

**EXPERT WITNESS CAUCUSING CONFERENCE AND JOINT WITNESS  
STATEMENT: Productive land**

<b>BEFORE THE TASMAN DISTRICT COUNCIL IN THE MATTER</b>	Of application RM200488, RM200489 (Land use consents) and RM220578 (Discharge Permit to Land) at 134 Peach Island Road, Motueka
<b>APPLICANT</b>	CJ Industries Ltd

<b>Date / Time</b>	16 February 2023 – 1.00 pm to 4.00 pm
<b>Venue / Remote Technology Platform</b>	Zoom
	<a href="https://us02web.zoom.us/j/88273813423?pwd=dE5nNHlhRlljUzRYQXFvTWRnWk5sQT09">https://us02web.zoom.us/j/88273813423?pwd=dE5nNHlhRlljUzRYQXFvTWRnWk5sQT09</a>

<b>Witnesses</b>	<b>For</b>
Dr Hill (RH)	Applicant
Mr Nelson (in relation to identified matters only (MN))	Applicant
Dr Campbell (IC)	Valley RAGE
Ms Langford (ML)	Council

**JOINT WITNESS STATEMENT – PRODUCTIVE LAND**

Record of issues discussed, areas of agreement or disagreement, reasons. Witnesses should:

- identify their position and reasons by their initials
- identify if any matter is not within their expertise

The following is the records the discussions and positions during caucusing. The parties have reviewed the record. Summaries were added during the collaborative statement finalisation process.

While the caucusing was done on a without prejudice basis, the witnesses have chosen to generally maintain a version with relatively transparent ‘free and frank’ version of their professional discourse to assist the Commissioner.

The witnesses confirm that they’ve read and followed the Code of conduct for expert witnesses (Environment Court 2023 practice note – Section 9.0, and 9.5 relating to Joint witness statements - link <https://www.environmentcourt.govt.nz/about/practice-note/>).

1.	<b>With regard to the TRMP definition of “land of high productive value” – does the site/part of the site meet the definition?</b>
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RH – References evidence - table 6 report re interpretation LUC classes –re features:

In my opinion the site does not meet the definition because it fails to meet the second part of the definition. Following remediation reinstated soil will meet second part of the definition.

Yes meets for climate, slope within bounds yes, and the one feature outside = drainage less than imperfectly, or has rooting depth limitation (3S etc i.e. shallower), In that context only one of the features not met, so in theory should meet that, but 2nd part of definition; but combo such that land capable of crops at high range – cover versatility concept. That

versatility re 3S within stopbank, don't believe that 3S allows for a wide range of crops – some land uses – but limitations, so not as versatile as if not there. Point 2 post extraction – remediated soil – IMO soils are deeper and drainage that greater impeded, moderately impeded or well drained so removes limitations, and so after remediation more versatile, and limitations under original mitigated.

MN – agrees – not capable across the range; also consistent with similar site in close proximity to the river, tend to be shallow soils. Further back deeper silt loams more capable, more even soil types; reservations that this site could grow high range.

IC – LUC riwaka class A, but this classification on empirical, and soil types fair representation of productive throughout the district. At extraction site similar to many on Motueka plain etc throughout district under intensive horticulture. Land use experience thru the district, and proposed site incl opinion that majority of site can be classified as high class.

ML – to RH and MN – TRMP definition notes definition is an “or” not an “and”. Questions too re the wide range of crops. Historically has been a number of crops. Likewise Q to IC – while can compare to deeper soils that more capable re wider range, but Waimea Plains, which are stonier, still have higher range.

MN – highly productive – example of kiwifruit, and realities of licence cost – but can't see a grower getting into the investment, as historically hasn't happened. Refers to comment re blackcurrant – noting reflective of high variability. What evidence though that what has been grown there high yielding? In my experience on one similar circumstances, would question the long term viability based on water nutrients available.

Regarding the potential range of crops – classification by market gardens, permanent, tree, vine crops, can then within those groups go down to sub groups based on nutrient needs. In my opinion variability in that and means that is not suitable, and bad practice for intensive production; may lend itself to apples or grapes, perhaps, but not a wide range of crops.

RH – comparing to TRMP definition scenario – eg LUC 3 can't grow apples.

