is in a good position to.
Look at the sediment in earnest in the next stage, building upon that, that's all.

TC **Tony cussins** 31:29
OK. Thank you, Mr. Kent Johnson. That's that's useful.
Was it just before we move on, was there any comment from Doctor Tunnacliffe or Mr. Morgan just on that particular point?
Before we move on.

JT **Jon Tunnicliffe** 31:47
Nothing more to add.

PM **Paul Morgan** 31:49
No, nothing from me.

TC **Tony cussins** 31:51

OK. Thank you.

So at 36, then, what uncertainties will arise in relation to effects of visual monitoring as undertaken without quantitative monitoring of embeddedness?

Now I've just to explain this, I've inferred this from the the evidence of Doctor Hicks.

And please correct me if I haven't understood this, what's proposed here correctly.

So over to you, Doctor Hicks.

MH **Murray Hicks** 32:26

Just a point of confirmation. Are we addressing question #36 or 35? I'm not sure that we've.

TC **Tony cussins** 32:38

Oh, so, yes. So, uh, yes. So, so let's on thirty-five then. Um.

MH **Murray Hicks** 32:38

1035 Yep, Yep.

Yep.

TC **Tony cussins** 32:46

Yeah. So let's, yeah, let's address. Yeah, we got diverted there. So, yeah, just look at the at the monitoring and mitigation programme. So I did read that question out, but yes, over to you to address that. Thank you.

MH **Murray Hicks** 32:58

Yeah. So the Um, the Morgan Gorge flushing program is is really designed not to flush Morgan Gorge. It's cause that's so steep it will flush itself. Um, it's it's designed to flush.

Fine sediment from the river between the toe of Morgan Gorge and down past the power station. So the the the actual flood procedure will be that after a monitoring trigger.

And if there are no high flow events forecast in the river in the coming week, then a water, a large quantity of the natural flow of the water will be diverted from the power station.

And sent down the gorge and through the rest of the abstraction reach.

Um. And so the specifications for this release, Um, including its duration and flow will be Um refined during a program of trials in the first year of operations Um and that will.

Also assess the effectiveness of that flushing process and possibly a review of the specifications.

TC **Tony cussins** 34:30

Thank you, Dr. Tannicliff.

JT **Jon Tunncliffe** 34:40

Um.

Yeah, I don't think I had anything further to add to that.

TC **Tony cussins** 34:49

OK. Thank you. Yeah.

So look going to 36 then and this was part of the both of your statements of evidence. So to Doctor Hicks first and this is in relation to visual monitoring versus quantitative monitoring for embeddedness, so.

Over to Doctor Hicks 1st and then I'll ask Doctor Tunncliffe Tunncliffe to respond.

MH **Murray Hicks** 35:27

Beg your pardon the the question really concerned concerned what uncertainty would be loaded onto just monitoring the surface sediment cover rather than getting into.

TC **Tony cussins** 35:41

That that's correct. Yeah. If I understood your statement to be correct about visual monitoring being proposed, yes.

MH **Murray Hicks** 35:48

Yep, Yep. So, so the uncertainty really, um, comes down to by not doing the embeddedness, uh, monitoring as well. Um, that might then lead on to an undetected.

or underweighted impact on the the invertebrates that live in the substrate so that

Um.

Preference for surface monitoring was based on several things. First of all, it's something that's relatively easily done, whereas doing substrate embeddedness measurements is a difficult job in that very energetic polar environment.

And so I believe it would only be possible in a limited number of depositional environments, such as gravel baths and so on. Um.

Secondly, it's my belief that and backed up by observations in the river, that the most of the deposition will occur as a surface drape.

Rather than infiltrating into the substrate, again, it's a very high energy environment turned over very often by.

Energetic floods and we don't notice much in the way of fine cohesive range sediment embedded in the bed material. What we're seeing mainly is.

Sand grade sediment on the surface, albeit with a a minor component in the in the mud or cohesive range. So in that context I take the view that the surface monitoring.

Is a, if anything, a conservative proxy?

For the infiltration, and because it's a conservative proxy, that mitigates the uncertainty.

Attached to not doing the embeddedness measurements. So that's my perspective from the physical point of view. I might defer to Miss McMurtry.

If you could comment on how that risk might be transferred to invertebrates and the importance of significance of not monitoring.

Embeddedness from the invertebrate oint of view.

SM Shelley McMurtrie 38:44

Thanks, Doctor Hicks. So I refer to in section 14C of my response and this is something that we've also talked about previously in relation to the fish communities that you know the invertebrate community of the Waitaha main stem is is regulated by that regular.

Flood disturbance and the low nutrient status, with these remaining largely unchanged with the project in place with a slight drop of the 332 from 26 to 23.6, keeping it well within that highly disturbed category.

Also based on my observations in the field and I was also involved in all of the invertebrate monitoring, invertebrate sampling that was undertaken on transects across the Waitaha main stem above and below Morgan Gorge.

But so based on the observations in in the field during that work and in subsequent

visits, I I would agree with Doctor Hicks on his statement that or his feeling that embeddedness values may be low compared to the fine sediment deposition on the surface.

And so my feeling is that relying on embeddedness may be less precautionary than sufficient measurements of of fine sediment. Thank you.

TC **Tony cussins** 40:08

Thank you, Miss Mcurtry. I might hand over now to rather than to Doctor Cunnaclyffe. I might just ask Miss Richardson, do you have any comment on that aspect, that second aspect, just before we move back to the more physical component?

