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Horowhenua District Council
126 Oxford Street
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To whom it may concern

POTENTIAL ADVERSE ECOLOGICAL IMPACTS OF PROPOSED STORMWATER DISCHARGE ON *POWELLIPHANTA* SNAILS ALONG KOPUTAROA STREAM, LEVIN

INTRODUCTION

Horowhenua District Council is seeking resource consent for discharging stormwater from the proposed development of northeast Levin, which has potential to affect the Koputaroa Stream catchment. Four locations of threatened *Powelliphanta* land snails have been identified by Horizons Regional Council (HRC) within this catchment, all of which may be vulnerable to inundation during peak flow.

Horowhenua District Council has asked Wildland Consultants Ltd to undertake a desktop assessment of the potential adverse effects of increased stormwater discharges on the snail populations within the Koputaroa Stream catchment. The assessment will form part of the level of detail on the potential hydrologic effects at the identified snail locations, which will help to clarify the potential magnitude of effects and allow a more informed decision by HRC on the consent status.

WILDLAND CONSULTANTS' RELEVANT EXPERIENCE

Wildland Consultants Ltd has undertaken many ecological assessments for Assessments of Environmental Effects (AEEs) for a wide range of proposed developments. This includes stormwater management schemes, water supply dams and reservoirs, hydro-electricity generation (monitoring of existing operations and assessments of proposed development), forestry operations, wind farms, quarries, roading, landfills, subdivisions, a gas pipeline, geothermal power stations, gold mining, sand mining, walking tracks, cycling tracks, forestry, monorails, tunnels, back-county tourism developments, mangrove management in estuaries, regional prisons, marinas and other coastal structures, and other land uses. These assessments have included vegetation, threatened plants, avifauna, bats, herpetofauna (lizards and frogs), fish, and invertebrates.

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The Wildlands team has extensive knowledge of the RMA, regional and district planning, and resource consent processes. They have experience with the development of biodiversity policies in regional and district plans, including avoiding, remedying, and mitigating adverse effects of proposed developments on significant ecological values. Members of the team have many years of experience presenting expert ecological evidence at Environment Court cases, which have addressed proposed development, and the avoidance and mitigation of adverse effects.

Experience in the lower North Island

Wildland Consultants Ltd has an extensive portfolio of ecological experience in the Horizons and Greater Wellington Regions, and an excellent knowledge of the lower North Island's ecosystems and ecological districts. This, in combination with ongoing work on ecological projects throughout the area, ensures that Wildland Consultants Ltd are exceptionally well placed to undertake ecological assessments throughout these regions. Projects recently completed include:

- Ecological Impact Assessment (EcIA) of the realignment and upgrade of State Highway 1 from Ōtaki to North Levin for Waka Kotahi NZ Transport Agency (2020-2021)
- Assessment of ecological effects for the proposed subdivision at 176 Winara Avenue, Waikanae (2018-2021)
- Independent review of the Manawatu Gorge Bypass for the Department of Conservation (2018-2020)
- Assessment of Potential Ecological Effects and Mitigation Opportunities (Terrestrial) For Stage 2 of SH58 Safety Improvements Project (2020)
- Assessment of Ecological Effects for Mountain Bike Tracks at Johnston Hill, Wellington (2020)
- Assessment of ecological effects for a proposed subdivision at Otaihanga Road (2020)
- Assessments of ecological effects for a proposed subdivision at 490 Main Road North Upper Hutt (2019)
- Wetland Assessment and Delineation at 281c Katherine Mansfield Drive, Whitemans Valley (2019)
- Assessment of Potential Ecological Effects for Proposed Realignment of a Transmission Line Within Caribbean Drive Reserve, Grenada North (2019)
- Tree Assessment for a Proposed Dwelling At 10 River Glade Road, Waikanae (2019).
- Assessment of ecological effects for proposed expansion of the Kiwi Point Quarry, Ngauranga Gorge, Wellington (2017)
- Assessment of ecological effects for the proposed Kohekohe subdivision at Winara Avenue, Waikanae (2017)

KOPUTAROA STREAM CATCHMENT

The Koputaroa Stream is known to experience flooding due to high flows, where the quantity of stream flow exceeds the capacity of the banks and enters the floodplains. We have relied on the hydrological description of Koputaroa Stream catchment and the predicted impacts of the proposed stormwater discharge provided by the water engineering team at GHD (GHD 2021).