MN re apples / kiwifruit here, but not here at high rate, and esp re whole site

Key parameter = available water – shallow water little readily available shallow water. Recent experience re kiwifruit shallow, small percent deep, but producing kiwi over 30 years. But in Tasman stony, providing water provided thru irrigation = highly productive.

MN – reality that growers have moved away from marginal to more productive deeper soils – Moutere clay to silt loams for apple production.

IC says different issue re soil properties.

MN differs – eg move from tobacco to perm crops, mainly apple, kiwi – very different to grow on shallow soils – max production and agronomy.

IC differs re Waimea plain. In answer to RH 4, 5, 6 can be highly productive.

Re differences – MN anyone can bring water into site, but practicality, taking into account cost of crops – means when you look at cost in, rate out is important. Commercial application. This is a significant limitation

IC – versatility of soil key thing, as physical qualities diminish versatility reduces – so for moisture can be offset by among other things irrigation. LUC rating reflects versatility of soils. Traditionally for soil scientists don't take into account economics as market variable – ie economics. Don't rate soils on economic viability

MN “Could the site produce crops at high rate” – comes back to that in his view to this key question.

ML – notes the confusion between versatility and economic viability if the soil is versatile – able to support crop ie future what crop, what return (agree IC); notes too re high rate OR wide range? Directed to Mike to understand

MN – could just about be met noting OR arguable any could do so, but is practical. Example of avocado anywhere – but issue of risk – could do crop, as produce must be commercial crop, and don't believe could do wide range.

ML re practicality re those arguments but not the question – is the site capable of producing crop – ie potential for future.

RH re variability – looked at soil depth – Landvision mapping is okay – basically soil texture – sandy loam over loamy sand and sand only to depth of 20cm (up to 70 cm for 3s area) then deep gravels with sand matrix (for 4s and 5s areas) – many of soils were quite shallow and all sandy subsoil texture. Is it really Riwaka?, and thinks of it as boney,. But variability from perspective of managing growth – view that unlikely to be high rate for most of the site

**SUMMARY:**

Agreement that first part of the TRMP meets the definition, but not in agreement on the last sentence of definition.

*Where that combination is to such a degree that it makes the land capable of producing crop at a high rate **or** across a wide range*

- Is the land capable of producing crop at a high rate?  
 MN: No  
 RH: Unlikely  
 ML: Yes, but variability is likely
- Is the land capable of producing crop across a wide range?  
 ML: Yes  
 MN: Yes, but not in combination with high rate which will make it uneconomical  
 RH: Yes, but only parts of the site (classified as 3s) not all of it

IC: The site is similar to many other sites elsewhere in the district that are used under intensive horticulture.

2.	<b>With regard to the NPSHPL definition of highly productive land, clause 3.5(7), and the definition of LUC 1, 2, or 3 land as “means land identified as Land Use Capability Class 1, 2, or 3, as mapped by the New Zealand Land Resource Inventory or by any more detailed mapping that uses the Land Use Capability classification”:</b>
a.	<b>Is the mapping by Landvision “more detailed mapping that uses the Land Use Capability classification”?</b>

RH – Yes. Comfortable that boundaries are a fair representation of LUC of the site. Other component does it follow criteria in LUC, i.e. handbook, yes IMO it does.

ML – yes it is. BUT there is more to the definition under the NPS HPL (ie more that Council must look into mapping into cohesive mapping of the area). Guidance p14 – not intended to include site specific – and noting re Council's role and through plan change.

IC – no – the land use mapping is not more detailed. Key thin method employed –

worthless – electro-magnetic doesn't give detailed pic of characteristics of soil, at most soil water content difference, maybe organic status etc – still needs ground truth work to make sense – don't see evidence of ground truthing – 6 soil pit samples – amateurish re method, wording. Soil patterns relate naturally to features on the ground (notes Island pics back to 30s sighted, and can see landforms quite clearly, and soil types will be related to those features – and Landvision no relationship, so don't believe accurate. Many types of interpretative soil maps, for different purposes – based on fundamental soil data but need fundamental soil data, and don't; see that fundamental soil info there.

