

DUCK CREEK NORTH HEARING

Tuesday 5 April 2016

Commissioners: McArthur, Sweetman, Mark-Brown, Payne

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9.11AM HEARING BEGINS

9.11 Introduction by Gina Sweetman (Chair)

9.14 Housekeeping by Sonia Baker

9.15AM PROCEDURAL MATTERS

2 late submissions - GW accepted; PCC not

James Gardner-Hopkins (Applicant's Counsel) nothing further to add; Andrew Jones (Senior Resource Consents Planner, PCC) recommends they be accepted

Other jurisdictional issues:

Michelle Conland - Addendum to s42A report. Update on outstanding matters. Applicant has not had the opportunity to consider this.

Gardner-Hopkins: in principle no issue subject to understanding what is in it.

9.21 Hearings Panel adjourned to consider the jurisdictional matters.

9.25 Hearings Panel accepts late submissions and Addendum. Requests that be circulated to all parties.

9.30AM COUNSEL - LEGAL SUBMISSIONS

Mr James Gardner-Hopkins speaking to document: "Opening Legal Submissions"

Has laid out in submission what applicant believes to be outstanding residual matters. His submission is that there is nothing in the outstanding issues that suggests consent should not be granted. Applicant's evidence to be taken as read.

NZTA traffic evidence in relation to conditions accepted by applicant. In substance no issue between applicant and NZTA. Mr Tim Kelly to give traffic evidence but not available today (Tuesday). Can be called tomorrow (Wednesday).

Sweetman: No questions from the panel

10.03AM INTRODUCTION OF THE APPLICANT

Peter Cooney, Director - Jagger NZ Ltd and Classic Builders. Evidence not pre-circulated but not substantive nor expert evidence. Speaking to document: "Statement of Peter Cooney on Behalf of the Applicant". Additional comments: Housing trends in NZ are smaller, higher quality houses with a focus on amenity values.

10.15: Mark-Brown: I am interested in your comments around demand for smaller housing increasing?

Cooney If you look at consents and statistics on reports, the size of housing in the last 2-3 years is decreasing. It is definitely our finding and the [same as other] larger home builders.

Mark-Brown Is this driven by increasing construction costs?

Cooney Absolutely. Last year was 10%. As everyone is aware we are seeing a market that is going through a bit of a boom at the moment in terms of land prices. They have to find ways

to get people on budgets into houses. People are willing to accept smaller houses that are well-designed.

McArthur **Could you tell me a bit about your environmental compliance record with these other developments. I am particularly interested in stormwater, coast?**

Cooney We've never been pulled up on compliance issues to date. 8 or 9 years ago, 90% of houses were design & build. Now 75% of our houses are house & land packages. With that change we have to deliver a "turnkey" process. Medium density is very much about amenity and landscaping. When you wear the developer's hat we have to make sure that amenity value is there.

In terms of stormwater, we will have 1000 houses developing in the next year but we haven't had any issues. We haven't been smacked on the hand yet.

Sweetman **I am interested that in your opinion this is still low-density compared with other areas?**

Cooney 270m² is regarded as quite a large size now. 330m² is the largest you'll see in Hobsonville now. In Queenstown those sections are 350m². In Tauranga now we've got a 300-lot subdivision with sections between 300-400m². So this development is by no means into that 300-400m² development.

Sweetman **In those other subdivisions, have those been greenfield?**

Cooney Yes. The biggest development is the lake subdivision in the BOP. Their largest sections are 500m² and their average would be 400m². That's a standard development. In Queenstown nothing will be over 500m² unless it has a building line restriction on it. Hamilton is the same. In Rototuna their largest sizes are 600m² but they only have 10% in that bracket. It is the biggest trend in development.

Sweetman No further questions.

10.22[Agree with applicant to extended break to read Addendum]. Adjourn.

11.08 Reconvene.

11.10AM AVAILABILITY OF EXPERT WITNESSES

Sweetman **Ms Baker can you advise of Mr Lowe and Dr Oliver's availability?**

Baker Mr Lowe is coming tomorrow (Wednesday 6 April) and Oliver is available for questions but we would have to put them to her via a phonecall. She is not available to take them in person.

Sweetman **Ms Baker what is Mr Young's qualification?**

Conland I believe he is the director of Morphum and has an ecological background. I can find out the details today and provide that to you.

Sweetman Applicant can proceed

Counsel If I may speak to this issue. I think there is a commitment from the applicant to continue to engage with the witnesses who are available so we might still see some progress, but the other thing I do need to raise is that the supplementary material does foreshadow further evidence from at least two of the witnesses. It is not uncommon for supplementary material to be produced or for officers to update their views. My concern is around the timing. If we do not see the evidence until the last day of the hearing that may cause some difficulty for the applicant. My submission is that that should be provided with some urgency so that the applicant can respond appropriately.

[Hearings Panel request Mr Lowe's evidence be circulated and ask when Dr Oliver's supplementary evidence will be available; Sonia Baker to follow up on this]

11.15 Adjourn to discuss

11.20 Reconvene

Sweetman We have asked for Mr Lowe's addendum to be provided at this stage. While the counsel has the ability to respond, given that Mr Lowe is not available it would be more fair for the evidence to be circulated. Given that Dr Oliver is available by phone we will not require her evidence to be circulated. We would prefer Mr Miller to speak after the lunch break.

GH No concerns with this approach [to order of speaking]. It does seem that the extent of stability required is one of the driving issues. Understands that Mr Joseph is here and Kyle Christensen is here and that they could be given the opportunity to get together and narrow the issues.

[Hearings Panel directs the two engineering experts to caucus over the next day and a half and report back to the hearings panel by Thursday morning if not sooner on the results of their caucusing.]

11.24AM APPLICANT'S ENGINEERING EVIDENCE BY RAY O'CALLAGHAN

Runs over a few points that he feels will be of assistance to the panel, speaking to statement of evidence.

Key aspect of background: involved in Whitby development of land, responsible for earthworks carried out over 26 year period as senior engineering practitioner within Cardno. Managed Duck Creek South.

