BEFORE	Independent Commissioners appointed by Tasman District Council
IN THE MATTER	Of the Resource Management Act 1991
AND	
IN THE MATTER	Of an application by CJ Industries Ltd for land use consent RM200488 for gravel extraction and associated site rehabilitation and amenity planting, for land use consent RM200489 to establish and use vehicle access on an unformed legal road and erect associated signage, and for a discharge permit to discharge cleanfill to land RM220578

REPLY EVIDENCE OF SIMON JAMES AIKEN ON BEHALF OF CJ INDUSTRIES LTD
FLOODING

21 April 2023

1. INTRODUCTION

1.1 My full name is Simon James Aiken. I am a Senior Water Resources consultant at Tonkin & Taylor Ltd ("T+T"). My qualifications, experience and involvement in the project are outlined in my Evidence in Chief.

1.2 The applicant has applied for resource consents authorising the extraction of gravel, stockpiling of topsoil, and reinstatement of quarried land, with associated amenity planting, signage and access formation at 134 Peach Island Road, Motueka:

(a) RM200488 land use consent for gravel extraction and associated site rehabilitation and amenity planting, and

(b) RM200489 land use consent to establish and use vehicle access on an unformed legal road and erect associated signage.

1.3 The applicant has also applied for a discharge permit authorising the discharge of contaminants to land, in circumstances where the contaminants may enter water (RM220578).

1.4 My Evidence in Chief address the flood risk associated with the activity for which consent is sought and responded to issues raised in submissions and in the Tasman District Council's (TDC) 42A report.

Purpose and Scope of Evidence

1.5 The purpose of my reply evidence is to respond to matters relating to flooding and erosion. Specifically, submissions and technical evidence from:

(a) Ollie and Natalya Langridge

(b) Hannah Mae

(c) Valley RAGE Memorandum of Counsel

(d) Peter Taia

(e) Dr Mike Harvey

Code of Conduct

1.6 I have read the Code of Conduct for Expert Witnesses in the Environment Court Practice Note 2023 and I agree to comply with it. My evidence is within my area of expertise, however where I make statements on issues that are not in my area of expertise, I will state whose evidence I have relied upon. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed in my evidence.

2. EXECUTIVE SUMMARY

2.1 At the direction of Commissioner Craig Welsh expert caucusing was undertaken on the 14th of February 2023 between:

(a) Mr Giles Griffith (Tasman District Council)

(b) Mr Simon Aiken (T+T) on behalf of the Applicant

(c) Dr Mike Harvey on behalf of Valley RAGE

2.2 At the conclusion of the caucusing a Joint Witness Statement (JWS) was issued on the 6th of March 2023 that dealt with the matters raised by the Council Officers Memorandum (issued 2nd February 2023), including matters raised in my supplementary evidence on pit erosion dated 19th December 2022. Where appropriate, the recommendations from the JWS have been incorporated into the applicant's volunteered conditions.

2.3 Having considered the comments from submitters and Council dated 7 April and 14 April respectively, I have not changed the opinions in my evidence in chief.

3. EVIDENCE

3.1 In response to the applicant's additional information and updated conditions and management plans the submitters have commented on the following:

(a) The volunteered condition that separates the Stage 1 area into three tranches.

(b) Their view that limiting operations in the Stage 1 area to October-March increases the risk of erosion and environmental damage if flooding occurs.

(c) That the volunteered conditions will allow deeper extraction than previously proposed.

3.2 In response to 3.1(a), the volunteered condition breaks the Stage 1 area (approximately 25,000m^2) into three separate tranches. The submitters have interpreted this condition as an increase in the individual pit size from an area of 1,600m^2 to 8,300m^2. This interpretation by submitters is incorrect, the three-tranche limitation is in addition to the 80 m by 20 m pit size, not instead of. For clarity only a single gravel pit of approximately 80 m by 20 m will be operational at a single time. Figure 1 shows the relationship between the Stage 1 area, the proposed tranches and gravel pits.