POWELLIPHANTA IN THE KOPUTAROA STREAM CATCHMENT

Powelliphanta within the Koputaroa Stream catchment are currently considered a *Powelliphanta traversi* subspecies (*Powelliphanta traversi koputaroa*). The genetic make-up of this species has not been examined due to the critically low numbers of individuals. The species is currently classified as ‘Threatened – Nationally Endangered’ by Hitchmough *et al.* (2005) and has a very limited distribution within the Koputaroa Stream catchment, where it is largely restricted to swampy habitats such as alluvial kahikatea forest. No recent surveys appear to have been carried out for this species. For the purposes of this assessment, it is assumed snails are present at all four sites identified by HRC. Using the EIANZ (Environmental Institute of Australia and New Zealand) guidelines on Ecological Impact Assessments, we have assigned *Powelliphanta traversi koputaroa* a value of ‘Very High’ based on the determining factor of a ‘nationally threatened species’ (Roper-Lindsay *et al.* 2018).

PREDICTED IMPACTS

The assessment of the effects on the hydrology within the catchment are estimates based on elevation and therefore the associated risk of the underlying areas of flooding during significant flooding events. We have based our assumptions of the potential adverse impacts on *Powelliphanta* on these results being an accurate assessment of what could occur. The potential adverse impacts on *Powelliphanta* are presented below on a site-by-site basis. An overall level of effect for *Powelliphanta* has been determined using a matrix approach that combines the ‘Ecological Values’ with the ‘Magnitude of Effects’ resulting from the activity as per the EIANZ guidelines. The matrix describes an overall ‘Level of Effect’ on a scale from ‘Negligible’ to ‘Very High’ (Figure 1).

Ecological Value ▶ Magnitude ▼	Very high	High	Moderate	Low	Negligible
Very high	Very high	Very high	High	Moderate	Low
High	Very high	Very high	Moderate	Low	Very low
Moderate	High	High	Moderate	Low	Very low
Low	Moderate	Low	Low	Very low	Very low
Negligible	Low	Very Low	Very low	Very low	Very low
Positive	Net gain	Net gain	Net gain	Net gain	Net gain

Figure 1. EIANZ criteria for describing level of effects. Sourced from Roper-Lindsay *et al.* (2018).

Site 1

Site 1 has been identified as currently being at ‘moderate risk’, and is referenced as the baseline for any additional inundation effects (GHD 2021, Figure 2). Effects will be mitigated by the lower elevations surrounding this site that will flood first, ensuring that the site will only be impacted during the highest rainfall events. Flooding has been hypothesised as a potential mechanism of dispersal for *Powelliphanta*; however, due to the extremely limited habitat within the catchment and wider area it is highly likely that displaced snails will be negatively affected during a significant flooding event (Buckley *et al.*, 2014). The adjacent area is grazed grassland, which does not contain suitable habitat because *Powelliphanta* species are prone to desiccation (Standish *et al.* 2002). The extent of flooding is unlikely to be changed by the proposed stormwater discharge and therefore the flooding of snails out of the site is unlikely to be impacted above and beyond what could occur in a significant flooding event. Extreme rainfall events may lead to additional duration and depth of flooding (predicted to be a 2.6 to

4% increase in flood level). However, this predicted increase in the depth and duration of flooding is relatively small and is considered unlikely to further negatively impact the snails above the existing baseline, particularly because this area is already experiences flooding due to high flows. As the magnitude of effect is considered negligible ('very slight change from baseline conditions') we consider the overall level of effect of the proposed stormwater discharge to be 'low' at this site.