Two key issues in respect of engineering matters (excluding flooding): stormwater treatment and earthworks management, particularly in relation to sediment runoff into Duck Creek and into the conservation area of land and into Pauatahanui Inlet.

Earthworks management - contractors in this area over the last few years are fully on board with current measures and controls for erosion & sediment control. Believes earthworks can be carried out to high standard and will achieve that required by guidelines.

Stormwater treatment & disposal - noted Panel's minute and concerns about not enough detail about treatment. Additional work carried out in February. Effectively the development area can be separated into about six separate catchments. Calculations have been carried out. Range of solutions from dry ponds to swales etc. The same concepts used in Duck Creek South. Only in last eighteen months that houses have been built - only just starting the testing for contaminants loading. Preliminary design has been taken further than would be usual prior to detailed design stage. Area earmarked for stormwater treatment is sufficiently large though detailed design not final.

Mark-Brown **Regarding the wastewater pump station. When we walked through the site yesterday it seemed very low-lying. Is it above the flood level? Is it going to be bunded?**

O'Callaghan We are raising land around it and that would in theory leave it in a hole but we have designed the earthworks such that there is an outlet swale heading towards the northern side of the estuary so it is not reliant on pumps to keep the whole dry. We are proposing to manage the flood protection through that mechanism.

MB **Concerns about neighbouring lots to pump stations. In your experience can the odour be adequately controlled?**

O'Callaghan In my view it can. We have built pump stations within a 20m boundary of houses. There's a pump station within 200m of here that is bounded by buildings. Odour controlled with odour beds/activated carbon. It's just a matter of putting in the technical engineering to deal with that matter. Has not been previously necessary on the site because of its remoteness. Previously the pump station was on the balance title and acquired by PCC. The position of that boundary was set to be appropriate to manage noise and odour with appropriate management inside the boundary. This pump station should have that and that was always intended when the land was set. It was that or council required a larger parcel of land, but PCC did not want to buy a larger area of land.

MB **Satisfied that there wouldn't be vibration problems?**

O'Callaghan No. Very solid concrete structure. Not large. More an issue of noise - raised in officer's reports. Managed through appropriate attention to detail: doors, vents. Unnecessary in

the past but eminently feasible to implement those changes. Refers to his evidence that houses not likely to be occupied until 2017, which will allow time for Wellington Water & PCC to implement those improvements.

MB Stormwater. We saw the constructed stream. Elsewhere there has been talk that it performed well in storm in 2015. Comment?

O'Callaghan Well in excess of a 10-year event in May. It did perform well. One area of erosion. It was immediately downstream of triple culvert. Cross over large bridge and travel on western side and then cross triple culvert. Erosion and protection design failed to think about scenario - it worked fine through the flood - but when the floodwaters dropped the water was still flowing through the eastern cell and swung out and dropped back down into the main channel -600-700mm drop. We went and put some protection in there and it's performed fine.

Condition of consent to maintain new stream for three years. Report submitted to PCC and annual walkover to make sure it's working. If not working the developer goes in and does remedial works. In the 3 1/2 years since doing the construction work in that stream, that is the only occasion we've had to do remedial works. It was minor, less than \$10,000, 2-3 days. In hindsight should have thought of it but over a km of works you can't think of every detail.

We're relying on the vegetation, grass and plantings to keep velocities to those that have been modelled. In first year used silt fencing to mimic that since we didn't have the vegetation. Trialled grass seeding to get immediate protection. Worked well. Lessons learnt: buried large stumps to create habitat and one of those floated in the large flow event.

MB In Brookside - question about proposed rock protection and difference between council position and regional council's position. Scenario: three or five year period where the applicant needs to take responsibility for vegetation/erosion and then a big flood comes through and causes erosion and that is then council's responsibility. Do you agree with opening legal counsel that there is not a considerable risk and would not threaten adjacent residences? Other question: how certain are you that there won't be a large flood that causes a lot of damage that is caused because it is narrower than before.

O'Callaghan Dealing first with point A: I have been involved with concepts for Duck Creek North since 2003. Heavily involved in CDP work, overseeing modelling carried out and also for Duck Creek South. All that work enabled clear understanding of velocities. Mr Christensen brought additional skills. I haven't seen anything. I have been a strong player in design of these. The earthworks design is an integral part of this protection. From that, based on my experience and my judgements, I have no concerns. I am highly confident that the

property owners close to the stream will be exposed to a high degree of erosion. The modelling tools are very effective way of simulating large flood events. We are finding that the grass and vegetated surfaces are very effective at resisting erosion. I see wall-to-wall rock lining as unnecessary and poor performance. No concerns regarding the properties close to the stream.

The narrowing of the stream - not a bad thing at all. There are some very steep banks in that stream that erode every time there is a large flood event today. A lot of positives from cutting back big vertical banks. Low flow channel, low flood zone. That design deals with small events. Tools to deal with technical factors. Rock mitigation, planting, grass, cover, shape, direction of the stream. In Duck Creek South in some areas of marginal risk put rock protection in, covered it with soil and planted it. We've done that in beach environments. Can go decades without being exposed. In an extreme event it is there to do its job. That way you get amenity value from planting.

Is there a need for this rock work? In my view there is no need for massive rock protection in the stream. We know that velocities out on edges is sufficiently low that vegetation can deal with it. It is a function of how long it is exposed to that high velocities. The banks are not exposed to large velocities for long periods of time. In this particular case this stream has been designed to a climate change high scenario, greater than required in District Plan. Back in 2008/2009 when we were dealing with the CDP, PCC wanted to take a more conservative view. Came to conclusion that it was fine, more earthworks but could deal with it.

