BEFORE INDEPENDENT HEARING COMMISSIONERS
APPOINTED BY THAMES COROMANDEL DISTRICT COUNCIL

IN THE MATTER	of the Resource Management Act 1991
AND	
IN THE MATTER	of the hearing of submissions to Variation 3 to the Proposed Thames Coromandel District Plan (Taiwawe Catchment Structure Plan)

SUPPLEMENTARY STATEMENT OF EVIDENCE OF MICHAEL GEORGE CHAPMAN ON BEHALF OF HOT WATER BEACH (NZ) LIMITED

Dated 31 March 2021

Qualifications and Experience

1. My name is Michael George Chapman. I currently hold the position of Director – Stormwater Engineer with Te Miro Water Consultants Ltd in Cambridge. My qualifications and experience are as set out in my primary statement of evidence.

Code of Conduct

2. I confirm that I have read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2014 and that I agree to comply with it. I further confirm that I have considered all the material facts that I am aware of that might alter or detract from the opinions that I express, and that this evidence is within my area of expertise, except where I state that I am relying on the evidence of another person.

Scope and Preliminary Comments

3. This supplementary statement addresses matters raised in the Supplementary s 42A Report tabled at the hearing on 15 March 2021, as it relates to stormwater management issues within my area of expertise and as previously addressed in my primary statement.

4. Firstly, I wish to reinforce that the significant re-vegetation programme results in a net positive outcome for stormwater management. The entire philosophy of water sensitive design and mitigation of adverse stormwater impacts from new development is based on having to deal with increased runoff volume and peak flow through various treatment/attenuation solutions which are very catchment specific. There is no longer one single ‘pipe to pond or wetland’ solution assuming all catchments should attenuate based on a perceived downstream flood risk.

5. In all cases as stormwater engineers, we simply try to replicate a natural drainage regime as far as possible with indigenous tree/shrub coverage. The issue normally is that extensive native vegetation no longer exists and typically cannot be replicated as part of a new development due to space constraints and yield requirements. But, if possible, by reintroducing native planting, we strive to provide balance and enhance the water cycle – it is by far the best way to replicate a natural system if space allows and there is willingness.

6. In my 20 years of working on stormwater solutions and catchment management plans I have never been in this unique and fortunate situation whereby there is a commitment to undertake significant re-planting that will, in net overall terms, reduce runoff volume and peak flows (notwithstanding the other ecological, cultural and amenity benefits of the re-planting).

7. In most instances the objective is to provide (at best) a 'drainage neutral' approach whereby pre and post development peak flows are matched, however the overall volume is always increased. Indeed, drainage neutral is not strictly correct as only peak flows are matched according to best practice guidance.

8. This is not the case for Taiwawe. We go beyond drainage neutrality. A spreadsheet analysis which I have now completed in preparing to write this response to the Supplementary s42A Report shows that, for the 2 year typical channel forming and 100 year flood event, peak flows from the site are reduced by approximately 10% and overall runoff volume is also reduced. A catchment runoff summary is **attached** as Appendix A to this statement.

9. The issues about the validity of the proposed 'pass it forward' approach raised in the Supplementary s42A Report are therefore somewhat of a moot point, e.g. in terms of stormwater adding to flows downstream, or coinciding with flows from other parts of the catchment. Whatever combination of flows results, will be less than under the existing situation, not more or worse.

10. By 'pass it forward' I am expressing my professional opinion that there is no need to provide attenuation (e.g. basins or stormwater attenuation ponds) for new road impervious areas, as would ordinarily be the recommended solution. But I should clarify that even if there was an increase in volume and flow – which there is not due to the scale of re-vegetation - I would still recommend a pass it forward approach, so that flows from the Structure Plan land do not coincide with flows from (particularly the upper areas) of the wider 450ha catchment surrounding the site. I discuss this at paragraph 2.2 of my original statement (and the point is covered on Page 9 of the report attached to that statement).

11. For these reasons also, I do not believe a catchment scale hydrological/hydraulic model (as suggested at paragraph 59 of the Supplementary s 42A Report) would show

otherwise, or any discernible result given the graphical assessment in Appendix A showing flows and volumes are less, and in my opinion, a model would not change the stormwater management approach for Taiwawe. I would certainly undertake such an assessment if the scale of new development were larger in respect to the remaining catchment area, and impervious areas were proposed to connect directly to streams with no re-vegetation proposed as mitigation.