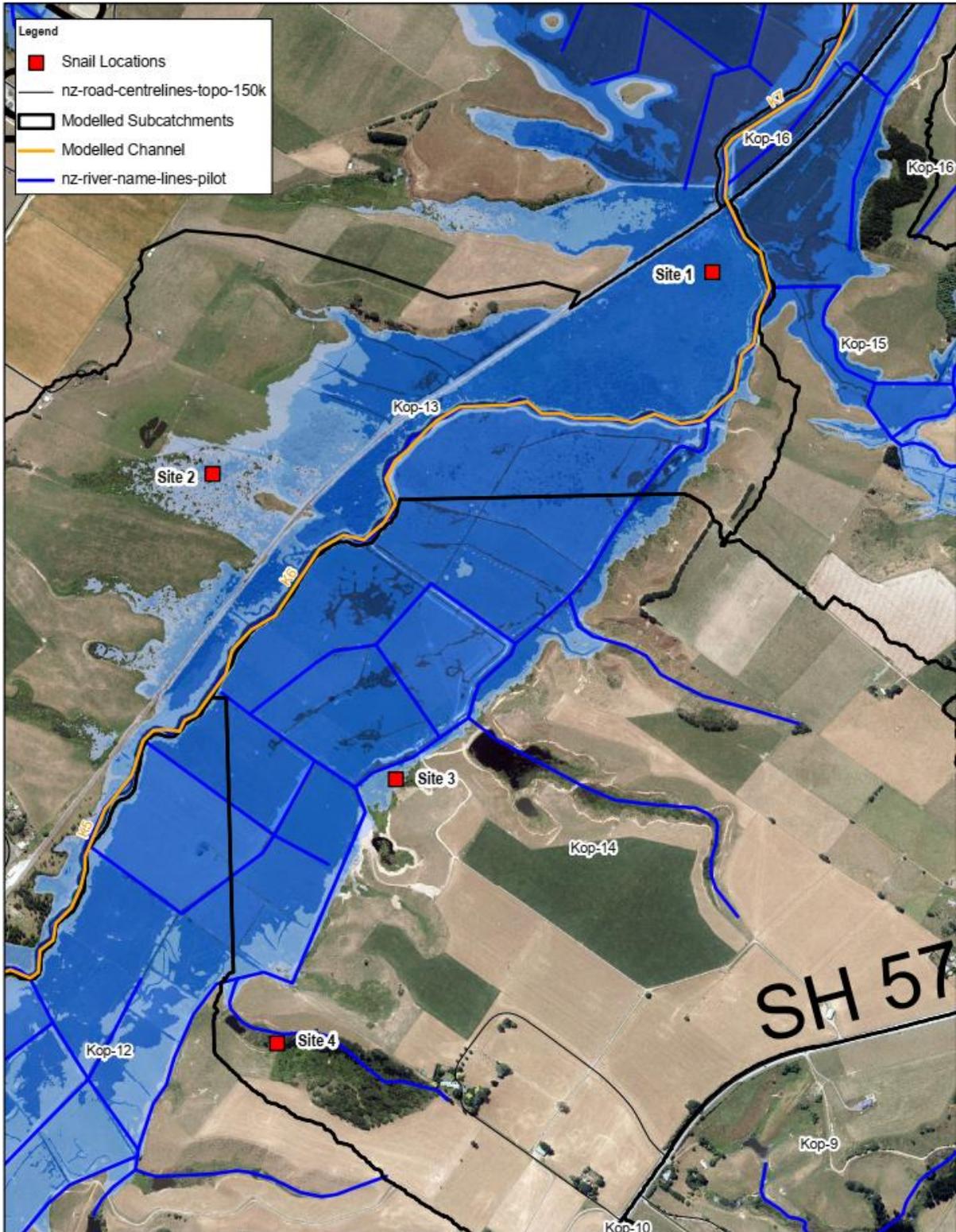


Figure 2. Overview of the Koputaroa Stream area with identified snail sites. The blue shading indicates lower elevation, which has been used as a proxy for flooding risk. Figure reproduced from GHD (2021).

Site 2

Site 2 is located on the opposite side of existing KiwiRail tracks adjacent to Koputaroa Stream, and in area of marginal flood vulnerability (Figure 3). Hydrological modelling suggests that most of the backed up-flow and/or additional water volume will be retained by the rail

embankment rather than spilling into the identified snail habitat. Figure 2 suggests that there may be minor water inundation within the identified snail habitat in significant flooding events, the impact of which is likely to be negligible. However, if snails are found in the contiguous habitat to the northeast of Site 2, they are likely to be adversely affected by a flooding event. The effects of the proposed stormwater discharge are unlikely to be above what would already occur during a significant flooding event. Based on the above assumptions there is unlikely to be any impact above-and-beyond what will already occur at the site. As the magnitude of effect is considered negligible, we consider the overall level of effect of the proposed stormwater discharge to be 'low' at Site 2.