RH – been on site – use conventional soil maps for LUC mapping (cf soil mapping), but agrees with IC re approach and building LUC maps – acknowledges some generalisation in LUC mapping. Acknowledges Lockie done general background, but a lot of LUC experience. In absence of versatility info, are you more open to accept regional that cover site as more accurate?

IC suggest earlier unpublished Cawthorn more reliable. RH says no evidence of deep Riwaka, but deepest (ID'd by Landvision 60-80cm). Not sure that constitutes Riwaka soil. (which is what the regional scale info says).

IC repeats re Landvision believes not enough detail to be able to check data; RH notes re methodology in LUC and soil handbooks – IC re hard yards for field work; IC indicates 60 – 80 soil profile holes supplemented with observations, particularly for a situation like this

RH notes 7-hectare site and quantity needed, would be at a very fine scale. Seems in conflict with accepting regional mapping over LV mapping.

IC re fine material over gravel. Agreement re shallow.

RH notes difficult to test and validate. But teasing out granularity of soil variation (number of observations), but if lots of soil profile holes needed for confidence in detailed soil variability/pattern methodology begs question as to showing it is in fact variable.

RH notes issue of comparison with regional LUC as the fall back and that LV mapping is still improved detailed information.

**SUMMARY:**

RH: Yes

ML: Yes, council need to consider the entire NPS HPL and guidance document which guides councils for mapping geographical cohesive areas and not to accept site specific maps at landowner scale

IC: No, does not agree with methodology of mapping undertaken my land vision

**b. Any comments on whether the Landvision mapping should be accepted?**

IC As above, notes 15% LUC 3 – acknowledges part can be classed as LUC 3.

RH – Yes to accept re above – does provide more detailed re LUC units vs other available info

ML – agree with RH re more info better than accepting regional scale BUT – problem as regional council that yet to undertake more detailed mapping. Whether we should for individual site, how would we map it – and would map it (likely) as LUC 3 noting other parameters re well defined boundaries as well a site as larger geographical area. For that reason no.

IC – NPS HPLP 21-page definition incl soil physical products plus versatility – IMO key statement.

**SUMMARY:**

RH: Yes

IC: No, but agrees that some of the site can be classified at LUC 3

ML: No, reasons given in previous question

c.	Is the site/part of the site (if so which part) highly productive land as defined in the NPSHPL ? Comment on mapping scale as part of this (giving regard to clause 3.4 and 3.5 as well as the guidance document to the extent you consider they are relevant).
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RH

My perspective – accepting Landvision mapping – does say an area of LUC 3 – so identified as highly productive; but parcel as a whole is not LUC 3 so is not highly productive. As to whether contiguous – depends on detailed regional mapping – suggest existing NZLRI or regional mapping based, so not really considered detailed. But hypothetical consideration, My understanding re parcel – could go either way – predominant type not LUC3 and join to surrounding rivers / waterways; or alternately attached it on to adjoining 3S indicated upstream to make it highly productive. Defer back to more detailed mapping, as it gives you to what is in fact there. Therefore I guess could be excluded as small part of no LUC 1, 2 and 3 within larger area outside the site or tail area of NZLRI1,2,3 i.e. highly productive land.

IC clarification re LUC 3, may not be all LUC3? – RH states yes, Both parties agree that possible for some LUC 3 to be ‘hidden’ in other mapped LUC classes.

But majority of site not in LUC 3 so in LV would drop out.

MH covered above.

Experts looked at example tabled by RH on a without prejudice basis (**the example**)

**SUMMARY:**

Agreement that parts of the site (LUC3) are defined as highly productive.

RH: When looking at the parcel as a whole it could be mapped as either highly productive or not depending on how the NPS HPL is being applied.

3.	Do the proposed conditions <sup>1</sup> and the draft Soil Management Plan provisions provide a framework that will prevent a loss of productive value of soil on the site?
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RH Yes – what we’re proposing more directive than example tabled, and what following. Time frame re achieving highly productive for 3 yrs. SMP suggest in pasture not cropping for 3 yrs, deep root species to build soil structure etc, low stocking rates. So more than example site. Seems to be appropriate. SMP includes more specific conditions re depths, soils to be used on site, where to be placed to avoid compaction, SMP has more monitoring and guidance from experts (Soils, past experience contracting placement and Mike re advising land post placement and limitations)

<sup>1</sup> Version presented with Mr Taylor’s supplementary planning evidence dated 19 December 2022.