MR **Marine Richarson** 40:28

The invertebrates are not my primary area of expertise, so I will defer to Miss McMurtry on that. Miss Beck, if that's OK.

TC **Tony cussins** 40:38

Thank you. Uh, Doctor Tanniclove.

JT **Jon Tunncliffe** 40:45

Yeah, thank you. The there are a range of different morphological environments going from the relatively bouldering cascade through Morgan Gorge and I think more importantly the run out further downstream where we have some riffles and pools and.

I think it would be prudent to have some sort of cross-section based assessment of how fine sediment accumulation or embeddedness might might occur both as a baseline and and going forward.

Particularly upstream of the the outflow from the scheme where the the loss of those intermediate flows might be more important for flushing of those materials and and so having a systematic.

Metric and and having a baseline that can be compared through time would be quite important.

TC **Tony cussins** 41:50

Thank you, Doctor Clooney or or Doctor Hicks, would you like to comment on that, that aspect of establishing a baseline?

MH **Murray Hicks** 41:59

Yes, um, I'd like to do that.

The very extensive IFYM study that was done on the on the abstraction reach didn't identify any falls in the classical sense of slow.

Deep water. They only got as far as fast runs and slow runs and.

Acknowledging that we have in our monitoring specification picked slow runs as the most likely environment where fine sediment deposition.

Would be noticed rather than fast run. So rather than doing a a systematic study of cross sections everywhere, we would go straight to the what we see as the most.

Vulnerable environment, even though they they're far from being old in the classical sense, and do the analysis there.

TC **Tony cussins** 43:14

Any further comment from the applicant and if not, we'll we'll move on to the next question.

Now this relates to Mr. Doyle's evidence and at 37, Mr. Doyle notes at 5B that the unusually high ponding effect that occurs across the bottom third of Kiwi flat, creating slow velocities while also drowning.

Coming out the intake location, what ponding and aggregation effects are anticipated in Kui for that flows of approximately 150 cumecs when construction of the gorge creates a choke.

So I think that could be for Mr. Doyle firstly.

MD **Martin Doyle** 44:08

Thank you. First of all, 150 cumecs is kind of a break point between 2 phases of river flow down Kiwi flat and to understand the way sediment deposition occurs on the flat you.

Really need to understand what happens at that flow. And the best way to describe it is actually to look at the photos that I collected through time laps photography and there's some key ones shown on Mr. Hicks's Doctor Hicks's evidence evidence.

In his reply to Mr. Tunnicliff and in particular I think it's photos 3-4 and five on his page 9 and that just shows the way that the the choke develops and the ponding

develops across Kiwi flat.

Which enables that change in sediment deposition.

Oh.

TC **Tony Cussins** 45:11

Just a quick supplementary on that, Mr. Doyle, in the A EE it suggests that there isn't any significant change to the hydrology upstream of the intake. Now would you suggest that still is the case?

And and from a hydrological perspective as opposed to sediment aggregation.

MD **Martin Doyle** 45:37

As soon as that gorge chokes, what happens is this drowning out of the area above it. So anywhere that's placed at the height, that's the at the design height, the current design height, that wear will not affect the the height of the water or the pipe.

Ponding upstream of the weir location. So it once once the gorge is choked and that ponding has occurred, then there is very little effect apart from some very localised changes to velocity right at the weir itself.

TC **Tony Cussins** 46:17

Thank you. Dr. Tunncliffe, would you like to respond to that?

JT **Jon Tunncliffe** 46:24

Yeah, I think that's true that the the hydraulics are are.

Roughly similar with and without that that weir, but the key component is the the the movement of the sediment which which is you know will be altered by the emplacement of the weir and so on.

Yeah, I think that's the the the key issue and I think the I've attempted the a fixed beds model which shows the shows how things change with stage but.

It will be important to get into a mobile bed model where the channel is shifting as the as that choke takes hold or as the shear stresses is acting on the bed and.

From my you know from the from the views of the the time-lapse imagery, it certainly gives us a good indication of what it what it looks like, but it's it will be important to understand how the the transport field within that inundated section is is changing over time.

TC **Tony cussins** 47:42

Thank you.

JM **Josh Markham** 47:43

Sorry, Commissioner Cousins, Doctor Hicks had his hand up for a while and just wondering if you could give him an opportunity.

TC **Tony cussins** 47:48

Oh, does he? OK. Thank you. Yep. Thank you.

MH **Murray Hicks** 47:53

Um, I was going to offer to screen share the.

Time lapse imagery of the real river rather than the model to just in support of what Mr. Doyle described. So I could do that if you wish or we could move on.

TC **Tony cussins** 48:04

Yeah.

I think we could move on, but if you if you're able to share that, I think that would be useful contextual information for the panel. I would defer to the chair on that question.

JM **Josh Markham** 48:24

Yes.

MH **Murray Hicks** 48:29

Yep, there you.

VM **Vicki Morrison-Shaw** 48:29

Is is that something beyond what you put in the response statement or is it what we've already seen?

MH **Murray Hicks** 48:36

No, it's it's figure two in my statement of the 10th of February. So there's there's, yeah, that's already shared.

VM Vicki Morrison-Shaw 48:40

OK. No, we've we've got that. So I think that thank you. We'll we'll move on just I'm very conscious of time and we do still have quite a few questions remaining.

TC Tony cussins 48:43

Yeah.

