
To: Kelly Burgess
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From: Wayne Hodson
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Task: 3 Waters Review

Date: September 1, 2021

Reference: Peer review Springhill Farm Development RM 210103

1 INTRODUCTION

A review was carried out in May 2021 of the application submitted for the above development that included an Assessment of Environmental Effects – April 2021 prepared by Development Nous and supporting documents:

- Development Nous, Engineering Services Master Plan Report, 1200 Stage Highway 50, Ongaonga – Central Hawke's Bay, April 2021 V1.
- Freeman Cooke Associates PTY LTD, Preliminary On-Site Wastewater Management Site Evaluation Report, 16 April 2021

The review was limited to 3 waters (potable water supply, stormwater, and wastewater) along with flood hazard considerations. Review findings and recommendations for additional information to be provided by the applicant, were communicated in an email dated 26 May 2021. In general, for the scale of this development further investigation and assessments are warranted to demonstrate that the potential effects of the development can be mitigated, and servicing can be adequately provided. Refer to the review notes and recommendations from May 2021 attached.

After this review was provided to Central Hawke's Bay District Council (CHBDC), a Section 92 information request was sent out on 3 June 2021 by CHBDC to Development Nous.

Further information has now been provided from Development Nous relevant to the 3 Waters review:

- Revised Engineering Services Master Plan Report (July 2021, v2)
- Letter dated 26 August expanding on on-site wastewater effects and proposed requirements.

This memo documents the outcomes of the review of the further information and any outstanding aspects that have not been addressed adequately.

2 REVIEW - AUGUST 2021

2.1 STORMWATER

Development Nous has provided further information in a revised engineering services report. This includes:

- Recommendations for maintenance provisions for the swales to be in accordance Auckland Council guidelines. Maintenance would be carried out by CHBDC for vested roads and individual owners for private systems, however no mechanism for this is noted. It is recommended that maintenance requirements are assigned against individual titles as ineffective maintenance of on-site stormwater systems will be potentially detrimental to the overall development and wider environment.
- Indicative sizing for infiltration systems has been provided based on an assumed infiltration rate of around 40mm/hour (1m/day) based on guidance from Minnesota. It is not clear what rainfall or design storm has been assumed in these calculations and whether these infiltration devices would be sized for mitigating runoff to pre-development rates or to take the full areas of hardstand and overflow from roof tanks.

It is noted that HBRC has guidance on infiltration rates in their Waterway Guidelines, Table 5-1 for different soil types, and design guidance for designing infiltration practices.

Whilst Development Nous has provided some additional information this has not answered the main queries raised previously around design standards and mitigating to predevelopment runoff for the existing flow paths. Due to the uncertainty in the design basis proposed, the various flow paths for runoff from the sites matching predevelopment and erosion effects, it is recommended that individual lots are designed to provide infiltration systems sized for the full lot runoff up to the 100-year event.

It is recommended that all the infiltration systems for the development are designed in accordance with the HBRC Waterway Guidelines 2009, using a 100-year event design storm with rainfall from Hirds V4 with climate change allowance of RCP 6.0 2081-100.

2.2 FLOODING/WIDER FLOW PATHS

Development Nous has provided information on the existing upstream overland flow paths and catchment areas that drain into the proposed development site. Runoff from the catchments for various return period events are presented, but combined flows at specific points are not clear from the report. The report notes that the 100-year event would be contained within the watercourse banks and overtopping is not expected.

There are some errors in the report referring to the catchment Ext-W which is on the northern side on the drawing C503 but is noted as the overland flow path to be directed to a formed swale through the southern side. This is potentially just an error in the catchment numbering on drawing C503.

The modelling outputs provided in Appendix D of the main watercourse are not readily interpreted for reviewing, but the assumptions noted, and basis of approach is likely to be conservative in estimating flow rates. However, due to the nature of the wide overland flows and large upstream catchments there is potential for specific flow paths to change in the future with erosion of channels or the surface over time or during a flood event with scour occurring and debris directing flows in different directions. As such there remains a flood hazard to the proposed development from the large upstream catchment.

It is recommended that further engineering consideration should be given at the design stage to mitigating potential flood hazard where practical and incorporate resilience into the development to accommodate flood events by considering flow path linkages through the proposed lots where appropriate and identifying the recommended minimum floor levels for each property.

The main watercourse through the site appears to have eroding banks and have the potential to change course/alignment across the plain. There is a concrete weir on the stream, upstream of the SH50 road bridge, but it is not clear if this is for erosion control or another purpose. It is recommended that further consideration is given to appropriate buffers between the stream and the proposed lots with the proposed stream easement.

2.3 WASTEWATER

Development Nous has provided further explanation on the approach and potential effects from the proposed 312 lots and associated individual wastewater treatment and disposal systems. It is stated that nutrient loading would increase but be within the designed allowances of the Regional Resource Management Plan, however no details are provided to support that statement. Pathogen risks are noted as low, but the applicant has offered to include a consent notice requiring a tertiary level of treatment (UV disinfection) for any on-site wastewater systems installed.