ML – Q's (1) unclear re condition of soil when been handled – being dry but not too dry (dust) but lain saying if handled = makes it too dry. (2) re example site from 1980's so clarify the 3 yrs timeframe

RH (2) states original soil and fill then subsoil and topsoil to reinstate to old land level (cf depression) so original site remediated (remediation of remediated site).

IC no re conditions. Refer to example. When look at original soil Staplegrove fig 13 and all other figs of restored soil, major dislocation / disrupt of soil profile, and no way back to functional soil – significant time needed. Also re management of stockpiles to 3m high – how can you do that without driving over soil structure.

No clear demarcation re soil horizon A and B in management plan

Dealing with pit up to 5m deep, and proposal to extract then backfill same day, huge logistical challenges. That also means need access. Noting 50 ton trucks. So no way can mitigate. Plus natural physical features, that can't be put back. Change traumatic. Major problem, 20cm to 30cm; my estimation average amount removed is 40cm top / subsoil with backfill, then 60-80cm with back fill – where is extra material going to come from. So what sort of medium is that going to be for future stock / plant growth.

RH re dry. Taken from previous reference. My understanding dry means not wet and not too moist so not creating deformation. Since sands most loamy is loamy sand, sandy loam, wouldn't want it too dry to avoid blowing around, don't believe high risk or weak structure as having much structure to deform or break down, so moving / removing it not going to have much impact... struggling to see degradation / deformation where soil does already have weak or no structure, though acknowledges susceptibility to damage and desire to avoid damage.

Re no clear demarcation on horizon A / B – clarification re separate 10cm top from bottom subsoil?

IC confirms re requirements previous, eg Ranzau Rd; noting Ranzau Rd under strict experiment conditions supervised by scientist re moisture level identification to avoid soil structure breaking down. IC logistics re when next day work next to previous backfill how can you ensure maintain walls of previous backfill?

RH can't comment on that as don't have references on hand, notes comments re the 3.0m high stockpiles - so asks IC for view re stockpiling.

IC re Staplegrove no more than 60 cm – truckload height – came from Ranzau Rd experiment; RH notes 1m – IC doesn't know if enough room for such stockpiling on application site. RH / IC acknowledge pros and cons re height – protects soil. RH acknowledges must avoid machinery moving over stockpiles.

RH re Staplegrove and Ranzau examples – those still good examples required methods where not done properly. IMO Staplegrove re backfill contaminated material with heavy metal trace metals and placement of subsoils during wet conditions; IC says not correct, visits to area, work only during dry months and even though done only when not deep, still had trucks having to drive over with associated compaction – pics of flooded due to absence of infiltration from deep compaction, RH acknowledges, and asks for whys different for Staplegrove vs pics tabled. IC notes needs to see deep pit, but Appleby site has taken 30 years to at last achieve crop growth.

RH re mitigations to avoid compaction and try and put back soils as best as can, and include limitations some types of materials in sub and top soils to avoid some of the other



issues at Staplegrave. IC asks re depth though – RH replies re importation of topsoil, and RH states current topsoil is sparse, lacking in nutrient material, and shallow – RH unsure where. But RH notes cost – preference re on site, but issue that external has to be Motueka not Moutere (locally sourced).

MN re the site in question – no issue resourcing topsoil – and RH adds re subsoil, being paid to take it, though RH subject to quality control.

ML – no – defers to expertise of RH and IC – confidence level low. Key disagreement re right or wrong ways to deal to it.

**SUMMARY:**

RH: Yes

IC: No (list of some of the reasons as to why not in discussion)

ML: No

MN says depends on site, many sites with those characteristics – concern when excessively leaking – highly drained, concern especially with environmental (nutrient leaching) concern (ie future land use to meet regs / rules to minimise). Many vegs grown on beds now. MN ask RH re other example site over road. Notes wetter patches, but not mottling.

RH notes bar of TRMP definition context to match for productivity, but look to achieve higher (not guaranteed) if possible. Bottom layer certainly TRMP context as imperfectly drained. And noting landowner does want best soil can get (such as topsoil).