MH Murray Hicks 48:44

OK.

Yep.

TC Tony cussins 48:50

Thank you. So on to question 38. Now this question was designed to allow Doctor Tunnicliffe to respond to some of the various issues that have been raised, raised in evidence.

I will read it out, but I I think some of them have been addressed, but for completeness I'll read it out and then to Doctor Tunnicliffe to address any issues that haven't been addressed and then allow the the applicant to respond.

So question 38 reads to the Associate Pressor John Tunnicliffe. In relation to your technical review, please comment on the applicant's responses dated 10th February 26. To what extent are your concerns in relation to fluvial geomorphology characterization and sediment effects addressed?

What is your response to Doctor Clooney's assertion in his paragraph 15 that the modelled scenario is, in opinion, in his opinion, unrealistic? Do you support Doctor Hicks's opinion that the natural hydraulic choking of Morgan Gorge, which he's commented on?

Will not be significant significant influence by the intake structure and that the minute and that minimal impact on the bedload budget and channel GM morphology can be expected downstream of the power station. So those are various various references than Doctor Hicks's evidence.

Early. So just over to you, Doctor Tunnacliff, to pick up on any of those particular matters that we haven't discussed already, give a general perspective on your current position and then I'll ask the applicant to respond to that.

JT **Jon Tunncliffe** 50:40

Thanks, Commissioner Cousins. With respect to the first question, I still have concerns regarding the characterization of the sediments and the sediment effects. There is a great deal of uncertainty and it's quite an optimistic presentation of how things.

This will work in as we've said, the highest among the highest rainfall rates in New Zealand and adjacent to the Alpine faults and considerable variation in annual sediment yield. So it will be important to have a robust.

Modeling framework and data set that can answer some of these concerns. And when these numbers are used, I think it's appropriate to reflect the uncertainty that you know it may be 5% it could be.

15% it's an environment that's very poorly monitored and understood because these places are hard to get to and it's extremely inhospitable to instrumentation. And also drawing these lessons from other international environments, right.

This is, you know, when we talk about Nepal and then Himalaya and the high mountains of British Columbia, these are the types of environments where some of these ideas have been tested, but it's.

We do need a robust data set and modelling framework to deal with this with response to my modelling. I take the point that the my model was a 5 hour model rather than a.

A 14 hour model. I did not have any of the hydrograph data to work with, but my point was that on the rising limb of the of the flood, we have a relatively high degree of connectivity and I think my modeling.

My modelling does reflect the the backwater, the the ponding, the choking effect that occurs and once we have that choking in place, we have deeper water and thus diminished capacity for onward.

Transport and deposition and so the connectivity is somewhat diminished and I take the point if there's a longer trailing limb, we would see you know the expansion of that that filled zone. It was my attempt to to.

Understand what was being proposed. We were shown a one-dimensional cross-section water level, but it's a highly complex place and this dynamic is not adequately captured to understand the.

TC **Tony cussins** 53:14
Yeah.

JT **Jon Tunncliffe** 53:29
The maintenance regime, the the risk to the the infrastructure, the ecological effects and the overall trajectory of the system. It's it's a waypoint between the mass wasting regime and the the high mountains there and the the the Canyon downstream. And that that geomorphic context is quite important for, you know, thinking about these ecological questions and fish passage and so on with respect to the third question.
I think I've addressed that and that's the.

TC **Tony cussins** 54:10
I think you you just did too. Thank you. Look, I think those that responds to the three specific questions. In the absence of any overall comment, could I go back to the applicant, Doctor Hicks, would you?

JT **Jon Tunncliffe** 54:12
Yeah.
OK.

TC **Tony cussins** 54:28
Like to respond or Doctor Clooney both?
With the epic in.

JT **Jon Tunncliffe** 54:37
Um.

MH **Murray Hicks** 54:40
It's I'm I'm I'm pleased to hear Doctor Tunncliffe acknowledging the issues with with his modelling a very large pod over too short a duration which.
I think quite misleading impression that there was no bed load being transported down to Morgan Gorge.
During the recessions of floods, when in fact because they last longer.

And you do get the choking effect disappearing. They do most of the work and and transferring the the bedload down to the gorge. I also appreciate his point that it is a very complex environment.

Um. And I I think in hindsight, what we who've spent time on the ground there at Kiwi Flat were able to appreciate more.

Is that there's a there's a an excellent set of field evidence left behind as to what happens during choking events and I and.

When the fat is choked and when it opens up again and we attempted to convey some of those pictures in the sediment report, but it's it's hard to capture everything in a few pictures.

I believe the time lapse photography collected by Martin Doyle and shown in Figure 2 of my statement of evidence goes some way to indicating what the real prototype. Situation actually does and how it behaves. So I I acknowledge those points of limited information from Doctor Tunncliffe and I think in the through this process of statements and hearing that we've clarified the picture a little more.

TC **Tony Cussins** 56:55

Thank you. Any anything to add, Doctor Cloney?

DC **Dougal Clunie** 56:59

I have nothing further for me. Thanks.

TC **Tony Cussins** 57:01

OK. Thank you. So just moving now to just the section on Feo.

Question 39 reads What impact might additional sediment build up at Kiwi Flat and operation of the scheme have on the FIO behaviour in and around Morgan Gorge?

Note that on our site visit 3 FIO were observed flying into Morgan Gorge and landing on rock ledges before flying out to Kiwi Flat and landing.

