PPC95: NOTES OF REPLY COMMENTS BY JAMES ABRAHAM 14 NOV 2024

1. My name is James Abraham

2. I am the Asset Management Team leader for Water Services at Western Bay of Plenty District Council. I have a Bachelor of Engineering Technology and 8 years of engineering experience in three waters design and Asset Management of three waters assets for Local Government.

Constant Change

Firstly, I would like to note that I am responding to the information that has been provided which has constantly changed throughout this process, with new information supplied yesterday during expert evidence which at times conflicts with other evidence provided.

On the topic of Stormwater

- The Section 42a Report raised the following concerns about the proposal.
    - Safe conveyance of existing overland flow paths through the plan change site.
    - Stormwater soakage limitations.
    - Cumulative impacts of additional stormwater due to discharge and displacement.
- I am satisfied that existing overland flow paths can be safely conveyed through the proposed residential area without exposing residents to unreasonable risk.
- I continue to have the following concerns about the Plan Change:
    - The suitability for disposal of stormwater to ground by soakage.
    - Cumulative impacts of additional stormwater due to discharge and displacement.
- Dan Hight for the Applicant proposed that fill may be required for lower lying areas, the number estimated in the engineering service report is 21,000 cu.m. I note that this does not include the fill proposed in the wastewater irrigation field.
- I agree fill maybe required to support this plan change, However, the effects of fill and loading from dwellings has not been assessed, particularly with regard to the impacts on existing ground water levels and permeability of soils. Mrs Brown for the applicant yesterday acknowledged this risk, and has proposed the that ground water monitoring be conducted following the placement of fill. It is my recommendation that groundwater monitoring be conducted prior to the

adoption of the plan change, as it relates to the viability of proposed stormwater soakage and wastewater systems.

- I support Sue Southerwood's statement for the Bay of Plenty Regional Council that the applicant has not provided sufficient evidence that the soakage rate assumed can be achieved. Soakage rates used are based on testing undertaken in Pongakawa.
- If this soakage rate is not achievable, then the sizing of stormwater management devices such as the private soakage systems and the stormwater wetland will need to be revised.
- Dan Hight for the applicant has noted that using a soakage rate recommended by Mrs Southerwood of 7mm/hr compared to the original 100mm/hr, that soakage is still a viable solution. It is noted that Mr Hight stated yesterday that soakage is achievable employing a soakage device with an area of 24sq.m. Following discussion with Mr Hight and Reviewing his calculations I have found that the design is not compliant with the development code specifically the requirements that:
  - soakage devices should be designed, with a 50% reduction factor, this assumes that the soakage device will not be as efficient as the first day it is installed.
  - the soakage system will fully drain in 24hrs following a 10-year rainfall event, note this requirement differs from BOPRC stormwater management guidelines which Mrs Southerwood referred to as being 48hrs.
  - with this in mind the soakage device sized to cater for the 7mm/hr soakage rate will have an effective area of 75sq.m if the 50% reduction factor is not applied, this would be in excess of 140sq.m if the reduction factor is applied as noted by Mrs southerwood.
- Compared to the original 9sq.m The 24sq.m device would take over 4 and a half days to fully soak away, I would re-iterate this is none compliant with both councils development code and BOPRC stormwater management guidelines.
- But, I would like to acknowledge that Mr Hight has made allowance for back to back rain fall events to be stored in the proposed device.
- I would also like to respond to the statement of mr cooney made yesterday. mr cooney referred to the stormwater requirements imposed in Te Puke. Mr Conney noted that they are a barrier to development and could be considered cost prohibitive. While I agree with Mr Cooney that the stormwater requirements in Te Puke are relatively high, this is largely due to an effort to reduce the impact on the BOPRC, Kaituna catchment management scheme. The outcome in Te Puke, is that privately owned onsite stormwater devices are required, which is the same solution that is being proposed for Pencarrow Estate. And is the same solution which Mr Cooney has identified as being a barrier to development. It is my opinion

that the resulting risk in Te Puke which is relevant to Pencarrow, is that that the long-term performance of the stormwater network, is reliant on individual landowners, effectively maintaining their privately owned stormwater soakage devices.