McArthur **From some of the material in Mr Miller's supplementary addition there is some suggestion that there is deposition going on in Pauatahanui - peak around the 2013 timing. Are there any solutions you can offer that will mitigate sedimentation during high events or does it become too hard?**

O'Callaghan In 2013 there were 2-3 sites being earthworked in Whitby area, not just Duck Creek South. Also sediment from upstream catchment during rainfall events. Recording sediment loads 60-70 ppm from upstream. Changes since 2013: new developers have implemented higher levels of controls with contractors, oversize ponds larger than required, installing baffles within ponds. For this application we've got the benefit of the proposed stormwater treatment pond to utilise that area for sediment and erosion control through stage 1 and 2 earthworks. That's a larger area than we'd need for an oversize pond.

Difficulty with earthworks is builders stripping topsoil and then rain with no erosion and sediment control. In this case developer is building the houses so will implement similar level of control at building stage. In Duck Creek South we have a protocol but there is

not the same degree of control with house builders. There's more that can be done on this site.

McArthur **In terms of adaptive management plan. Scenario: triggers happen, monitored, significant effects found. What then?**

O'Callaghan Part of the answer is scale of event that triggered problem. Design ponds for 2-5 year category. What can we reasonably do on those greater events? In this case if we were getting an undesirable level of sediment in stream, only feasible option to break earthworks catchment into smaller catchments and increase size of pond. There is a limit [to what you can do]. You can't get it down to clean water - which is why we need the resource consent.

McArthur **what happens when this scenario happens [in terms of steps in the plan]. Is there any benefit to having those steps defined?**

O'Callaghan If they're there, we're doing them already. We're doing what we think is feasible. There are weekly audits of the site and if someone comes up with a good idea, we'll trial it. There's not a conflict in terms of whether it's precisely written down or not. Positive side: flat site. Much easier to control runoff from a flat site. Ponding within earthworks before it even gets to the pond.

On this site: flat area, large area, plenty of room to construct things, oversize anyway, additional steps, monitor weekly, adaptive management on a weekly basis, close working relationship between developer, engineer and regional council.

McArthur **Flocculent PAC. Mention of alternative less toxic flocculants?**

We've tried all sorts of mechanisms. Main goal to change ion charge of particles to form a greater mass and settle faster. Tried other solutions; haven't worked well in our experience. Effectiveness dependant on chemical makeup of particles in particular area. Industry constantly trying to improve. But most effective one in Whitby seems to be PAC. We try to manage that by having highly refined dosing system: rain gauge, pump varying dose dependant on rainfall at the time. Used to get overdosing but now applying what is needed when it is needed to minimise toxicity.

McArthur **talked about overplanting over top of rock lining. How effective has that been in terms of vegetation growth and succession?**

O'Callaghan It's been fine. Mainly grass, small flaxes - avoid trees. Can get a bit of root down.

McArthur **Not much stream shading?**

O'Callaghan No.

Sweetman **Pump Station. Understand development contributions agreement, should it be finalised, includes payment for upgraded part of pump station. How much surety that by 2017 those upgrades would have occurred?**

O'Callaghan In hands of the council rather than the applicant. Not something I can answer. Certainly there is enough time and it wouldn't be a rush. The scale of the works is relatively minor but it would want to be into the next financial year's program for WW and PCC. There's nothing the applicant could do about it if they chose not to do it in that timeframe.

Sweetman **If upgrade works not undertaken by the time development in those area, adverse effects on those residents?**

O'Callaghan One or two lots - [indicates on map adjoining houses] there is a risk. Could control with building consent?

Sweetman **Would the applicant have recourse if they'd made a development contribution to those works?**

O'Callaghan In my experience if it was linked into the reserves agreement or associated agreement that that should be carried out, if PCC was in breach of that then the applicant would have recourse through that, though not through an RMA process. Essentially PCC would be in breach of good faith if they choose not to do the works if they grant consent on the basis the works are going to happen.

Sweetman **is the quantum of contribution agreed to sufficient for all the upgrades?**

O'Callaghan Not familiar with the actual quantum that has been suggested. Mr Rhodes would have a comment on this. It's probably \$70-80000 wastewater contribution. Scale to deal with odour and noises is well less than that. Somewhere in the \$20-30000 range if memory is correct.

Sweetman **expect council and counsel to address that further. Turning to Para 47-49 in terms of stormwater treatment where you say the commissioners may wish to consider condition of consent that...Have you looked at the recommended conditions of consent in tee officer's report?**

O'Callaghan I did but could not find out if that condition was included. Can't confirm what the wording of that condition is.

Sweetman **expect council officers to address that. In terms of earthworks - earthworks Para 63-65 placement of material over the boundary. Any progress?**

O'Callaghan Those discussions held by applicant and Mr Holmes. They would be the appropriate person to put that question to.

Sweetman **Confident you can design solution if approvals not forthcoming?**

O'Callaghan Yes. No impact on stability. Assume owners prefer earthworks carried out on boundary and toe of hill as it gives them physical access to their land.

Sweetman **Could you point out those properties?**

O'Callaghan [Indicates on map: along road south of Reserve Area 1]

GH In terms of potential of effects if pump station works not undertaken. Can you give any assistance on level of effect?

O'Callaghan Effect more relating to odour than noise. Noise not significant. Odour - risk of nuisance in particular climatic conditions. In light wind, often early evening in Wellington. Relatively calm and light wind in direction of the property. Odour risk also related to performance of pump station. When flows normal, dry weather, not a problem, but increased odour problems if there is a change in those flow conditions - rain previous day, wet weather. Overnight with low flow so flow is sitting in the well for longer period of time before the pump is turned on.

Sweetman **No further questions**

11.22AM APPLICANT'S FLOOD & EROSION EVIDENCE – MR CHRISTENSEN

Mr Christensen Speaking to Powerpoint Slide Presentation – available to Panel. Take written evidence as read. Overview of key aspects of experience. Duck Creek North stream characteristics. Methodology. Recommendations. Stands by conclusion in evidence that methodology is robust and recommendations are appropriate.

Payne **If it becomes apparent that your measures you believe are appropriate are not appropriate do you have measures to rectify that?**

KC Have 3-year maintenance requirement. If problems, will rectify. Don't expect any. Always things that can happen that are unexpected. Extending protection - rock, embankment - is possible in terms of adaptive management philosophy.