So over to the applicant in terms of a response.

JM **John McLennan** 57:37

I I think I've clicked my microphone on. Is that correct?

Good. Thank you. The assessment of environmental effects considered that the effect of the changes in sedimentation patterns above the headworks would be have a minor effect, have a minor effect on the pier.

That inhabits that area and the changes in sedimentation that we've just been hearing about below the head works are likely to have a minor positive effect. So the conclusion is, is that we expect the overall effects to remain minor.

TC **Tony cussins** 58:24

Thank you. Would would Doc like to respond to that?

JM **Jason Malham** 58:31

Yeah, I pretty much agree with all all of that. So I would expect the pair that's living immediately above the Rose Ware site are probably going to be pushed up the valley.

I suspect that's the bottom of their territory at the Weir site probably. And so they might, they might end up being pushed up the valley. I reckon the area immediately above the Weir site is not optimal feeding habitat for them. It's highly dynamic and you know, subject to.

Sediment deposition and then removal and so on with all the floods and whatever the I suspect the the optimum feeding habitat for that pier is actually up on like Caesar Creek, one of the big the side Creek on the true right of the Kiwi flat that looks like a.

From what I've seen on the aerial photos and whatever that looks like, prime feeding habitat for that pair, you might see. I reckon you could see if they are pushed up the valley, you might see more territory disputes between them and the.

Pairs up the valley because they feel really territorial and they will defend their boundaries, you know, against other pairs. But I don't think that's going to impact the any of those birds significantly.

Yeah. So that that's my opinion and I agree the area downstream, the gorge, good, you know, with the lower flows, it will probably make it better for feel, feel. But it's still a deep bedrock gorge and even at low flows it's still a, you know.

Predominantly bedrock. They don't like bedrock gorges so very much. So it might make it better. But yeah, that's that's my opinion, yeah.

TC **Tony cussins** 1:00:26

Commissioner Markham, I think has a question for you. We go to them.

JM **Josh Markham** 1:00:31

Thank you, Mr. Mallum. Just one really quick question about that territory dispute that that pier that's located just above the gorge. Is there a possibility or risk of that pier being displaced and the and moving out of the valley or are they quite happy just to have a dispute?

JM Jason Malham 1:00:31

Yep.

Um, yeah.

JM Josh Markham 1:00:51

The other peer in in live overlapping.

JM Jason Malham 1:00:52

Right here.

Well, so feel commonly occupied between 1:00 and 2:00 kilometres of river. You know, peers do for their life and they and that's, you know, like I said, they'll defend those boundaries against other peers. They do overlap. They quite often overlap a little bit.

I I would say if the feeding, if food resources are good enough immediately upstream of that where site, you know like up on up in Caesar Creek and and up the main flat for example, then they might end up with a shorter territory but.

Um.

They'll probably stick around. That's my opinion. Yeah. If they did go out of the valley, I mean, that has been known to happen, you know, in the Oparara River over in the coast. There's a big slip, natural slip, you know, and about 5 pairs got displaced out of there naturally through seed. I mean, you know, the river filled up with sand, so they had to go somewhere else, but.

Um, they would probably go up some side Creek or something, I I guess, yeah.

JM Josh Markham 1:01:58

OK. Thank you.

TC Tony cussins 1:02:00

This is the clown. Sorry, back to you.

JM **John McLennan** 1:02:03

Yes, Commissioner Markham, just to just to clarify that point, the the existing pier at the Headwork Headworks, its territory extends up into the confluence of whirling waters.

Which is a whole lot more stable than the main stem itself, and that is where they're now doing all their feeding and I think they'll continue to do that following the sedimentation changes lower down. So I don't expect.

I don't expect any displacement from a territory, but I do expect they they may spend more time in the upper reaches of their territory, which is already their favoured feeding area.

JM **Josh Markham** 1:02:51

Okay, thank you for that further explanation. Very helpful.

TC **Tony cussins** 1:02:54

Yeah. Thank you, Doctor McClellan. And I expect that the next question may be for you as well. And that this is a question 40. Do you agree that aside from potentially one pair, wheo and their habitat are unlikely to be affected by any changes? And sedimentation.

JM **John McLennan** 1:03:16

Yeah, the answer is yes. We have in the compensation package allowed for possible impacts on one to two pairs and the reason why we went to the worst case scenario. Is because Jason Mullum's comments about possible inter territory increased inter territory conflict could spill over and maybe upset the pier further upstream. But we think that is actually unlikely, so I completely accept.

That two is the absolute maximum of probable effect, and I think it's actually one pair.

TC **Tony cussins** 1:04:01

Thank you, Doctor McLean. Any any response? No.

JM **Jason Malham** 1:04:04

Yeah, yeah, no, I agree. I agree. I think if there are territorial disputes, I don't see that

being an issue. But yeah, I agree that most likely that pair by the where and yeah, yeah, totally agree.

And that's it for me. Yep.

TC Tony cussins 1:04:22

But.

Thank you. That completes that issue section. Madam Chair, I just wonder, would you like now to go back and address those last four, the reasonably mechanistic questions related to changes to management plans and conditions?

JM John McLennan 1:04:30

Yeah.

TC Tony cussins 1:04:44

I.

VM Vicki Morrison-Shaw 1:04:44

Yes, please. If we could just address those before we move on, just quickly before we move on to the excavation of material. We're getting close to finishing, but yeah, if we can just have some nice crisp responses to the the next four.