Development Nous has not addressed the following key aspects raised in the May 2021 review:

- Sensitivity of the groundwater at the site and potential effects on the groundwater and existing users or on the adjacent watercourses as these appear to be fed from groundwater. There may not be a need for enhanced treatment (nutrient removal or disinfection) prior to disposal to land, however the applicant has not demonstrated this, only offered to include disinfection to address that risk.
- Layouts for smaller lots to accommodate the various on-site services, especially those with overland flow paths or formed swales through them. The letter does not that a site layout is shown for a large dwelling and garage to indicate scale of the lots, but this is not included in the information received.

It is recommended that the Hawke's Bay Regional Council are consulted on the proposed on-site wastewater arrangements and potential cumulative effects, along with any suggested assessment requirements or consent conditions.

2.4 POTABLE WATER SUPPLY

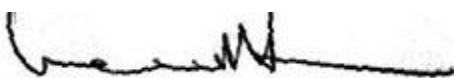
Development Nous have noted that Firefighting water supply requirements would be addressed at the time of building consent for individual sites. However, it is recommended, especially if the application is processed as non-notified, that prior to issuing consent that CHBDC consults with Fire and Emergency New Zealand (FENZ) on the scale of the development and arrangements for firefighting and any specific arrangements or considerations that should be made as part of design. This is recommended to capture any specific arrangements for additional facilities that may be appropriate, over and above relying purely on individual on-site storage tanks and connections in accordance with SNZ PAS 4509:2008.

3 SUMMARY OF RECOMMENDATIONS

The following summarises the recommendations from the review notes above. These have not been worded directly as consent conditions at this stage, but it is recommended that they are incorporated into any consent decision.

- a) It is recommended that all the infiltration systems for the development are designed in accordance with the HBRC Waterway Guidelines 2009, using a 100-year event design storm with rainfall from Hirds V4 with climate change allowance of RCP 6.0 2081-100. Individual lots to manage runoff from impervious areas on the site to on-site infiltration and storage systems designed to cater for the 100-year event.
- b) It is recommended that further engineering consideration should be given at the design stage to mitigating potential flood hazard where practical and incorporate resilience into the development to accommodate flood events by considering flow path linkages through the proposed lots where appropriate and identifying the recommended minimum floor levels for each property. Consideration should also be given to appropriate buffers of the main watercourse shown to be included with easements over the relevant properties. This design consideration should be addressed for the whole development at the time of submitting designs for the first stage of the development.
- c) It is recommended that the Hawke's Bay Regional Council are consulted on the proposed on-site wastewater arrangements and potential cumulative effects, along with any suggested cumulative groundwater assessment requirements or consent conditions.
- d) it is recommended, especially if the application is processed as non-notified, that prior to issuing consent that CHBDC consults with Fire and Emergency New Zealand (FENZ) on the scale of the development and arrangements for firefighting and any specific arrangements or considerations that should be made as part of design.
- e) Designs are submitted to CHBDC for peer review as part of engineering design approvals, and that consideration is given to this review memo as part of that peer review. The design consideration should be addressed for the whole development at the time of submitting designs for the first stage of the development.

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Attachment: May 2021 Review Notes

MAY 2021 REVIEW NOTES**STORMWATER/FLOODING**

a) Unnamed Stream

The site sits on a generally flat graded plain with an unnamed stream (tributary of the Kahahakuri Stream) and other smaller watercourses running through the property. This unnamed stream is ephemeral but appears to have a large upstream catchment that could potentially produce significant flows during large rain events in the catchment. This is supported by the scale of the bridge structure on SH50 crossing this stream. The applicant has not assessed this stream catchment or how it would perform in 100-year storm events, including any wider overland flows across the wider plain or through the proposed subdivision properties. Note there is no flood hazard mapping for the property from the HBRC, as the property sits outside any modelled area.

The unnamed stream appears to have eroding banks and have the potential to change course/alignment across the plain. There is a concrete weir on the stream, upstream of the SH50 road bridge, but it is not clear if this is for erosion control or another purpose. Another smaller parallel watercourse has not been addressed in the application or drawings. This is shown to currently flow through the middle of proposed lots 46, 48, 51 and 36.

b) Flow Paths

There is some contradiction in the report on how stormwater will be managed at the site, including that existing flow paths will be maintained but the drawings do not support this. Currently the wider plain appears to have broad overland flow towards the southeast, towards SH50, where it would be collected in roadside drainage and continue through existing culverts under SH50. Catchment plans for pre-development do not show the existing flow paths under SH50 or identify these existing culverts. It is not clear where excess stormwater or overflows from on-property soakage systems or from roadside swales will be conveyed to or how these flow paths will be provided through the proposed properties to SH50 as per the post-development catchment plan (H20210003-RC-C501). The report notes that culverts will be installed as necessary, but details of flow paths are not shown. Further it is not clear how the wider overland flow paths (from the west) will be accommodated through the development, as these catchment extents have not been included in the reports or noted.

c) Basis of On-site stormwater management

It is not clear if the basis for stormwater mitigation meets the recommendations of the HBRC waterway guidelines, Stormwater Management or other appropriate guidelines. The reports note that on-site storage and soakage will be provided and that this will mitigate the development, however there is no design standard or basis of what the storage and soakage systems will be designed to achieve. The pre-development and post development catchments and peak flows do not relate to existing outlet culverts under SH50, and the comments above on flow-paths and wider flooding potential mean it is not clear that the potential effects of the development can be mitigated. It is recommended that a design approach for the on-site systems with an appropriate design storm (i.e., 100-year event in accordance with the HBRC waterway guidelines) be confirmed.