- Further to my point, Mr Hights proposal of a 24sq.m soakage device assumes a perfectly maintained device.
- It is my opinion that this further compounds the risk that the proposed stormwater network may not be a viable long-term solution to stormwater management for the plan change area.
- However, regardless of these design recommendations. I would like to re-iterate the underlying issue which is, the viability of the stormwater system is reliant on soakage, however the soakage characteristics of the soil are untested at the site. It is my recommendation that soakage tests are undertaken prior to the plan change adoption to confirm the viability of the proposed stormwater system.

On the topic of Wastewater

- The Section 42a Report raised the following concerns about the proposal.
    - Disposal field viability.
    - Site Conditions. As it relates to Soil, Groundwater and Surface Water
    - Environmental risk.
    - Council's Financial Resources.
- I continue to have these concerns.

Firstly, I would like to acknolwedge that Council are not against wastewater irrigation fields as a solution to wastewater disposal. In fact we have implemented three wastewater irrigation fields in various locations across the district and are currently exploring options for two more. However, when identifying appropriate sites, council consider a range of criteria, such as distance from the urban area, minimum land size, slope of the land, buffer distances from waterways, overland flow paths and floodable areas etc, some of these are identified as risks on this site.

On the topic of Disposal field viability

.1. The map provided shows Overland Flow Path 3 crossing the proposed disposal area, Kirstin Brown for the Applicant notes in her evidence this is planned to be backfilled, I would like to point out that the plans provided shows the overland flowpath still conveying through the irrigation field. This is in conflict to Mrs Browns evidence yesterday where it was mentioned that this overland flowpath could be diverted away from the field. These conflicting statements make it difficult to understand the intent with regard to overland flowpath three, as it relates to the

wastewater irrigation field. It is not clear if this has been included in the total land area identified for the purpose of wastewater irrigation field.

.2. Residential land is proposed to be neighbouring the wastewater irrigation field. This could encourage residents to utilise the irrigation area, it is my recommendation that a setback be imposed between the residential area and the irrigation field. This is consistent with the WBoPDC Maketu irrigation field and imposed setbacks from the neighbouring campground in Maketu. It is not clear if allowance has been made by the Applicant for setbacks from the proposed residential area.

.3. There is not a clear statement from the Applicant on how wastewater is to be disposed of on the site, and there appears to be conflicting comments from the Applicant over the disposal method, namely whether it will be via raft fill or directly to land.

.4. Approximately 7000m^2 (0.7ha) or 13% of the disposal field area is identified as being floodable in a climate adjusted 1-in-100-year rainfall event. Dan Hight notes that earthworks to lift ground levels could be carried out, to meet BOPRC OSET requirements, to avoid placement of a wastewater disposal field below the 1 in 20-year flood level. This has not been assessed by the Applicant. These fill volumes do not appear to have been allowed for in flood water displacement volume calculations.

.5. The wastewater treatment plant and access to it sits within the irrigation field area they will take up a significant area and it is not clear if this has been accounted for within any of the plans or design documentation provided by the Applicant.

.6. I would also like to acknowledge Mr Cooneys comments yesterday that the proposed wastewater systems are advanced modular systems that can be added to easily. I agree with these comments from Mr Cooney, however acquiring additional land for the purpose of irrigation is less flexible which is where councils concerns lie.

.7. It is my opinion that each of the points I have just raised identify a cumulative risk that has not been assessed, being that, the disposal area is undersized. An increase in the disposal area is likely required, which would result in moving the disposal area further into identified floodable land. This land is less suitable than the already constrained site proposed. It is my opinion that further extension of the filed into the floodable area would require more fill, increasing the risk of overall viability of the field. It is my opinion that the application has not provided sufficient evidence to suggest that the proposed wastewater disposal Field is appropriately sized. And that viable irrigation cannot be achieved without significant variation from the proposed structure plan.