JM John McLennan 1:04:45

Yes.

TC Tony cussins 1:04:59

So back at 28 now it reads. Could you clarify the reason that 20% trigger and this relates to condition now can new condition 40 E has been removed the reason of applying.

Of that applying to just weightable streams does not appear consistent with what is stated in the sediment report, which refers to the trigger being based on national data sets which indicated different reference values for different river types, so.

Who in the applicant's team would like to address that question?

JM John McLennan 1:05:39

Doctor Hicks.

MH Murray Hicks 1:05:41

Um, thank you. Um. So I would say that the 20% trigger, um, has been parked up, not removed. Um, it's been parked up ending.

Analysis of the baseline data set.

To inform on the revision of the reference tape.

So as a result of that analysis, it it might turn out that a a 10% change could be reliably measured, or it might mean that a 20% change is still required to be reliably measured.

Or somewhere in between or somewhere different. So that's been um.

Delayed pending the results of the baseline monitoring. So in terms of the just clarifying the what?

Use was made of the Clapcott ET al criteria for wadable rivers. Clapcott ET al made two recommendations for setting the threshold.

Trigger in wadable rivers. The first one was for an absolute fine sediment cover of 20%.

And the the second one was a 10% change in copper from a reference level which varied depending upon the river type and they analyzed a large set of New Zealand rivers and.

Um assigned to those levels based on the different river types. We haven't used either of those approaches. What we're proposing is because it's not a wadeable river.

In quite a dramatic environment, if you like, that we would establish.

A Waitaha specific reference date.

And that will be done during the period of baseline monitoring in the first year of the the the project operation.

Through the only difference between what was proposed in the sediment report.

And what we're now proposing in that condition.

Is that the setting the trigger level will be delayed to after the baseline monitoring and the other addition to that addition is that we will review that.

Threshold level and the baseline.

On a rolling basis every five years.

TC Tony cussins 1:08:41

And is that position currently reflected in the the most recent set of conditions then, Doctor Hicks?

MH Murray Hicks 1:08:46

That's the case, yeah.

TC Tony cussins 1:08:48

Thank you. Any comment on that, Doctor Tanniclo?

JT Jon Tunncliffe 1:08:55

Uh, no. No comment on that.

TC Tony cussins 1:08:58

I I saw a hand up there. Is it?

JT Jon Tunncliffe 1:09:00

See.

TC Tony cussins 1:09:03

Jackson.

MJ Mason Jackson 1:09:05

Kia ora I just just to clarify the conditions currently before you have a a option for Westpower to apply to cease the flush management plan after five years. Subsequent to that Doctor Hicks and and I have talked about.

Actually adding some more words that if the flush management plan isn't ceased, then a review will be undertaken every five years at some place, so but you haven't seen that wording yet.

TC Tony cussins 1:09:38

OK. Thank you. And does that at question 29 in terms which reads in terms of the change to the condition to allow the consent holder to cease to implement the flush management plan after five years, is this sufficient time for the river to adapt? To the change in flow regime. So potential we could move to addressing that question now.

MH Murray Hicks 1:10:09

So to address that question, I think the answer is yes. Over five years, I'd expect 55 low flow events lasting longer than a week in the river. I'd expect 75.

Floods exceeding 250 cumics, which is the cut out flood and I would expect.

Something like 2 mean annual floods which are of the order of 800 cumecs. So given that level of activity, I do believe that any state change.

And the abstraction reach in terms of fine sediment cover will emerge within a five-year period.

TC Tony cussins 1:11:03

Thank you, Doctor Hicks. Is there any comment from Doc and then to Doctor Tanniccliffe on here?

You're muted, I think. Oh, sorry, I think that that comment was muted there.

JT Jon Tunncliffe 1:11:18

Uh, it would be oh.

TC Tony cussins 1:11:26

Was that nothing from Doc? Am I correct? Yeah. Thank. Thank you. Yeah. Dr. Tarnaclo.

VM Vicki Morrison-Shaw 1:11:28

No.

JT Jon Tunncliffe 1:11:33

Um, I would.

Yeah, we would want to consider the the hydrology report that that points to the changing flow regime in a IPO positive year or there's various climate fluctuations that will change over time.

There is a what we might call a relaxation period as the system adjusts to filling of the weir. It's still not clear how long that's going to take. There's been no modeling to support that time frame yet.

But the adaptation of the system will surely take more than five years, so I would.

I would think there's a number of climate factors. There's a mass wasting regime to

consider. How does the system cope with elevated sediment levels after a recent landslide in the headwaters?

And so on. So there's a number of factors you would want to consider over the monitoring time frame.

TC **Tony cussins** 1:12:40

And that that's a useful segue to question 30. Is the sediment issue a short term effect and not one that needs managed over the life of the consent?

Doctor Higgs.

JT **Jon Tunncliffe** 1:12:56

So.

MH **Murray Hicks** 1:12:58

The the fine sediment build up, if it occurs to any significant level, will occur on a transient basis in between natural floods and I believe if it's going to occur at all.

In any significant way, that that will happen on an ongoing basis.

So no, not not a one-off short term, but if it's going to be there at all, it will continue ongoing and as a a means of managing that with the monitoring program.

And the um.

Morgan Gorge flushing management plan. Every five years the situation, the the monitoring data set will be reviewed and.

