

Appendix 3

Stormwater Servicing

To The District Planning Team
From Carey Senior – Awa Environmental

26 January 2024

Subject Private Plan Change 83, The Rise – Stormwater

1. INTRODUCTION

1.1 I have been engaged by Kaipara District Council to provide a stormwater engineering technical review in relation to Private Plan Change 83 to the Operative Kaipara District Plan 2013, which relates to The Rise/Cove Road, Mangawhai.

1.2 I have undertaken a technical review of the stormwater elements proposed in the lodged plan change application, including a review of additional reports provided post- lodgement.

1.3 In this memorandum I address the following matters:

- (a) Summary;
- (b) Background;
- (c) Comments on Land Development Report - Stormwater (Chester);
- (d) Comments on Stormwater Management Plan (Chester); and
- (e) Comments on Flood Risk Assessment (Chester).

2. SUMMARY

2.1 Chester have provided a comprehensive and principled approach to the management of stormwater within the proposed PPC area. In my opinion, the provisions outlined within the Stormwater Management Plan will ensure that future development activity will be appropriately managed within the re-zoned area and will not adversely affect the downstream environment. Water quality outcomes are achieved with by adopting an industry best practice approach that is conservative yet flexible.

2.2 Flood risks have been appropriately identified and suitable mitigation requirements have been proposed to ensure that future development impact is maintained to the same level as

the existing greenfield scenario. I support the SMP requirement to require stormwater neutrality runoff for the 5-year, 10-year, and 100-year ARI rainfall events.

2.3 Based on my review of the stormwater documentation that has been submitted in support of the proposed PPC, I consider that the impact of the proposed re-zoning on stormwater runoff and quality has been suitably addressed. I support the proposed stormwater management provisions.

3. BACKGROUND

3.1 This memorandum is prepared on behalf of Kaipara District Council, and should be read in conjunction with and inclusive of the following documents:

(a) Cove Road & Mangawhai Heads Road, Mangawhai Land Development Report - The Rise Private Plan Change – PPC83 dated 15th December 2023.

(b) Cove Road & Mangawhai Heads Road (West), Mangawhai Stormwater Management Plan – The Rise Private Plan Change – Rev 0 dated 24th January 2024.

(c) Cove Road & Mangawhai Heads Road, Mangawhai Flood Assessment Report – The Rise Private Plan Change – Rev 0 dated 24th January 2024.

3.2 The Rise Limited (**TRL**) have applied for a Private Plan Change (**the plan change**) to the Kaipara District Plan (**ODP**) to rezone and modify planning provisions on 56.9 hectares of land at The Rise/Cove Road, Mangawhai. The private plan change application proposes rezoning of Rural zoned land to Residential zoned land, and the creation of the “Cove Road North Precinct” over the rezoned land.

4. COMMENTS ON LAND DEVELOPMENT REPORT

4.1 The Land Development Report has been prepared by Chester Consultants Ltd.

4.2 The Land Development Report proposed that due to the re-zoning, stormwater management within the PPC area would be governed by precinct rules based on a modification of Chapter

13 Residential Conditions outlined in the ODP. These rules are proposed within the Cove Road North Precinct and primarily relate to the increased impervious coverage that is proposed, as well as increased water quality and discharge mitigation measures.

4.3 Permeable surface coverage is proposed to be increased to 60% maximum coverage. A detailed assessment of the appropriate mitigation for stormwater impact due to the PPC re-zoning is outlined within the Stormwater Management Plan.

4.4 The Land Development Report proposes the stormwater management should follow the principles and toolbox of options that is outlined in the SMP, and specific requirements are also legislated within the Cove Road North Precinct provisions. I support this approach. Review of the Stormwater Management Plan is included in this memorandum.

5. COMMENTS ON STORMWATER MANAGEMENT PLAN (SMP)

5.1 The SMP has been prepared by Chester Consultants Ltd.

5.2 The SMP has noted that the maximum impervious area for the PPC zone is proposed to be raised to 60% site coverage, which is an increase from 40% as currently permitted in the Kaipara District Plan 2013. Consideration has been given within the SMP to measures to mitigate the expected increase in stormwater peak flowrates (runoff), stormwater volume (runoff), and the degradation of stormwater runoff quality. I agree that these are the primary aspects to focus on and mitigate to ensure a low impact sustainable re-zoning outcome.

5.3 Stormwater runoff volume increase generated by low intensity / high frequency rainfall events has a known impact on stream erosion and poor ecological outcomes, and therefore the applicant has proposed the stormwater strategy of adopting an Auckland Council 'SMAF' approach, which is outlined in Guidance Document 01. This requires retention of rainfall within a site (which may include re-use and/or infiltration to ground), as well as detention of runoff. A 1/3 of the 2- year ARI rainfall is proposed as the design rainfall event that should be utilised to reduce stormwater runoff volumes within the PPC area. I believe this approach is consistent with industry best practice, and the applicant has adopted similar performance requirements to those outlined by local Council stormwater codes of practice, as well as other

governing planning documents, such as District & Regional Plans. The approach is similar to the strategy and specified parameters outlined within the Auckland Unitary Plan as one example.