Figure 3. Contiguous habitat (red outline) to Site 2 that may support *Powelliphanta* and will be impacted in a significant flooding event. The blue shading indicates lower elevation, which has been used as a proxy for flooding risk.

Site 3

Site 3 is expected to be inundated from the stream only during the most severe rain events. The stormwater modelling predicts that water inundation within this area is likely to be low during these events with adjacent habitats remaining dry. This suggests that snails could survive the minor flooding that could occur during a significant rain event. The potential adverse effects of the proposed stormwater discharge above the existing baseline in this area are likely to be immeasurable and we therefore consider the magnitude of impact to be negligible. As such, the overall level of effect is considered 'low' at Site 3.

Site 4

Site 4 is located outside of the low-lying vulnerable areas identified in the Stormwater Modelling Report and no adverse effects are expected from the proposed stormwater discharge or a significant flooding event. Therefore, we consider that there will be no adverse effects on *Powelliphanta* at Site 4 from the proposed stormwater discharge.

A summary of the magnitude and level of effects for each site is presented below in Table 1.

Table 1: Magnitude and level of effect on *Powelliphanta* from stormwater discharge at four sites along Koputaroa Stream catchment prior to effects mitigation.

Species	Ecological Value	Impacted Sites	Magnitude of effect	Level of effect
<i>Powelliphanta traversi</i>	Very High	Site 1	Negligible	Low
		Site 2	Negligible	Low
		Site 3	Negligible	Low
		Site 4	None	None

LIMITATIONS OF OUR ASSESSMENT

- The potential adverse effects of flooding on *Powelliphanta* species are poorly understood.
- *Powelliphanta traversi koputaroa* is a cryptic species that is vulnerable to predation by invasive mammals. The records of this species being present in the catchment are not recent, therefore it is uncertain whether *Powelliphanta* populations are still present at sites 1-4.

CONCLUSION

Powelliphanta traversi koputaroa were noted as being ‘close to extinction, requiring urgent and active management’ (Meads *et al.* 1984). The small populations within the fragmented landscape are highly vulnerable to pressures such as habitat loss and modification, introduced predators, and stochastic environmental factors such as extreme flooding events. Significant flooding events have a high potential to negatively affect the small known populations of snails within the Koputaroa Stream catchment because of the small total area and fragmented nature of suitable habitat for this species. Snails have the ability to actively migrate during flooding, but are unable to escape rapid flooding (Nicola and Ansart 2017); however, this is not likely to occur as a result of the proposed stormwater discharge; instead, a gradual rise is predicted only when the Manawatū River floodgate is closed, in which there is a minor change to the volume of water from baseline conditions. No research has been presented on the ability of *Powelliphanta* to migrate during flooding events to avoid impact, and considering the small fragmented nature of the remaining habitat we anticipate that the additional depth and duration of flooding predicted may have a negligible to low level of effect.

Flooding associated with the proposed stormwater discharge is only likely to occur in exceptionally rare circumstances, and based on the hydrology assessment it is likely that these events would not have a significantly higher impact above-and-beyond the existing baseline at Sites 1-4. We consider the level of the effect on *Powelliphanta traversi* at Sites 1-4 from the proposed stormwater discharge to be low on this basis, therefore no effects mitigation is likely to be required at these sites as per Section 5 of the Resource Management Act (1991).

While not required by the Resource Management Act, mitigation implemented at some or all of these sites would likely result in a ‘net gain’ for the *Powelliphanta* species. Mitigation could be implemented by increasing indigenous planting around the impact zones such as with *Phormium tenax*, *Carex lessoniana* and *Gahnia xanthocarpa*. These species will help to

dissipate and absorb overland flows as well as increase available habitat and to possibly create linkages between sites. All plant species used for mitigation planting should be sourced from the Manawatu Plains Ecological District, and an Ecological Management Plan should be prepared in order to guide site preparation, plant species and numbers, and maintenance. .

A survey could be carried out to ensure the species is still persisting within the catchment and thus establish a baseline for future monitoring. If requested, surveying could be carried out using spotlighting during warm, moist nights particularly after a long dry period when snails are most likely to be active. We recommend mitigation planting, however, over surveying as a mitigation action on the basis that surveying can be damaging for the species and destructive to their habitats.

If you have any queries, please do not hesitate to contact us.

Yours sincerely



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