IC any downgrade of drainage = downgrading of soil versatility. Eg drainage in existing situations to.

RH re rooting depth increase to IC improvement? IC most unlikely as any water that sits in soil for any period of time = poor.

MN re composition for growth ideal is 25% water / 25% air / 45% mineral matter.

IC notes re imperfect = more surface water so longer to wait for drying and to be able to cultivate land.

**SUMMARY:**

RH: No, soil can still be versatile even if imperfectly drained

MN: No, as RH; given local examples

IC: Yes, any downgrade of drainage = downgrading of soil versatility

ML: Yes, as IC

4.	<b>If one or more of you rely on previous attempts to rehabilitate soil as the basis for your opinion at 3, what are the areas of agreement/disagreement between you regarding what those examples showed and their relevance to the proposal?</b>
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IC general way – each of the major examples in Nelson can regard it as an experiment as outcome can not be predicted with any confidence, relatively thin veneer of soil, and putting it back in homogenised form not conducive to retaining the productive capacity of the land.

RH Based on previous example re photos – believe land can be made highly productive following rehabilitation– but with deeper soil profile; with positives re rehabilitation. Do believe that earlier example do in part represent some poor practice – based on my interpretation of report; and from that guidance to avoid poor implementation – greater controls in place, and greater / monitoring post placement, to ensure becomes productive again. Notes separate out A and B soil horizons and place accordingly then would separate out soil horizons so would be closer to original rather than homogenised condition – i.e. controls to ensure that happens.

IC reality that not surgical, machines big buckets, so in placing truck loads of soil, no precision; no consistency in what replaced, reflected in pit profiles taken at Staplegrove, and while some productivity replaced, not same as original, all an experiment.

ML defers to RH and IC expertise, but leans to IC re experiment and uncertainty of outcome

5.	<b>Regarding condition 52 (the requirement that the restored soil be at least imperfectly drained): does the drainage class need to be the same post-gravel extraction as it was pre-extraction in order to prevent a loss of productive value of soil?</b>
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RH I don't believe it does – range of crops achievable on imperfect soil drainage – and aiming for better than that – not limited by imperfect drainage per se so wont result in productive loss value of soil – deeper finer textured soil will give other benefits cf from existing shallow soils – more growing medium and water holding capacity, requiring less water and nutrients than current soil. Notes under TRMP re land high productive soil, imperfect drainage still defined as high value land. Where line drawn in sand re outcomes. To MN re types of crops – prefer to see imperfectly soil rather than excessively drained, especially where in future limits for excessive drainage and probs of nitrate leaching. Current site a lot of excessive drainage going on.

IC no such thing as excessively drained – its about permeability – rapid or slow – rapid = pretty fast and not good water holding capacity. Types of drained soil (4), and as category increases so does capacity of soil to support range of crops. All sorts of unproven materials introduced, anticipated permeability changed, soil close to surface retained, oxidisation effect to vegetation, and imperfect drainage IMO significant downgrading in site. 80% of site = well drained in Landvision report – why would you want to change.

RH Q's re benefits of 40cm fine soil matrix medium with 1m or up to 1m – if that doesn't



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provide any great gain in growing medium or soil for other crops compared with current.

IC notes no confirmation / certainty re nature of underlying material. RH assumes clay loam – IC says no controls. Could be heavy clay or gravel. RH clarifies that is backfill of subsoil and topsoil – so more consistency. RH notes there are conditions re where and quality of materials –

[ added following request to provide: pages 10 and 11 of SMP]

ML – notes her issue – how she sees it is swapping rooting depth for limitation of drainage depth , but what would like to know as variable doesn't meet definition of high productive, if backfill means then it becomes highly variable so are there any examples locally of perfectly drained soils?

MN winter peak events water standing for a while; but in most times mod drainage and wee bit of mottling. Not prob for root activity – if enough air in 20-30 cm with roots for water / air compared with deeper anchor roots. Soil profiles I've done – imperfectly drained doesn't mean it's bad.

RH – fluctuating water table so up to 30cm will mean constrained growth during winter (as less air lower down), and most vegetable crops rely on top 30cm for nutrients and to lesser extent water at that time. Can't comment on apples. But knows imperfectly drained soils in the region with apples on.