12. I now address specific comments in the s42A supplementary report in the following table.

S 48 and 49	Noted and addressed below
S 50	Noted
S 51	Agree– Source for Figure 4 is Figure 8-34 WRC Stormwater Guidelines
S 52	It is my understanding that TCDC is now a member of the Waikato LASS joining close to the end of 2020. https://waikatolass.co.nz/about-us/our-councils/ Regarding management of siltation during construction, this will be addressed in detail during resource consent and construction phases. The WRC Erosion and Sediment Control – Guidelines for Soil Disturbing Activities and The Erosion and Sediment Control Plan and Preparation Guideline is referenced in the RITS and relevant New Zealand Standards – both documents will be followed at resource consent and construction stages to manage siltation.
S 53	Noted – actual road impervious is 2ha, residential roof and associated hardstand estimated at 7,500sqm, making a total of 2.75ha of additional impervious area. Full details are set out at page 3 of the report.
S 54	Agreed - there are two other catchments that connect to the Taiwawe stream prior to outlet to the coast. These are as identified on Figure 1 A and B of the s42A report. In this respect the site area (~38ha) and balance of the site catchment (450ha) can be referred to as 1 of 3 sub catchments whose confluence is close to the coastal outlet. Of these, the site catchment (at 450ha) is the largest contributing catchment.
S 55	The 'bottleneck' referred to is what I understand to be the build-up of sand at the estuary/river outlet within the beach foreshore. All three catchments outlet to this point. The bottleneck is due to seasonal coastal processes accretion and erosion of sand balance at the beach

	although coastal processes are outside my field of expertise and I have not looked in detail at the issues related to this bottleneck in terms of flood risk. At this point I wish to reinforce the message that this is a net positive situation due to the re-vegetation reducing volume and peak flow compared to the current land use. An estimated 10% reduction in peak flow is achieved by re-vegetation at Taiwawe for the 2 year and 100 year events. Total runoff volume also decreases compared to existing runoff volume, which is highly unusual for new development, typically only achieved through large scale soakage or re-vegetation. The reduction assessment is based on runoff from the current farmland + existing bush compared to future farmland + existing bush + re-vegetation + impervious areas. A reduction in volume and peak flow is a hydrological enhancement and an improvement over the status quo. The re-vegetation measures go beyond simply adopting a drainage neutral approach which seeks only to match existing and future peak flows but not reduce those flows or indeed overall runoff volume. Any combination of peak flows coinciding at the bottle neck will be reduced as a result, and (regardless) the combination could actually be worse if stormwater from the structure plan land is attenuated/retained (rather than passed forward) as it would then be more likely to coincide with flows from the upper catchment areas surrounding the site.
S 56	Noted as per Point 54. There are two other catchments that discharge to the tidal estuary. The main Taiwawe Stream catchment encompassing the site is 450ha or ~2/3 the entire area contributing flow to the estuary (ref as 735ha – NIWA).
S 57	It is advisable to let flows from the site pass through before the main peak from the wider catchment area arrives at the estuary. At the risk of coinciding with flow from the other two smaller catchments, it is still better than coinciding with the peak flow from the upper areas of the largest catchment which is 450ha encompassing the site. However, the pass it forward approach is a moot point because overall, runoff volume and peak flow is less than existing flows and volumes due to the re-vegetation programme. The beneficial impacts of replanting cannot be underestimated, noting the house lots (roof, parking areas) are some distance from the stream/gully heads (with reference to the building platform locations in the landscape plan). Runoff from water