McArthur **Could you provide the reference that goes with the diagram as well? The citation.**

KC Yes.

McArthur **Hydraulic modelling - what can you tell me about the cumulative effect on stream velocities generally over the site?**

KC earthworks for fill not encroaching on instream ecology as not encroaching on 10-year flood event. In areas where diverting stream are modifying what is there. Our design is trying to replicate/improve existing environment through diverted reaches. Key areas of

primary effects. The actual increase in flows from the development is negligible. Treatment is more for quality. Not Effect on flow frequency and velocity through that reach.

McArthur **Was the model used a digital elevation model?**

KC Around periphery used LIDAR. Around part of channel and key parts of channel went out and surveyed in detail, as LIDAR can have issues. Detailed topographic survey from channel around structures to create digital terrain model. Base topography of hydraulic model.

McArthur **Have you seen diagram Mr Miller provides in relation to key inanga spawning habitat? Inundation area under mean high water springs is? If you've got accurate terrain model can contribute to understanding of that process?**

KC Yes. At this stage only modelled flood flows. In terms of salt water/fresh water interface that would be modelling day-to-day flows with tidal boundaries. I appreciate that there are complexities in that with the salt water. The hydraulic model is accurate for predicting 2D flow but accurately predicting tidal boundary a 3D model is what you would use.

McArthur **I think even being able to pin down the inundation area for mean high water springs would be useful. How difficult?**

KC Wouldn't be too difficult. Determining information - don't have low flow hydrology determined.

McArthur **Trying to get a gauge on how difficult/expensive that might be?**

KC Probably not something that would get done this afternoon. Possibly with a week or so's effort to run that through the model. A matter of a week's worth of effort perhaps?

Sweetman **We will break for lunch. Mr Lowe's evidence now available for circulation. Adjourn.**

Reconvene 1.50pm

Mark-Brown **Used 0.5m sea level rise for model?**

KC Also considered impacts of 0.8m as required by CDP Guidance. Previous model, no allowance for storm surge, so increased baseline tide by 300mm to allow for storm surge and then added 0.5m for sea level rise.

Mark-Brown **If an appropriate level of sea level rise is 1m rather than 0.5m, what sort of difference would it make to your flood levels?**

KC I would draw your attention to hydrology we've used, which is conservative in the rainfall.

Mark-Brown If there was another 0.5m sea level rise, how far upstream would that affect flood levels?

KC Depends on size of flood. In a 100-year flood I think it would have limited affect. The 300mm we've provided for and the storm surge on top of base mean high springs would reasonably account for anything higher at that downstream end.

Mark-Brown MacDonald review: in that review it had a recommendation to do with flow attenuation in the model. I haven't seen any response to that request in your latest evidence. Can you advise whether you have responded to that particular request?

KC My feeling on that request is that the primary conclusion of the peer review was that the model was fit for purpose and the request seemed at odd with that. In my view it was a request that didn't add any value because we'd already arrived at the conclusion that it was fit for purpose.

Mark-Brown You're saying that your model is showing that there is no increase in flooding once you've increased as you've proposed? Why is that?

KC Not filling lower part of flood plain. Only filling above 10-year event.

Mark-Brown I got a different impression from the drawings. Series of cross-sections starting with drawing 622. My reading of that distance 165 and 210 shows fill on right hand side going up. Is that the final ground level as distinct from existing ground level?

KC That is correct.

Mark-Brown 10-year proposed ground level is well above existing ground level.

KC I note that point. These sections are showing cut on that floodplain but I'd agree that there is some fill on the edges of that.

Mark-Brown My reading is that there's quite a bit of loss of the floodplain even at the 10-year event. Trying to understand in no increase in ?

KC Draw attention to cut/fill plan. More fill broadly but significant cut, particularly around bridges. Also tidal boundary that fills in some of what you would perceive as useful storage. That portion of the storage isn't lost to the system, it just does not store tide any more. We're also reducing the peak flows into the system because of the retention we're providing in the stormwater treatment system. There are increases in flood levels particularly in sections we are constraining but primary purpose of modelling to show that levels don't backwater upstream and cause additional effects.

Mark-Brown Moving to erosion control, the rock protection. Hard to see how close it comes to the stream on your drawing. My understanding that of the 3 types only one envisages encroaching into low flow channel itself?

KC That is correct, that is the rock protection in blue.

Mark-Brown 2D model allows you to look at that across a cross-section?

KC That is correct.

Mark-Brown Assuming not very well established vegetation then? More resistant with flax and so on? Conservative in terms of allowance?

KC Yes. With larger vegetation can get localised increases but do generally provide more hydraulic protection than the problems they create. Have used grass protection as a benchmark protection for the model.

Mark-Brown Understanding from landscape plan is that it will be planted up?

KC That is correct. My understanding is riparian restoration through whole stream corridor. Will enhance erosion protection.

MB One aspect not addressed too much in your evidence was low flow channel. So ecological erosion protection separate from rock erosion protection? Engineering criteria that go into that erosion protection?

KC No. We've looked at areas of key risk in terms of bridges, embankment fill. The additional riparian planting and mitigation is dealt with by Mr Miller.

MB In your view ecological planting plan side of thing is sufficient to ensure that low flow channel is appropriate in terms of mitigating erosion of low flow channel, which will happen in regular small floods?

KC Comes down to aspects of risk. This engineered protection is around embankment structures. My understanding there's only isolated areas of migrating channel and the mitigation measures Mr Miller is proposing would address that.

MB See no need for additional engineering input into that?

KC From past experience the landscape plan, ecology, and engineering of the stream is something that is done collectively between landscape architects, ecologists and engineers. Certainly been the case on Duck Creek South.

MB Recommended 3 year period of maintaining planting. Haven't seen any period for maintaining erosion protection before council takes it over. As soon as council takes it over and then there is a problem - in your view is the likelihood of an expensive

problem arising if there is a location where you haven't quite got the calcs right - in your view is that unlikely to cause a major expensive problem for council?