6.	<b>Are there other aspects of the conditions or draft Soil Management Plan that should be changed in order to prevent a loss of productive value?</b>
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RH Agreed stockpile height – protect soil values

Observations that managing subsidence and depressions in land – post placement management (based on experience).

IC if management plans per those for the Ranzau Rd & Staplegrove example would minimise the damage that could occur from the changes

RH to IC re SMP examples from other rehabilitation examples (excluding original Ranzau Rd example) – how have they formed part of the management including complexity / simplicity?

IC says no practical difference re outcome.

RH trying to find out if SMP re complexity what is then required based on other examples involved with e.g. other controls other sites? IC says only other two involved in. -

ML defers to expertise, but adopts RH.

7.	<b>With regard to NPSHPL clause 3.9:</b>
a.	<b>Are the adverse effects of the proposal on the site's productive capacity able to be avoided, remedied or mitigated and over what timeframe? [3.9(3)(a)]</b>

RH – yes – re SMP and conditions there re placement and post placement management of the site- example tabled – believes that would be achievable within 3 year timescale (noting example site less control etc – could be done)

IC – impossible to avoid adverse effects; what in 100 = unknown. Start recent flood like material, takes decades to develop what soil looks like soil nutrient profile etc,

ML – unknown, relying on IC and RH. Not optimistic about 3 years achieving productivity.

RH does indicate that example tabled is more like for like, but without controls via conditions / SMP.

RH notes importance of guidance of experienced contractor

**SUMMARY:**

RH: yes, with conditions and guidance

IC: impossible

ML: unlikely

8.	<b>With regard to NPSHPL clause 3.9(3)(a), does the proposed activity including conditions and SMP “minimise or mitigate any actual loss or potential cumulative loss of the availability and productive capacity of highly productive land in the district”?</b>
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IC 3000 hectares of Motueka productive, 20% already lost, cumulative.

RH notes re guidance and size, that there will be cumulative loss

Yes - Activity in accordance with SMP would – minimise or mitigate any loss, as it aims to replace soil with similar productive value that is there if not better. (comparable)

IC on above basis wouldn't.

ML deferring to RH and IC expertise.

**SUMMARY:**

RH: there will be cumulative loss, but SMP will minimise or mitigate any loss

IC: No

ML: Likely that cumulative loss will occur as unlikely that SMP will be successful

9.	<b>With regard to NPSHPL clause 3.9(3)(b), does the proposed activity including conditions and SMP: “avoid if possible, or otherwise mitigate, any actual or potential reverse sensitivity effects on land-based primary production activities from the use or development”? [n.b. reverse sensitivity effects are where a more sensitive land use establishes, and complains about the effects of an already established activity, resulting in constraints being placed on the established activity]</b>
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All parties agree that scope is limited to their expertise re soil, and primarily on others would be dust generation, which they feel sits outside their area of expertise.

<b>10.</b>	<b>With regard to NPSHPL clause 3.10(1):</b>
<b>a.</b>	<b>are there permanent or long-term constraints on any part of the site that mean the use of it for land-based primary production is not able to be economically viable for at least 30 years?</b>

RH noted that is from basis of in current condition

RH water is available and remains ongoing for 30 years, and noting re nutrient rules in the future.

RH – in terms of considering past attempts – notes if profitable and making money would still be there (but acknowledges markets do change etc).

MN – in my view will improve productive value of land/usefulness re rehabilitated soil, highest value crops, consistently grown on land with deeper more soil.

ML - No - re p33 under NPS HPL– presence of constraint – distinction re economically unviable vs uneconomic (observation).

IC – No constraints as at present but constraints post gravel extraction

<b>b.</b>	<b>In relation to those areas, does the proposal meet the requirements of clause 3.10(b)?</b>
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Guidance re 3.10(b) reluctant / don't have ability to comment on that point – don't believe they have that information to make that comment right now.

Signed: (digitally via email confirmation to facilitator, final for release).

<b>Witness</b>	<b>Signature</b>	<b>Date</b>
Dr Hill		6 March 2022
Mr Nelson		6 March 2022
Ms Langford		6 March 2022
Dr Campbell		6 March 2022