	supply tanks and hardstand will therefore be by diffuse flow to the ground e.g. flush kerb or similar surrounding a parking area next to the house. No direct pipe connections will be permitted to streams/gullies and it would not be practical to do so being some 10's or 100's of meters away. In short, in my opinion the 'pass it forward' approach is correct and does not need to be reconsidered.
S 58	As above, peak flows will be less for the post development phases, but also it is better to add to increased flows from two smaller catchments than add to the main peak flow from the upper areas of the main 450ha catchment.
S 59	I do not believe a detailed hydrological model is warranted when the increase in impervious area is out-weighed by the substantial increase in re-vegetation. This is supported by the new vegetation approach presented in the WRC stormwater guideline (s.8.5.9.5 WRC May 2020), and my spreadsheet runoff assessment of existing and future runoff which shows volumes and flows are less for 2 year and 100 year events.
S 60	Noted – setting floor level for the house at Lot 25 will be subject to detailed design and flood assessment at resource consent stage. The lot suitability for a residential dwelling can be reassessed and confirmed (or otherwise), as necessary following this process. The actual building platform (on the southern lot boundary) is above the 5m RL contour. This is above the coastal inundation and tsunami low hazard zone.
S 61	In my opinion, there is no "contradiction" between swale management and pass it forward philosophy, as suggested by Ed Varley. Swale sizing is important to convey primary and secondary flow; however, I suggest this be a matter for subdivision - there being no reason or constraint against a sufficiently sized swale being provided for any of the road areas. 1st bullet point: The Pass it forward approach refers to less frequent storm events at significantly greater flows for example the 10 year and 100 year events. The water quality rain event which is 1/3 of the 2 year or ~50mm over 24hrs will be treated by planted swales at slower rates. These frequently occurring flows relate to small first flush rain events which carry the highest contaminant yields. Larger storm flows – following the first flush event - will still pass through the swale network under the pass it forward approach, in such instances the swale network is needed for conveyance not for water quality treatment purposes.

	Check dams can also be incorporated into planted swale sections with grades steeper than 10% as per the RITS – this is a matter of detailed design when the earthwork model and road long sections are finalised. 2nd bullet point: the report is saying that roadside planted swales provide benefits in terms of treating water quality, and this is correct for first flush runoff from smaller events. During larger events flows will be conveyed along the swale network or disperse overland depending on the contour the accessway is passing through. 3rd bullet point: Planted swales by their porous nature will provide a degree of infiltration although they will not be designed with underdrains (to discharge the 10 year primary event to ground for example). Surface water from housing will be via overflow from water supply re-use tanks and from parking/hardstand areas. House sites are all positioned some distance away from gully/streams (and so there is no other option other than to discharge flows diffusely across ground). Acknowledging the limited capacity for infiltration within the site soils, the lots are all located on moderate sloping ground and so there should be no issues in managing runoff as shallow sheet flows are dispersed across ground from turning areas and any overflow from domestic water supply re-use tanks. 4th bullet point – It is difficult to provide flow calculations for swale sizing at this stage because the accessway long sections/earthworks model has not yet been finalised. However, the Dunwoodie and Green typical sections have been amended to show a typical swale section adjacent to the road (as produced by Mr Green). Most importantly, at the structure plan stage, we know the road network is not constrained by space as would be the case for a high density development. There is ample room available to incorporate swales of sufficient size at the resource consent design stage. Likewise, cross connection culverts may also be required at sag points with design details provided at resource consent. 5th bullet point: the road network follows generally the ridge lines where groundwater levels are deep. The swales will not be designed with underdrains to percolate water, other than what will naturally percolate through via plantings. The remaining points are as covered above.

Michael George Chapman

31 March 2021

APPENDIX A

Summary by Mike Chapman	29/03/2021			
Taiwawe Catchment ~450ha				
SCS graphical method - Peak Flow and Runoff Volume Assessment				
Based on runoff from 38ha site area only				
	Peak Flow (m^3/s)	Runoff Volume (m^3)	Land Use Type Areas (ha)	
2 year existing	2.0	24,460	Total site area	38.0
2 year future	1.7 ↓	24,349 ↓	Ex bush	9.2
100 year existing	4.8	91,920	Ex farmland	28.8
100 year future	4.2 ↓	91,690 ↓		
			Proposed re-vegetation (13.6) + Ex bush (9.2)	22.8
Rainfall Total	24hr Total (HIRDS)		Proposed total new impervious	2.75
2 year	151mm		Balance remaining farmland	12.5
100 year	367mm		Total site area	38.0
Soil Type B	CN			
Pervious Bush or Re-Vegetatior	55			
Pervious Farmland	61			
Impervious road/house	98			