KC My understanding is we've offered the same conditions as for upstream. My view is that the tools we've used have definitely highlighted the key areas of concern around the bends/bridges. There could be some other areas where vegetation hasn't established and there's some movement in the channel. Would not expect severe based on past behaviour of stream. Stream stable for last ten years.

MB 3 year period adequate?

KC Don't know what will happen in 3 year period. Last year 100-year event in CBD. Can't predict what floods will occur in that 3 year period. 3 years is reasonable timeframe. Will be some flooding during period but frequency and size is unknown.

MB From council liability consideration, you think that would be fair and reasonable period in terms of risk management?

KC Yes on basis that key areas of risk mitigated by proposal. 3 years provide reasonable time period in that would expect some kind of flooding during that. Reasonable balance.

McArthur Cut & fill in tidal inundation zone. Walk me through what you meant by that.

KC No cut or fill within the active channel. Refers to earthworks drawing C201. Only works within the actual low-flow channel is where we're doing diversion.

McArthur Only inundation talking about is storm surge?

KC Mean high springs is not going to get out of that channel.

McArthur Is inundation area reduced by fill that is put in there?

KC No. The embankments are outside of that area.

McArthur Riparian vegetation in wider channel, flood carrying channel. If events in future whether that is washed away. Who maintains that? What level of event would move that vegetation out of channel or damage it?

KC Depend on age of vegetation. Once established resilient to velocities esp. In lower part of channel. But initially growing in maintenance period. Beyond that period will be more well-established, but not my area to comment on responsibility for that. I believe Mr Holmes addressing that.

McArthur Remain in place because of low gradient?

KC Once established it should.

2.15 Counsel Mr Miller has had lunch break to review Mr Lowe's statement. Fair to say that there's a bit in it, some of which is captured in key issue raised in supplementary s42a report. [Reads from Addendum about compensation for riparian planting]. I understand Mr Miller can talk to that key issue but may not be able to go through it in its entirety. May need to check some things. Seeking leave for Mr Miller to produce short reply to address matters beyond what he can address today in speech.

Sweetman That is acceptable.

Counsel Would be available by closing or provided earlier if possible.

2.18PM APPLICANT'S ECOLOGY EVIDENCE

Miller Start with issues raised in Michelle Conland Addendum: (1) inanga spawning habitat and (2) riparian planting for areas of erosion protection for earthworks embankments. Starting with (2) earthworks embankments. In terms of where they proposed,. Recognise some rock rip-rap incorporated into one option - 165m protection - doesn't affect main SEV functions. Does affect type of plants. Understand deep rooting species not appropriate but lower growing shrubs and outside of that taller species to provide shade.

Inanga spawning habitat - calculated amount of compensation required based on undertaking riparian planting along stream corridor as wide as possible within constraints of the development. Have estimated widths available. From Bridge 1 to Bridge 2: not much opportunity on true right bank because of residential properties. On true left bank more-or-less average width 19m available. 10m wide planting could be done. Bridge 2 to Bridge 3 average width 13-14m on true right and 16m on true left. Mostly 10m wide strip could be achieved there as well. Bridge 3 to southern boundary: roughly 408m. True right bank roughly 11m. True left bank pretty similar. 7-8m planting. Restriction on what would ideally be planted and I have carried this through to SEV calculation.

Inanga spawning - hadn't allowed for any inanga spawning habitat improvement since wouldn't put in taller plants as would reduce SEV scores around water temperature controls and we would achieve less compensation gains. Enhancement of inanga spawning in that area is probably a superior option. Would require more instream work than is currently proposed in terms of regarding banks to provide appropriate bench for planting favourite spawning plants that would be inundated by spring tides and would tie in well with other terrestrial compensation work in my evidence. In my view that could be undertaken, recognising there would be less SEV gains from that work. But may be appropriate and have more ecological benefit on a qualitative basis.

[Referring to Mr Lowe's evidence] Starting with error in SEV calculation. He is right. Need to check his calculation but it may be of that order.[refer Para 6.4(c)].

Another issue raised about ability to implement on site, I queries the landscape architect on what is available for ecological restoration so the figure comes from him. Roughly about 1km of stream length available for compensation. I have taken into account those limitations of the development. I'm predicting that there will be a modest improvements and the numbers in my calculation between 6.3 and 7.1. So I'm confident can be achieved.

Impacts of land-use change in riparian zone [section 7]. Mr Lowe's view not consistent with mine. Haven't come across any instances where applied across entire flood plain. Have taken into account constraints as to how much mitigation can be achieved. Would be difficult to attribute residual effects in the stream. Stormwater control work mitigates effects of bridges and roads.

Mark-Brown **Widths of mitigation. From Bridge 3 going to the south, can you repeat that?**

Miller From Bridge 3 to the south has overall length of 410m. True right bank width of roughly 11m measuring from stream out to nearest manmade feature - could be walkway or road. So I estimate 7-8m wide strip of what can be planted. On the true right roughly the same.

MB **That's on the small size, don't you usually go for 10m?**

Miller 10m is to achieve self sustaining riparian forest. Narrower widths can be subject to more weed invasion. You'd need to recognise it may require some maintenance.

MB **So you didn't have any input into what the width of the zone would be?**

Miller I did not.

McArthur **Potential to provide shading even with rock lined banks. Other ecological reasons to want those to be vegetated?**

Miller We'd want them to be vegetated for riparian benefits that come with that. Woody input, filtering of runoff not captured by stormwater system. Habitat. My understanding is some planting could be happening on stream side of that. Further back? Perhaps not.[Shows pictures of stream in Hamilton examples of narrow planted riparian vegetation.] With narrower stream width more difficult to provide overhead canopy cover.

MA **At Section 9.1 Mr Lowe discusses other matters. You've said the two could be overlapping? Difference of opinion?**

Miller We weren't saying we were proposing the riparian vegetation would mitigate the losses of terrestrial vegetation; it would just provide terrestrial value as well. Referred to evidence. Don't believe there's any double-dipping.

McArthur Covenanted within adjacent lots?