Only if that indicates that things there's there's no issue, then an application would be made to the consenting authority to cease this program. But if that's not the case, then the program would continue and the.

It would be reviewed again no longer than five years after that and so on through the.

Life of the project is necessary.

TC **Tony cussins** 1:14:27

Thank you, Dr. Hicks. Any Any quick comment on that, Dr. Tunncliffe?

JT **Jon Tunncliffe** 1:14:33

No comment.

TC Tony cussins 1:14:34
Uh, OK. Uh, anything from Doc? If if not, we'll just quickly move on to the last Uh.

VM Vicki Morrison-Shaw 1:14:40
I think that's question's actually been answered the last one in terms of the after five years, I think Doctor Hicks has just spoken to that issue 31 unless he's got anything more to add.

JM Jason Malham 1:14:40
No, no comment.

TC Tony cussins 1:14:51
Right. Well, well.
Well, that's really fortunate then. Do you have anything to add, Doctor Hicks?

MH Murray Hicks 1:15:03
No, it's always nice to knock off 2 questions with with one answer.

TC Tony cussins 1:15:06
Yeah.
Yeah, Mr. Allen has his hand up at the moment.

VM Vicki Morrison-Shaw 1:15:10
I'll fly.
Yes, thank you, Mr. Allen.

DA David Allen 1:15:16
If I may, just before Doctor Hicks knocks off, um, there's been a couple of comments about the filling of the ware and how many years that would take. Could I suspect it's either Doctor Hicks or Doctor Clooney, but could Doctor Hicks maybe stay?
Start if it's up to the panel, and just be clear as to how long he thinks it will take to fill the wear for want of a better word. Well, to use the same language.

TC **Tony cussins** 1:15:50

Um.

VM **Vicki Morrison-Shaw** 1:15:52

Thank you. I'm happy to allow that question because it was actually something that was raised by Doctor Tony Cliff in his response. So over to Doctor Hicks.

MH **Murray Hicks** 1:16:05

So my estimate of that is that it will depend on what what events come along now after the project's commissioned, it could if a big one comes quickly.

That could all fill up in a couple of days, but it might take some months or even into a couple of years for that to happen. It's it's really dependent upon.

What? What floods come through?

TC **Tony cussins** 1:16:45

Thank you.

VM **Vicki Morrison-Shaw** 1:16:45

OK.

I think that takes us to the end of the sediment topic, so thank you for bearing with us. We have a very small topic left excavation of material. Following that we'll address some procedural matters, so hopefully we will won't be too much longer. Thank you everyone for your patience.

I'll hand over to Commissioner Crystal now for this last issue.

DC **Dean Chrystal** 1:17:14

Thank you, Madam Chair. Yeah, I'll be pretty quick through these. I'm not sure who the appropriate person to answer each one is, so I'm just going to say the applicant and it may be that Mister Jackson, you need to direct to the right person. So first one there is what happens to the material that's periodically excavated from and. to the where, where does it go?

DC **Dougal Clunie** 1:17:40

Thank you, Commissioner. I'll take that one. So I'd just firstly like to clarify that there's

no plan to excavate directly in front of, do you? So it's it's plan, plan, plan the excavations up at the approach to that intake channel or potentially within the intake channel as required.

DC **Dean Chrystal** 1:17:49

Yeah, I get. Yeah, I'm just talking. Yeah.

DC **Dougal Clunie** 1:17:58

So the the concept behind this excretion is to not to rely on excretion to do the bulk of it, but to to use the power of the river to to transport the material. So the excretion is to to encourage or help pushing through the gate.

So expression that it's only enough to be sufficient to to open up a path towards to allow this to happen. So for context it's we're talking.

10s or maybe 100 cubitres of material that might be moved.

So to to now actually answer the question, the material would be pushed into the channel and then immediately flushed through the gate, or it would be excavated out and placed to the true lift of that channel, so within the river channel.

And to be to then be washed away and then when the next flood comes it would wash away over the weir.

So we're we're not not removing it from removing it from the river or transporting it past the work stores. It's just.

Placed within the river channel, within the dry areas of the river channel to be washed over the where and come the next pressure flood.

DC **Dean Chrystal** 1:19:10

OK. Thank you. I I don't think there's anyone else that needs to, we need to involve our experts or doc in these. I think these are just these are questions around excavation. So second question is could it could that excavation work?

Excavation of the above material be limited to weekdays only.

RG **Rodger Griffiths** 1:19:32

Perhaps I can ask to answer that one, Commissioner. Short answer, no. Westpower cannot control when events might occur, just as we can't control when a upstream landslide or an earthquake could occur.

Similarly with a severe flood, they don't just happen on weekdays or weekends, so we

really just have to be prepared to respond to the event whenever it happens. And it's more likely to be in a weekday than a weekend, purely because of the number of days involved. But no, we we don't believe.

We could limit it to weekdays only.

DC **Dean Chrystal** 1:20:12

Thank you. Thank you for that one. The when we got information back sort of during December, there was an estimated 5 to 15 days of excavation had been determined. Just want to understand how that was estimated.

DC **Dougal Clunie** 1:20:31

Yeah. So excuse me, that's that's an indicative range based on the expected frequency of of large floods, so floods in excess of 250 cubics.

Generally occur 5 to 15 times a year.

And so in those those larger vibings with high loads of sediment and debris will be moved towards the head works and where there's potential for this problematic local agradation to occur at the head of the the intake channel.

Um to.

DC **Dean Chrystal** 1:21:03

So.

