

Kia ora Jim ma

Thanks for the two readings. I have read through both thoroughly and your interpretation seems to be quite selective. In fact both documents rather seem to support my understanding.

It is actually the prerogative of the Courts to determine the relative weighting of the four well-beings in their decision making. Using an approach that weights them equally and then allows different weightings of the wellbeings to acknowledge the different worldviews is totally consistent with the approach suggested by the paper as it allows the different perspectives to be more accurately understood. Conversely, swamping a decision analysis with many criteria that indirectly emphasise particular well-beings is not useful and just introduces complicatedness when the need is for clarity and to be able to deal with complexity.

That the Mauri Model and MCA results were consistent should give confidence that our process was robust and defensible. The approach used was clear and ably assessed the limited options that we considered in a fair and equitable way. I am interested in the reason that you have chosen not to refer to these analyses in the consultation that is progressing but seem to be relying heavily on the responses from MOH and MoH when these have not been vetted at a TAG meeting, nor have these been subject to any robust analysis (not that there is much to analyse).

The PCE submission is just that (I also submitted in that process and can provide mine which was more comprehensive than the PCE's), but I note that it is suggesting that the intention of the act not to be an economic development enabling Act which is the vein of the changes being proposed that are opposed specifically. It is interesting that both documents are silent on the introduction of more than seventy references to Maori concepts in the Act (and other indirect ones eg. intrinsic values (mauri) of ecosystems). These are the significant departure from other sustainability laws and their absence is an interesting reflection on the two sources you have chosen.

My last point is that the journal paper is now twelve years old. The submission is just a submission. A better reference might be the Environment Court decision from 2012. We seem to be placing a lot of emphasis on aspects of this challenge that the Environment Court has already indicated were being given too much emphasis. Environment Courts tend to look at previous decisions that are relevant – I would respectfully suggest that the 2012 decision is the most relevant in this case.

Considerations:

1. Environmental impacts due to greywater disposal through existing septic tank systems are referred to. Is there any recent literature known of that details these impacts and in particular the N and P sources and load proportions?
2. Is there potential to cost in value of Urine when Peak P during this decade? Should this be zero costed as the Urine will in all likelihood become a valuable resource before the half-life of the infrastructure?
3. Cropping consideration apply to options 2 through 4 only as options 5 and 6 to use subsurface irrigation.
4. The clusters are predominantly located in valleys along the lakeshore and as such have gentle slopes towards the lake. Gravity flow to Biolytix distributed as proposed will not be a significant concern based on a preliminary layout (RDC maps).
5. The intermittent nature of holiday home occupancy has proven a problem for some owners but is unlikely to be a problem for the Biolytix given the cluster arrangements which will be able to be 'fed' during servicing if necessary (Half a pumpkin keeps the worms going for six months).
6. Kingsgate West used a superceded design that has now been addressed. Our trial will identify issues that could be expected with the introduction of Urine separating toilets.
7. The final cost of the solution chosen is likely to be a more relevant concern than the continued use of existing on-site systems for greywater. The community is not excessively wealthy and a majority are retirees.
8. Electrical upgrades would not be required for options 5 and 6 due to the very low electricity demand but should be assessed for options 1 through 4.
9. Why is a greater survey requirement expected for options 5 and 6?
10. What potential cost savings might be possible for options 4 through 6 that have not been identified?
11. Appendix B is a less biased presentation of the six options.

Thank you for your report which has provided additional insights into all of the options.

There are a number of assumptions made that will change these estimates significantly – some are likely to be correct and some are likely not.

1. Isolated houses or groups of houses less than five will have a stand-alone solution (OSET).
Examples: Doctor's Point, Manawahe Road, Pongakawa Road, Honeymoon Bay and TMIOR.
2. Clusters can avoid wahi tapu, and also rock.
3. Mix and match solution unavoidable as cannot economically include every house and toilet.
4. Address challenges pragmatically: If nutrient removal consider 'buy a farm' as well.
5. Environment Court likely for Options 1 and 2 possibly 3. Who is likely to challenge others?
6. Best solution may be a hybrid, but unlikely MBR due to economic reality of community.
7. Large proportion of properties on landward side of SH are Maori blocks with genealogy connections (ie same owners and trustees for many of the land blocks).