Miller Covenanted on applicant's land and if necessary extending into reserve with approval from PCC.

MA Mr Lower also discusses mitigations around rock armouring in 9.5. He talks about refuge pipes. Can you tell me about them?

Miller I do have experience with them. [Refers to Hamilton stream example]. Cabin buried bank from bank with pipe so there's somewhere for fish to go during high flows Kokopu condo. The other habitat feature we've used soil filled bags novocoil and used u-shaped coils stacked within the stream. Tuna townhouse. U shape because eels can't swim backwards. Those options only appropriate for work within the stream, not for erosion control on earthworks batters.

MA Inanga spawning. Have you read ECan publication modelling potential inanga spawning habitat?

Miller No.

MA Probably some quite useful measures in there.

Miller I have seen it; I haven't read it in detail. In this case, safe to assume there's favourable inanga spawning habitat there. Stock standard tall tree would be opportunity cost. Would require field investigation to go out Feb-April, measure extent of tidal wedge and observing level to which banks are inundated. Target level to focus any bank regrading to maximising inanga spawning habitat. Risky to create bench but sloped bank can ensure always some inundation.

MA You think that bank regrading would be a necessary part of spawning enhancement if that was targeting or that part of the stream?

Miller My understanding that the amount of spawning habitat could be increased.

MA Is there a potential ecological downside to the regrading that you can think of?

Miller Short-term effect that would need to be managed that applies to all in-stream works. No long term downside.

MA Did you discuss regrading of banks in caucusing that you had?

Miller Not in detail but it came up.

MA **Regional Plans identify this as significant habitat. Can you tell me what your understanding of the impact of land use change and increasing impervious cover on ecosystem health?**

Miller Did attempt to answer that by assessing likely impacts of stormwater contaminants. Assessment shows no significant effect so long as the treatment devices worked as designed during storms. Chronic effects different from acute effects. Stormwater effects more acute effects.

MA **Thinking more about macroinvertebrate community health and persistence of fish communities?**

Miller My assessment covered standard guideline levels that would apply to macroinvertebrates as well. In poorly managed urban streams might expect degradation. In combination with management, riparian planting, I don't think we'd get a degradation that would have an effect through the food chain.

MA **So some experience of catchments that have become urban and maintained ecosystem health?**

Miller Hamilton's stormwater programme for the last five years. Just completed second round of monitoring work. Includes old catchments with no stormwater control and new ones with high levels of stormwater control. Older catchments where sediments most contaminated.

MA **Zinc specifically. [Refers to written evidence]. Near US EPA acute guideline value? Given sensitivity of stream, is there value in further restricting ability of zinc transport because it's problematic to treat?**

Miller For futher improvement would need wetlands, and wetlands aren't proposed.

MA **From an inputs?**

Miller More likely to be conveyed through the stream system.

MA **Requirements for changes in roofing materials to reduce zinc?**

Miller I would support that in general.

MA **Cumulative effects. Note triggers from upstream. Main mechanism to control? Do you think those triggers will be adequate down the track to be able to isolate those effects? Referring to water quality percentage change.**

Miller I think 20% change I've recommended is a good starting point. Would prefer to see in management plan as they can then be adjusted as more data collected. I think more site specific information is needed for pH.

MA Have you recently visited the residential portion that's been completed?

Miller Last year, yes.

MA Opinion of riparian vegetation there?

Miller Low-growing, was advised there had been issues with it. Suspected soil pH issue and some wind effects.

MA Any ecological advice if same circumstances occur for this development?

Miller Need to learnt from upstream experience, get right contractor involved, do some soil testing perhaps.

MA Addition of boulder cascades for diverted section of stream. New habitat type? Measures you intend to use to ensure fish passage for Duck Creek species?

Miller Come from landscape architect to create noise. I'm proposing they are checked at installation time to not provide fish barrier. I think with care they could be appropriate.

MA Minimum requirements for all species fish passage?

Miller Given that there's inanga, think it would come down to site-specific supervision.

MA Do you think it would be better off without boulders or can be adequately devised around?

Miller From ecological perspective anything that makes fish passage more difficult, I'd rather not see in the stream.

MA Diversion into artificial stream channel?

Miller Cardno would have experience in how that worked. I imagine it requires careful timing to place that material then place it into new channel to avoid excess sedimentation.

MA Recommend avoid works during inanga spawning season? All in-stream works?

Miller All in-stream works. Some in-stream works that could be undertaken as long as they're not around the spring tides. Bridge work should avoid spawning season. Further upstream where indirect effect is sedimentation, could be managed by avoiding spring tides.

MA Separate fish in holding tank before relocated?

Miller Euthanise exotics and keep eels separate.

MA Fish passage barrier at south end? Plans talks about removal of barriers?

Miller Don't know about that specific one. Is the intention to look at all in stream barriers

MA Timing - recommend specific timing provisions to avoid inanga spawning and whitebait migration?

Miller I think works further upstream from where inanga spawning is. In-stream works could happen but should just avoid those spring tides. My observation of inanga spawning is that it happens in a really short time period either side of spring tides, an hour, an hour and a half. Don't think we should be doing anything that could cause gross sedimentation.

MA So if inanga spawning improvements goes ahead would need additional in management plans?

Miller Yes

MA 2-years monitoring enough after diversion going live?

Miller There's a longer period of monitoring in draft consent conditions.

MA Adaptive management: monitoring exceeds trigger values, then what? Window of 3 months to take ecological samples and then determine what has happened.

Miller Tough one because event would have passed. Recommend follow up water quality sampling. Recommend extra sampling post event to ensure immediate works have worked.

MA Deposited sediment and water quality samples?

Miller Adverse effect on macroinvertebrate community needs to extent over trigger [technical detail]

MA Samples collected last year included in baseline?

Miller Yes but we require replicates.

MA Photographs in your evidence show quite turbid water. Risk that that will influence baseline statistics down the track?

Miller Yes. That sampling had followed a stormwater event. May not have had 2-week standown period. We probably need to collect more.