So that would, so just sorry, that would then suggest that the answer of the next question that it's been based on no more than 15 days if you've used those flood events, is that correct?

DC **Dougal Clunie** 1:21:17

No, so the assessment for the.

Sediment management regime work has not been based on a cap of only 15 interventions in a given year. So it's got to be, it's got to allow for variability, hydrology and sediment loads. You may have good news, you may have bad news.

Um, so that 15 was intended as a an indicative range, not a not a hard cap on.

Number of interventions that maybe but so that yeah this will be be further quantified through the sediment modelling that's been planned for the for the next stage of of design works and reflecting incorporating uncertainties as as Doctor Tonikoff suggests to you know to.

To mark your to accurately quantify expected cement loads, a different flow, but regimes.

DC **Dean Chrystal** 1:22:14

So can I take from that answer that there could be more than 15 days where the digger is working in the river or on the side on the banks?

DC **Dougal Clunie** 1:22:28

potentially.

DC **Dean Chrystal** 1:22:39

That probably means that the answer to the next question is no, which was the could a cat be developed which limited the number of excavation days to that maximum.

DC **Dougal Clunie** 1:22:56

Excellent.

MJ **Mason Jackson** 1:22:57

Yeah, I could, I could answer that one. You're right. You could, you could prescribe a maximum, but but I don't think it's warranted in this case given the confidence the team have on on the effects.

And the ability for the scheme to pass bedload sediment.

DC **Dean Chrystal** 1:23:18

And Mr. Jackson, can you just remind me, did was Mr. Greenaway's report based on the 5 to 15?

MJ **Mason Jackson** 1:23:29

Golly.

Um, I can't recall off the top of my head.

Mr. Alan, my.

VM **Vicki Morrison-Shaw** 1:23:38

That's that's perhaps something Mr. Greenway can address in his statement that he's filing next week.

DC **Dean Chrystal** 1:23:43

Yeah.

Mhm.

OK. And then just the final one there. So how will the public know when such excavations are occurring? Is there, will there be notifications and are there any public safety implications?

RG **Rodger Griffiths** 1:24:04

I I can answer that one, Commissioner Crystal.

Yes, we will be providing notifications not only on our website, but also we believe there's a doc website. I believe it's called Know Before You Go. So if we can put a link there to our website.

Well, we're very, very happy to, yeah, post that information as as it comes to hand. If it becomes obvious, we need to have a digger working in there. As far as the public safety implications are concerned, no, we don't believe there will be any.

As the panel would have seen at the site visit, there's no public access down to that, you know, true right intake area where the the digger would be be operating. You know the the swing bridge goes across at a very high level and then the track heads in a different direction.

And in any case, if we're doing those sorts of operations, our health and safety management plans will apply. We're required to do that anyway by by legislation. So short answer is no.

DC **Dean Chrystal** 1:25:23

It's me, Doug.

VM **Vicki Morrison-Shaw** 1:25:26

Great. Well, thank you everybody. So we've now completed the expert questioning part of this impanelment. Really appreciate everyone taking the time. It's been a really long session, but it has been really useful for the panel to be able to explore these directly with the witnesses. So thank you.

One and all, Mr. Ellen, Miss Bradley, if you're there, could you turn your cameras on? We've just got a few procedural things to talk about.

The first one is just I noted in a response that Mister Jackson just gave. It sounds like

there might be another conditions set making its way to us. He indicated there was some discussions as a result of discussions with Doctor Hicks.

In relation to some of those, the trigger conditions, etcetera, can you talk further to that and just explain whether there is another condition set coming our way in timing?

DA **David Allen** 1:26:31

Was that to me, Madam Chair? Sorry, my I've just changed over to my headset. I was having problems with my speakers. Well, you said that in terms of condition sets, yes, there's.

VM **Vicki Morrison-Shaw** 1:26:35

Yes.

Is it?

DA **David Allen** 1:26:47

There's a question now of whether the panel wants another condition set, or whether it's easier now for the panel to get a memo that attaches as an appendix and drop ins to a few conditions.

The last condition set for the conditions. The panel's just been given all of the concession conditions and they align with the last condition set for the consents, which the panel will be aware. I call it the Pink Pony Club.

Um, condition version because of all the colors and Laneway was on last week, so that's where it ended up being. But the the highly complex, highly complicated now version, you can either get a clean set of that or the drop in suggestion, whatever works easier.

VM **Vicki Morrison-Shaw** 1:27:39

And what's the timing? Is there a difference in timing between either of those two options?

DA **David Allen** 1:27:44

I'm sure Mace can get the timing to you at the same time. So saying that's not me, the timing will be Monday.

MJ **Mason Jackson** 1:27:54

Either option Monday.

VM **Vicki Morrison-Shaw** 1:27:55

Yeah, um, I think um.

From our perspective, I think given that we now have word versions of the previous, just some drop ins would probably be the easiest rather than restarting another version because we do have some work going on in the background in relation to conditions. So that would be helpful. Thank you. And if we could have those by Monday, that would be great.

The second procedural issue was in relation to the follow on landscape and recreation statements and that's in relation to anything that's arisen out of the peer review report, the applicant response and.

The oral evidence that we've heard today that has implications for landscape and recreation. Now we received a request from Mr. Allen that there be a staggered response date so that we get Doc's response 1st and then Westpower response. Can be all inclusive. That makes sense to us from a efficiency perspective rather than having to add in another a step later on in terms of a variation to our current timetable. I understand Doc had raised some potential issues about whether or not they could meet the 18th on the basis that the.