Potential downstream stream erosion effects from the development are likely to be mitigated with sufficient on-site storage/soakage systems, however this should be confirmed with an understanding of the proposed flow paths versus existing.

It is recommended that the applicant is requested to provide further information on the following:

- the potential wider overland flood plain and streams through the site to understand the flood extents, erosion hazards/stability, appropriate buffers or margins to the existing watercourses along with any stream diversions that are required, and any on-going access for maintenance that should be included. Considerations to consider climate change and potential future for more frequent storm events and potential for increasing erosion and movement of the stream.
- proposed post-development flow paths through the development

- proposed design standard for the design of on-site soakage/storage systems for individual lots, private access ways and proposed public roads.
- typical example sizing is determined for on-site storage/soakage approach based on conservative soakage rates. This can then be used when the properties are developed as part of building consent or roads are designed but confirmed once the extent of site development and ground conditions at each site determined. This is expected to be a minimum volume/area required for storage/soakage from say a 100m² of impervious surfaces (roofs, hardstand, roads).
- Maintenance provisions for private access swales and soakage systems, along with on-site stormwater storage/soakage systems.

Once the further information is provided the stormwater and flooding aspects can be reviewed for assessing the resource consent application and any appropriate conditions of consent.

WASTEWATER

A preliminary site evaluation report has been provided for on-site wastewater for the development. This notes the limitations due to soil type, climate and topography and notes approximate sizes for disposal areas for the different soil types and disposal methods. The report concludes that the wastewater will have minor environmental effect. The report notes that as groundwater is greater than 2m below the surface that no impact on groundwater would seem likely. However due to the scale of the development and the rapid permeability of some sub-soils, especially for the northern half of the development area, this should be considered in more detail.

Note NZS4404:2010 requires on-site wastewater treatment and disposal to be designed in accordance with AS/NZS 1546 and AS/NZS1547. Under NZS1547:2012 some of the site soils would be considered category 1 and 2 (gravels and sands and sandy loams). Category 1 & 2 soils have limitations with soil treatment capacity rather than hydraulic capacity that govern loading rates to minimise environmental impacts. Potential short-circuiting through these soils and low nutrient retention that potentially will impact on groundwater should be addressed. In addition, the separation to the stream may need to be greater with the rapid permeability if this is fed from groundwater at the site or further downstream. Specialist design for distribution techniques will also be required at the design stage. Consideration should be given to the minimum level of treatment (nutrient removal and disinfection) for on-site systems considering the cumulative effect of the overall development on groundwater. The sensitivity of groundwater or proximity to existing groundwater takes has not been considered in the reports provided as part of assessing environmental effects.

It is recommended that a simple 3D model for the groundwater at the site is developed considering any stream interfaces or downgradient groundwater abstractions. The assessments are required to determine the minimum level of treatment to be provided from on-site systems prior to discharge to land, to mitigate potential impacts on groundwater from pathogens or nutrients.

It is also recommended that some example site layouts are prepared for the smaller lots with watercourses through them to demonstrate that the various on-site services can be accommodated within the proposed lots, providing for separation from boundaries, water courses, buildings and stormwater soakage areas.

Once the further information is provided the wastewater services basis can be reviewed for assessing the resource consent application and any appropriate conditions of consent.

POTABLE WATER

It is proposed that water supply is completely achieved by on-site servicing within each property. For the scale of this development that is remote from existing residential areas and water supplies an assessment of the expected on-site water supply system should be provided. This would include an assessment of required storage volumes given the limitations of annual and seasonal rainfall patterns at the site. Is it expected that the properties will generally rely on transporting additional potable water from other areas for water supply, and if so, how would this be accommodated? Alternatively, is there groundwater available within the proposed lots that is of a suitable quality and quantity for potable use? What water treatment at source is

expected for the on-site potable water supply? Note consideration should be given to the proposed on-site wastewater servicing and risks to any potable water supply from groundwater.

It is not clear whether Fire & Emergency have been consulted on the on-site approach for this scale of development in a relatively remote area and whether the scale of risks are acceptable for on-site systems on the proposed approach. It is recommended that Council follows up on this. As a minimum it is recommended that a consent notice to be placed on property titles that requires: "A Fire-fighting water supply shall be designed and installed in accordance with the requirements of SNZ PAS 4509:2008, specifically the full requirements of Appendix B and E, as part of any building development on the property".

It is recommended that the applicant is requested to provide further information on the following:

- Expected on-site water supply storage and treatment systems as noted above.