MA Quantify sediment loads evidence: note significant increases measured in Inlet relative to Duck Creek sampling location. Conclusions from analysis?

Miller In my review of data, seemed to be some sediment in stream that coincided with estuary. Haven't had a repeat so can't comment on whether that has persisted. Site visit May 2015 after stormflow sediment was clean as a whistle.

MA Widths of riparian management - could you come back to us in writing?

Miller Yes.

MA How much riparian compensation would be affected by inanga enhancement planting?

Miller That would be my gut feel on that? General guide is that spawning can happen within 500m of mean high water tide. Near Bridge 2 around some willows, probably upper extent is my feeling.

Sweetman Terrestrial ecology: PCC's ecosites. Are those sites, in your opinion, would they meet the s6c habitat?

Miller I think they would meet the criteria on the whole. The parts that the applicant would impact, not necessarily. They're more important because they buffer.

Sweetman 10.4(c) Mr Lowe - do you agree with his statement?

Miller The calculations for mitigations, best-case scenario. Assume, say, 20m riparian planting on either side of stream and fully sustainable riparian forest.

Sweetman Bed width of Duck Creek?

Miller [Reads from written evidence Appendix F, p3 for stream widths] SEV assessment you look at 20m from the stream in either direction, so if you were estimating potential value you imagine a riparian forest for 20m on either side.

Sweetman Where does no net loss principle come from?

Miller biodiversity offset programme.

Sweetman You familiar with RPS and Regional Plans?

Miller Not intimately

Sweetman Requirement for no net loss in any of those regional plans?

3.15 Sweetman When may Mr Lowe be available for questions?

Baker Not certain. Maybe tomorrow.[discussion around availability of Mr Lowe]

Adjourned

3.35 reconvene

3.15PM APPLICANT'S PLANNING EVIDENCE - MR BRYCE HOLMES

BH Main areas of disagreement around technical matters: stabilisation, SEV, consent notices, some discussions around built form. Physical measures agreed to around pump station. Built form: some agreement on hybrid situation; remaining disagreement around site coverage figure. Some questions for Mr Miller around fish passage - in draft consent conditions from GW there is a 5 year monitoring period. My understanding is that those baseline conditions would form part of the adaptive management plan. Also had opportunity to read through Michelle Conland's Addendum. Apart from SEV planting, I don't have any major concerns or issues with her statement of evidence or supplementary brief.

Payne Cultural effects of application. Emails between yourself and Ngati Toa. Appendix 7 to s42A from PCC. Although you've put forward a lot of suggestions, I don't seem to be able to find any outcomes?

BH Email chain finishes on 17 December to person who has since left. Since then, have sent 2-3 more emails to see if there was a desire to get together to discuss content of that email. We haven't had any response or request to come and have a chat with Ngati Toa. I know Ms Conland has suggested that monitoring should form part of consent conditions and be provided to Ngati Toa to further their information base and the effects of this proposal on that stream environment, given it does have noted cultural value.

Payne Nothing specific in emails relating to this application. How confident do you feel that what you're proposing meets their obligations as kaitiaki?

BH I'm not a cultural expert and do not pretend to be. I wouldn't put myself in their shoes and tell you what their values are for this land. In all our discussions, they have been mostly around environmental issues and health of resource rather than waahi tapu or other concerns. The impression the applicant has taken from those meetings is that the concerns of Ngati Toa was mostly around environmental issues. In my mind this is provided for in draft conditions of resource consent. I think all planning witnesses agree that effects will be addressed.

Payne Mr Jones refers to Map 27 in his report. Is that what you refer to?

BH It's quite a generic map. There were two maps from Mr Jones.

Payne Burial grounds. Have you made any further investigation about that?

BH Other than asking Ngati Toa directly, no. No information on that.

McArthur Coastal environment - NZCPS policies refer to defining the coastal environment. What is your understanding of the site in relation to those definitions?

BH RPS talks about landward extent of the coastal area as opposed to MHWS. It comes down to assessment. Mr Miller, in particular, has picked up things like inanga spawning and transition between salt marsh downstream.

McArthur There are then areas within the site that you would take as fitting the definition of coastal environment?

BH Not by statutory planning definition but by assessment.

Sweetman So PCC has not identified the coastal environment but as I understand it P38 still requires consideration of the impact?

BH Yes

Sweetman Refers to Para 53 of evidence "in your opinion the NZCPS..."

BH Only as relates to the coastal environment as it relates to the statutory plans. I have assessed the NZCPS in terms of the issues that are present for the coastal environment, at Para 57.

Sweetman Cultural matters and your assessment on p8 - your appendix includes some of your correspondence with Ngati Toa. Particularly 9 Dec email suggests ways of responding to Ngati Toa's concerns. Consider these side issues to this consent or some benefit to these being included as conditions to this consent?

BH I think some of the info around the adaptive management plan, monitoring reports, info transfer and sharing could be conditions. Overseeing of works and things like that are more of an archaeological way that could be canvassed through HNZ outside of this forum. Some of the other matters - promotional signage - direct relationship with applicant and Ngati Toa. Can be activated at any time.

Sweetman Natural hazard effects and condition 102. Should investigations find sites that are unsuitable for development to occur, do you think it's appropriate to put conditions on those sites?

BH Engineering reports at time of s224. Degree of risk assumed by applicant if not done as conditions of resource consent. If those lots can't be made good, then won't get to s224 certificate. Degree of comfort in reports to date in methodology.

Sweetman Would you suggest alternative wording?

BH Potentially if it was clear about what the issue was, but we run the danger of running into Building Act requirements and mixing up the two bits of legislation. What should be done at the time of subdivision? I believe the conditions of resource consent adequately cover those requirements.

Sweetman The advice note? Are you happy with the condition as recommended otherwise?

BH Yes

Sweetman Refer Para 46-47 of evidence planting as mitigation and recommend adding to conditions of consent. Do you have a suggested condition?