Recording might not be available till Tuesday, but I understand that the relevant witnesses have been here as observers today and given that the AI transcript will be out earlier than that, could doc just.

And let me know whether there's still an issue with with meeting the 18th.

Is Bradley still here? Or is she gone? Thank you.

SB **Shona Bradley** 1:29:39

Yes, I am. I think if if we're directed to, we will make those statements be filed by the 18th. Of course we'd like till the 20th. There's lots to think about, lots to sift through. From the further information, so we're really in your hands if you are, if the panel requires them by the 18th, we'll make sure that they're filed by that date.

VM **Vicki Morrison-Shaw** 1:30:07

Thank you. Well, we are conscious that the information, most of it was provided on

on Tuesday and the the witnesses had been here today. If an extra day would assist, we could move it to the Thursday and then move Westpower to the Monday.

SB **Shona Bradley** 1:30:20
Yeah.

VM **Vicki Morrison-Shaw** 1:30:27
In terms of retaining that to working days.
Is that kind of meeting in the middle Kapai?

SB **Shona Bradley** 1:30:34
That would be helpful. Yes, that would be helpful. Thank you. Yeah.

VM **Vicki Morrison-Shaw** 1:30:38
All right. Mr. Ellen, are you happy with that?

DA **David Allen** 1:30:41
Yes, I've got, well, we've been on this call, an e-mail from Mr. Greenaway that he's now on his yacht got Starlink. So he will be sailing because we thought everything would be done by the 20th. But we can link with them apparently, so that should work fine.

VM **Vicki Morrison-Shaw** 1:31:00
Thank you. All right. Well, we'll issue a brief minute just confirming the change of direction. So it will be the 18th, sorry, the 19th for Doc's response from Miss Sidley and.
And Mr. Head and then the 23rd for West Powers response, if we could have those then the in terms of the response from Mr. Greenaway, Mr. Allen.
I think you mentioned before that we now have all of those conditions. So we've had that. I assume we've also had the full response to the RFI. We haven't seen it yet, so yeah.

DA **David Allen** 1:31:43
Yes, yes you do. You've got the full response to RF55I think it is will be waiting in your inboxes.

VM Vicki Morrison-Shaw 1:31:50

It.

It's not quite in our inbox yet, but it will be in the EPA inbox. But in terms of Mr. Greenaway's response, can we just confirm with you, has he responded to the question around the difference in scale, the five point scale versus the seven point scale that was a key?

DA David Allen 1:31:59

OK.

VM Vicki Morrison-Shaw 1:32:14

Outstanding thing that we were just wanting to understand.

DA David Allen 1:32:16

From memory, yes, but it was about a week since I've last read his response because he's been away. But I will look at that straight after this and I can e-mail the through to the EPA.

Uncheck.

VM Vicki Morrison-Shaw 1:32:33

Thank you. If he if he has not, then it's fine if he includes that in his follow on statement that that's coming next, but just really keen to have that response.

DA David Allen 1:32:37

I'm just.

DC Dean Chrystal 1:32:46

Perhaps Mr. Allen, if I could just elaborate on it. He seems to have used in his table both scales.

DA David Allen 1:32:54

Yeah.

DC Dean Chrystal 1:32:55

So he's he's used a a nil from his five point scale and he's used a very high from a seven point scale in the same table and that's what that's what we're trying to understand, but that helps.

DA **David Allen** 1:33:07
Cool.

VM **Vicki Morrison-Shaw** 1:33:10
What the final procedural matter or sort of question really, it's not really procedural, but as we've been sort of working through, we've been looking at the conditions set. An issue came up where we had a look at the various conditions and we're just wanting to confirm whether the footprint for the alternative access track, which is required by condition 62, is included in the permanent scheme footprint and indigenous vegetation clearance areas. They are both both condition 22 and 19 have different areas and listing of the project site areas, but we couldn't see that they necessarily include the realigned the alternative access tracks, so we're just wanting clarification on that point. So happy for you to just file a memo next week addressing that.

DA **David Allen** 1:34:11
Happily, we can aim to file that, fold that into Monday's memo with the conditions.

VM **Vicki Morrison-Shaw** 1:34:12
How?
That would be great. Thank you. So that's the end of the procedural matters I had just wanting to check. Miss Bradley, did you have any procedural matters that you wanted to raise from Doc?

SB **Shona Bradley** 1:34:33
No, thank you.

VM **Vicki Morrison-Shaw** 1:34:34
And Mr. Allen.

DA **David Allen** 1:34:37

No, thank you.

VM **Vicki Morrison-Shaw** 1:34:39

All right. So that brings us basically to a close. We thought we would, it might be helpful if we just provide a brief indication of where we're we're currently at. We expect to be in a position to see comments on conditions around and to issue our draft decision around the 12th of March that's.

The date we're targeting, it may be slightly earlier, it might be slightly later, but that's around the time that we're targeting and noting that the the final date for the issue of our decision is the 20th of April since there was that earlier five working day suspension. So those are the the two sort of key dates on the horizon.

So hopefully that's helpful. If there's nothing else, then we will just wrap up with a closing karakia.

So just expressing thanks again to everybody that's participated.

Thank you, everyone. Have a good weekend. Thank you.

● **AJ Daniell** stopped transcription