On the topic of Site Conditions (Soil, Groundwater and Surface Water)

.8. As already noted overland Flow Path 3 crosses the proposed disposal area with conflicting comments as to how this is to be managed, highlighting uncertainty as to how this might affect the function of the disposal field.

.9. Kirstin Brown for the Applicant agreed yesterday agreed that the backfilling the existing farm drains could have an effect on groundwater, and that this will be assessed after the plan change has been adopted. I agree with Mrs Brown that the filling may impact groundwater and that it should be assessed however, it is my opinion that this assessment is required prior to plan change adoption.

.10. I would like to point out that Approximately 7000m2 or 13% of the disposal field area is identified as being floodable in a 1-in-100-year flood. This floodable area is most prominent in the northern area of the proposed irrigation field. BOPRC OSET requirements seek to avoid placement of wastewater disposal fields below the 1 in 20-year flood level.

.11. Peat soils have been identified at a depth of half a meter in this area, indicating saturated conditions at this level. Additionally, the northern portion of the site encompasses prominent flood-prone areas, increasing the risk of effluent transport in floodwaters. Kirstin Brown, representing the Applicant, notes that buried or partially buried wastewater infrastructure is planned for this area over the peat soils. Dan Hight suggests that earthworks to raise ground levels could also be undertaken, but it is well-known that peat is a compressible soil, posing a high risk of differential settlement if left unsaturated (without pre-loading). The quality of fill design and installation will be critical for the long-term function of the irrigation field. The CMW report provided mentions potential for a rift fill to be installed, while preloading will help manage settlement within the peat, this approach is not ideal for a wastewater disposal field, as it may reduce soil permeability. In my opinion, these compounded risks have not been fully evaluated, and given that the most constrained land is near the Puanene Stream, the minimum 20-meter setback may be insufficient to mitigate environmental and cultural risk.

On the topic of the receiving Environmental

.12. The disposal field neighbouring that residential area, may invite public use of the field. Council's recent experience with disposal fields in Maketu in areas of soft compressible soils highlights a risk of pipe breakage due to the maintenance or foot traffic over the field. Resulting in effluent ponding at the surface such a scenario also presents a health and environmental risk.

.13. BOPRC have identified that Waihi Estuary as a catchment requiring management to improve water quality I quote from the BOPRC website "The Waihī Estuary is a natural taonga located between Maketū and Pukehina. In recent decades it has degraded as increasing amounts of nutrients, sediment, and faecal bacteria have been washed into the estuary from surrounding land and contributing waterways." this may have an influence on the final design of the wastewater system. This uncertainty is a risk to the long-term acceptance of the discharge. It is noted that

minimum setbacks have been proposed however, the site is identified as being in a floodable area with no assessment of how this will be managed or if minimum setbacks are sufficient.

On the topic of Council's Financial Resources

13.1 Ongoing Council operating costs associated with small community wastewater systems are an inefficient use of financial resources compared to intensifying development in existing urban areas with existing wastewater treatment plants as noted in the section 42a report using the operating costs provided by the applicant for a typical system of this kind, it would be more than 1.5 times more expensive per connection to operate this system compared to Te Puke. It should also be noted, that due to the limitations and constraints I have just identified, operating, monitoring and compliance costs maybe higher.

To conclude

It is my opinion that the impacts of wastewater and stormwater ultimately pose a risk to the wai. Whether it be ground water, or surface water:

- within the proposed pencarrow estate
- the Puanene stream
- and the Waihi Estuary.

It is my opinion that these risks have not be sufficiently assessed, nor has sufficient evidence been provided to suggest that these risks can be appropriately mitigated without considerable variation from the proposed structure plan.