Specific Questions regarding Installation Costs:

1. What is the premium associated with having separate tanks on each property? Compared to adjacent each Biolytix? Compared to same solution as option 4?
2. Sleeved pipes are required for the LPSS but are they necessary for options 5 and 6?
3. If sleeved pipes are to be used are much smaller pipe sizes are likely? Would this allow directional pipe thrusting techniques to be used for the majority of installation?
4. Is the contingency for hard rock material applicable to options 4,5 & 6?
5. Explain dewatering expectations?
6. Consenting costs may be excessively pessimistic – options 4,5 & 6 treated the same. Range is \$50k to \$200k but taken as \$200k per cluster. Is this realistic given land ownership reality?
7. Urine separating toilets – on the plane and arriving next week. We have two planned for installation in our Ruato trial. What is the accuracy of the estimates provided in 4.1.1?
8. Biolytix supply cost includes pump unit which should get effluent to cluster central tank. Is this taken into account?
9. If unable to install Biolytix to suit three dwellings as suggested, then do pairs on those occasions – less expensive than \$6k grinder pump surcharge (also unclear why these are so expensive at \$6k?).
10. Does the \$4500 installation cost quoted include disposal field?
11. What is the assumed loading of P and N in greywater flow that has been used? N stated as 10% but what is P? Where from?
12. Existing Septic tank serviceability. Does RCBOP already have records? Assumption regarding retrofitting may be excessively conservative as suggest two thirds of existing septic tanks are non-compliant?
13. Septic tank replacements could be determined when surveying decommission ratio before starting. This would be a wise contribution now. If the proportion of unserviceable tanks is as high as assumed would it not be more efficient to pump greywater to disposal field also?
14. What size reticulation pipework is assumed to be required for options 5 and 6? Again would this allow directional pipe thrusting techniques to be used for the majority of installation? What cost reduction would be applicable?

15. Land disposal has assumed spray irrigation for options 2 and 3 which is necessary because of the very large volumes involved on a small area. It is not necessary to take this approach with the significantly lower volumes for options 5 and 6 that are dispersed across nine disposal sites however and subsoil disposal is proposed. The soil profiles at three of the sites investigated are 250 to 300mm dark brown topsoil overlying brown sandy silt loam.
16. Biolytix units are now OSET compliant (97% BOD and 97% S.S. removal, 42% N removal). If combined with Urine separation achieves better N removal than AWTS so could theoretically be discharged on-site with negligible operational costs. What reservations would there be for this option?
17. If a carbon/sand filter (Kyte trench or similar) were incorporated before dispersal at each of the cluster land disposal sites what reduction in land area could be achieved?
18. 25% engineering fees combined with 15% contingency is a 40% premium on the very conservative estimating approach. Is this a realistic expectation? What design aspects would justify this amount of effort? Is there significant repetition involved?
19. How many days storage are required for Option 5 effluent? Volumes averaged over the nine clusters 7.3m³ daily implies storage capacity of a week. ? Is a rising main on the scale contemplated actually necessary as opposed to a pressurising smaller bore pipeline?
20. How many days storage are required for Option 6 effluent? Volumes averaged over the nine clusters 2.1m³ daily. Is the estimate for a \$50k tank accurate? Nine times? Is a rising main on the scale contemplated actually necessary as opposed to a pressurising smaller bore pipeline?
21. Urine storage 500l daily per cluster average. 90m³ each six months meaning two 45m³ tanks emptied at three month intervals is possible. Seasonal demand may mean that it is prudent to use larger 90m³ tanks with six monthly emptying cycle.

Specific Questions regarding Operation Costs:

Operational cost estimates vary considerably from those anticipated for options 5 and 6.

1. Biolytix tanks do not require cleanouts. Is the assumption at 5.3 valid for either the pressure network or the cleanouts?
2. Land lease costs are expected to be accommodated within land use swap concept. By buying 200Ha of farmland and returning to native forest.
3. Treatment and disposal opex in section 5.6. What is required here is subsurface irrigation used?
4. Similar question section 5.7?
5. Section 5.9 would be included alongside Biolytix maintenance contract. What particular issues are expected with greywater disposal application?
6. Is odour control required for options 5 and 6 given the effluent characteristics and short distances involved?
7. As above why do section 6.1 problems occur with options 5 and 6?
8. Is there an alternative solution as suggested by CBC that eliminates the need for the section 6.4 provision?
9. Is it possible to avoid odour costs identified in section 6.5 given effluent characteristics for options 5 and 6?
10. Table 8 break-down.