- 5.4 Stormwater peak flowrates have been identified as a key metric that impacts downstream public infrastructure, as well as overland flow paths and areas of flooding. In order to ensure the zone complies with the Kaipara District Plan, the SMP outlines a requirement for all developed areas within the PPC to attenuate peak runoff flows for the 5-year ARI rainfall (residential zones) and the 10-year ARI rainfall (rural road culverts) to pre-development rates (predevelopment is noted to be a greenfield scenario). The SMP notes that due to the assessed flooding that occurs downstream and within the PPC area, developments will also need to demonstrate attenuation of peak flows to maintain or reduce pre-development runoff during a 100-year ARI rainfall event.
- 5.5 The SMP has investigated (with reference to the PPC Flood Risk Assessment) alternative approaches to minimising the impact of increased stormwater flows from the PPC area, such as increasing the capacity of specific downstream culverts or increasing road levels to reduce flood water levels. Their assessment has concluded that the culvert capacities are primarily impacted by tidal impact and flooding has been modeled to show no improvement with larger culverts (particular attention is given to the twin culverts under Mangawhai Heads Road (West)). I support the proposed strategy to limit the peak runoff from the PPC to the existing 'greenfield' runoff rates during a 100-year rainfall event. I believe this is a conservative and suitable outcome for this development catchment.
- 5.6 Water quality has been considered as part of the SMP and the plan generally follows the principles of Auckland Council's GD-04 Water Sensitive Design, and the toolbox of devices outlined in Auckland Council's GD-01 Stormwater Management Devices publication. The SMP requires water quality treatment to be considered for all potential contaminated surface runoff but allows for a wide range of treatment options to promote a design that is appropriate to the development impact. This provides overarching principles for consideration at the resource consent stage, and thereby protects water quality outcomes, while still allowing flexibility to ensure efficient and practical future solutions.

5.7 In my opinion, the SMP proposes suitable measures to manage stormwater runoff within the PPC area and will achieve the purpose of minimising or eliminating the impact of future development activities on people and the environment.

6. COMMENTS ON FLOOD RISK ASSESSMENT (FRA)

6.1 The FRA has been prepared by Chester Consultants Ltd.

6.2 The FRA has considered all contributing catchments that would contribute flow into the PPC area and has considered the flows through the PPC area and the consequent downstream flood impacts. A detailed hydrological model has been developed, utilising unsteady flow analysis for the 10-year and 100-year ARI rainfall events (using HEC-HMS hydrograph to produce flowrates for the design storm). The design hydrographs have been incorporated into a 2D overland flow model using HEC-RAS with appropriate parameters for site coverage, roughness, and boundary values. I am familiar with the modelling approach taken and support this methodology and basis of analysis. While a sensitivity analysis was not included, nor any clear validation of model results based on historic flood data (which may not be available in the modeled catchment), I have confidence that the flooding extent and reported outcomes are accurate.

6.3 The FRA outlines the flood inundation that occurs within and downstream of the PPC area for the current catchment scenario during a 10-year ARI event and a 100- year ARI event. The results demonstrate existing scenario flooding occurs within the PPC area as well as downstream of the zone. The flooding is primarily in close proximity to the existing natural gullies and watercourses.

6.4 The FRA has assessed the maximum probable development (**MPD**) scenario, comprising 60% maximum impervious coverage for residential zoning, as well as incorporating public roads at 85% impervious coverage. The resultant flooding is increased in extent and depth when compared to the pre-development flood results. Therefore, the FRA concludes that flood mitigation measures are required to ensure that the downstream environment is not adversely affected by the PPC re-zoning.

- 6.5 There is a significant watercourse and flow path that passes through the twin 1200mm diameter culverts on Mangawhai Heads Road (West). Chester Consultants have provided a detailed assessment of the impact of the culverts on the flood risk has and have run model scenarios with upgraded culvert diameters. The results indicate that tidal influence establishes a lower boundary flood level to the catchment (which semi-submerges the culverts) and the model results confirm that upgrading the twin culverts does not reduce the flood extent or depths caused by increased development activity within the PPC area. Upgrading of the culverts to mitigate an impact of flooding due to the PPC re-zoning is therefore not proposed.
- 6.6 Due to the presence of flooding downstream of the PPC area, and the inability to measureably reduce the flood results with infrastructure improvements, Chester Consultants have proposed that mitigation of the 10-year and 100-year ARI rainfall events be managed at source. This approach provides flexibility of design to future developers and allows for suitable management of costs associated with the progress of development activity. Flood risk mitigation implementation and associated costs are proposed to be the responsibility of each developer and would be assessed in detail at the land use consent stage.

Attachment A – Qualifications and Experience of Carey Senior

My full name is Carey Henry Douglas Senior.

I have been a Director and Principal Civil Engineer at Flowpath Engineering Consultants since establishing the consultancy in 2019. I am currently engaged by Awa Environmental to lead the Three Waters Engineering Team in Auckland.

I hold the qualifications of Bachelor of Engineering with Honours (Natural Resources) from the University of Canterbury. I have been a Chartered Professional Engineer for 13 years and am a member of Engineering New Zealand.

I have twenty-two years of consulting experience as a professional civil and environmental engineer, with the last 14 years of my work experience being based in Auckland.

I have worked on major infrastructure projects for Auckland Council, Wanganui District Council, and Tauranga City Council as well as other local councils and regulatory bodies. My practice experience in the last decade has primarily involved the civil engineering design and construction observation of residential developments in both green and brownfield locations. Project works have included many flood risk investigations and stormwater management plans. I also have consulting experience in master-plan projects in Auckland.