BH Yes. Discussed previously with Andrew Jones and Michelle Conland from councils. They were around showing those areas on plans submitted to council. Some suggestion of it being called infill planting. Additional wording around proposed condition 33 of Mr Jones'. Also referenced Para 92-95 of Mr Miller's evidence to give some guidance as to what that means. Helped with transition between development and ecosite.

Sweetman Densities, heights, coverages. You would accept single storey restriction with 45% coverage for edge lots or 35% coverage but ability to build 2-storey dwelling? What happens with the rest of it.

BH Haven't been any particular issues noted for remainder of lots that 45% coverage has been sought for. Internal to development.

Sweetman Reads out condition 38 - happy with this?

BH No. More flexibility needed for edge lots.

Sweetman Difference in effect between single story and 2 story dwelling at 45% site coverage?

BH Bulk effect. Appearance of a larger building than otherwise permitted.

Sweetman So in your opinion no need to restrict single storey to non-edge lots?

BH Yes. Gives variability and flexibility.

Sweetman In AEE on p32 you refer to reduction of front yards and primarily single storey dwellings.

BH No change other than allowing some flexibility. Difference between what the applicant intends and restricting what applicant can do.

Sweetman So in your opinion no difference in visual effect given site characteristics?

BH From a surrounding vista, at a distance from the site, I don't consider that to be a significant adverse effect.

Sweetman Para 73 and the Pump Station and consent notice. What is your advice to us in this regard, bearing in mind that upgrading of the pump station is beyond the control of the applicant?

BH Discussions with Wellington Water and PCC that upgrades would occur in conjunction with development. Jagger has relied on that. People have a duty to undertake their own due diligence. My advice to you is that it should be deleted.

Sweetman Consent notices for reverse sensitivity are not uncommon?

BH That is a consent notice for reverse sensitivity.

Sweetman Your Appendix 1 you obtained from PCC?

BH obtained from Mr Andrew Jones.

Sweetman NZTA proposed condition 5 - your advice there, would that be a regional council or territorial authority condition?

BH I think it would be permitted by the regional council and the TA aspect because it's an outlet it does have a flood management responsibility in terms of maintaining the flows out of that culvert.

Sweetman AEE, under 5.2.4, around treatment of stormwater and zinc. Is it correct that there is a broader condition recommended in terms of all rooves? You are happy with a condition that all rooves be constructed of [low zinc materials]

BH Yes

Sweetman PCC relies on s10 of the RMA for taking of reserves. Would an esplanade reserve be required for all of this reach of Duck Creek?

BH No. Relevant history: this issue was central focus of former owner's discussion with council. Resolution was found in CDP for the site. While reserve shown on plans, not marked as "esplanade reserve". Average width of creek is probably not 3m so whether or not it would be required is another issue. Application has not re-litigated issues resolved in CDP. His understanding rather than statement of fact.

Sweetman Front-yard parking. Double garages proposed. Why is consent sought?

BH Technical debate, abundance of caution. If it disappeared from the consent, it's really a moot point.

Mark-Brown Are you going to work through a markup version of the resource consent conditions?

BH Attempted this last week but given outstanding issues was not resolved. Happy to be involved in tracked changes version of conditions with residual issues tagged out.

4.25pm

Counsel Recap before closing applicant's case. Mr Tim Kelly, traffic engineer, has not been called yet.

Sweetman Generally of opinion that no questions for Mr Kelly, but phone availability may be required.

Counsel Tracked changes version of what is and is not agreed between Council and applicant to be undertaken. Mr Christensen conferencing with Council expert. Mr Miller to formalise some responses to Mr Lowe.

4.30PM END OF APPLICANT'S EVIDENCE

4.30 Question from Trevor Roberts. Issues of importance to submitters: traffic evidence and tracked changes version of conditions. Thinks it would be appropriate for some or all of them to be involved in tracked changes discussion.

Sweetman Agrees in terms of access to tracked changes document. In terms of traffic, are interested to hear submitters concerns. If we do find ourselves in position of wishing to question Mr Kelly we will proceed when that arises.

4.30PM SUBMITTERS' EVIDENCE

4.33PM CAROLYN AMOS

Lived in Shackle Lane for last 14 years when it was a Golf Course. Would like to know what experience this company has building on unstable/flood-prone land. Has had previous experience with issues in Dunedin with land where public concerns were ignored. Concerned about noise disturbance and issues with dust, including health concerns. Concerned with building up to boundary fence.

Mark-Brown Talked about smells from the sewer plant in your written submission? How often does that occur?

Amos On a hot day, it stinks. No pattern with still days.

Sweetman Thanks submitter for her evidence, asks for location of house.

Amos Shackle Lane will look down onto it.

4.39PM ROY & JAQUELINE NOBLE

Property is 26 Observatory Close. Backs onto proposed park. Speak to additional written material including photographs "Hearings submission of Roy and Jackie Noble". Have revised position from opposed to neutral.

McArthur In the areas that you're noting that unsafe in terms of bank profile, if those are areas that are fully planted back in terms of riparian margins and only the accessible open areas are made safe, would that meet your concerns?

Roy Does not think this would be adequate. In a public park children will move through trees and still fall in.

McArthur Talk of removal of some pipes and crossings. Would like to know which ones are proposed to be removed, [addressed to council officers and applicant].

Mark-Brown Is there a fence between your property and the stream?

Roy No fence. Was previously one 20-30 years ago. Condition put in by PCC that they won't fence properties bounding the stream, which is a further concern. If public access in the future, they could fence their property but PCC has said they won't pay half of it.

Mark-Brown If the stream was reshaped; is it deep the whole way it bounds your property?

Roy Was previously shallow under pipe but with all the damming and debris is now approx. 1.2m deep.

Mark-Brown Could people get across the stream at other locations than the pipe?

Roy No. They walk over the pipe regularly.

Sweetman Thanks submitters for attending

Counsel Wonders if availability of Thursday attendees to come Wednesday could be checked if progress is good on Wednesday.

Sweetman Asks for check of teleconferencing facilities. OK for material to be left in chambers.

5pm adjourned until 9am Wednesday 6 April