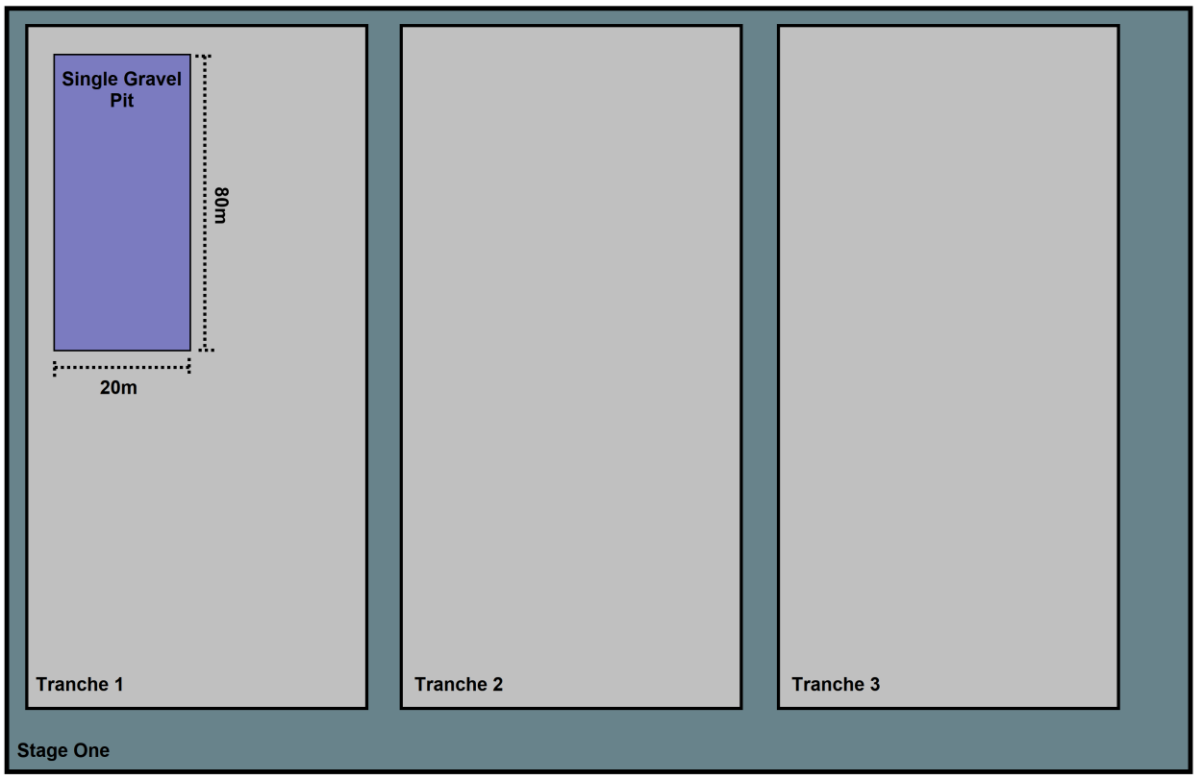

Figure 1 Schematic showing the relationship between the Stage 1 area, the proposed tranches and gravel pits.

3.3 The rationale for the volunteered condition is explained in the JWS and is twofold:

(a) By limiting seasonal operations to a single tranche, the applicant can focus on restabilising the site with good grass cover (80% tranche coverage) before beginning work on the next tranche. By establishing grass cover (similar to the existing floodplain) before beginning work on the next tranche the area of the Stage 1 floodplain that is potentially susceptible to erosion will be minimised.

3.4 This outcome of this approach[1] is supported by Dr Calum MacNeil with respect to consequential effects on surface water:

> "*In respect of keeping two thirds of stage 1 covered with vegetation and limiting quarrying / remediation to one third at a time, I would expect areas with established vegetation cover to be less subject to erosion than unvegetated areas. Therefore, I would expect this would reduce erosion risk and any consequent risk of sediment load discharge to recipient water bodies*"

[1] Supplementary evidence of Dr Calum MacNeil on behalf of CJ Industries Limited (Surface water quality and ecology) 16 March 2023

3.5 In response to 3.1(b) where submitters raised concerns that limiting operations in the Stage 1 area to October-March will increase the risk of erosion and environmental damage, the submitters have not provided any additional evidence on why limiting operations in the Stage 1 area to October-March will increase the risk of erosion and environmental damage. However, based on the statement (repeated below) by Dr Mike Harvey in the JWS and the Valley RAGE Memorandum of Counsel the origin of these statements is likely associated with the frequency and seasonality of flood flows.

> "*Dr Mike Harvey stated he was familiar with the Woodstock gauge record (located upstream of Peach Island) and that "a reasonable size flood event can happen at any time of the year, but suggests larger events are likely to be cyclonic driven events in the summer*".

3.6 In response to this I have conducted a simple maximum value (peaks over threshold) analysis on the Woodstock flood gauge. The Woodstock gauge has 55 years of record (1969 – 2023) and is appropriate for these purposes. The analysis was as follows:

(a) For each calendar year flow data was categorized by season.

(b) For each season (by year) the maximum flow value was extracted.

(c) These results were tabulated and compared against TDC's flood statistics for the Woodstock Gauge.[2]

Season/Return Period	**Number of Exceedances**				
	Annual	5 year	10 year	20 year	50 year
Autumn (March - May)	8	2	1	1	-
Spring (Sept – Nov)	8	2	-	-	-
Summer (Dec – Feb)	4	1	-	-	-
Winter (June – Aug)	8	6	3	3	1

Table 1: Tabulated maximum value and exceedance analysis results over the 55 Woodstock Gauge record.

3.7 The maximum value analysis suggests that:

(a) On an annual return period basis autumn, spring and winter have historically experienced a similar frequency of flooding.

[2] https://www.tasman.govt.nz/my-region/environment/environmental-data/river-flow/motueka-a-woodstock/

(b) For higher magnitude events (>annual) the maximum flood flow has occurred more frequently in winter (when works will not be occurring).

(c) It is notable that no events greater than the 10 year are recorded in either summer or spring. This is the period when activity in the Stage 1 area will occur.

3.8 Based on the above I agree with Dr Mike Harvey statements in the JWS "*that a reasonable size flood event can happen at any time of the year*" but disagree that "*larger events are likely to be cyclonic driven events in the summer*". My conclusions are supported by Giles Griffith who stated in the JWS that he is:

> *"…not aware of any such correlation from his experience – and can be any time of year (and notes for datasets Woodstock gauge has longer history of records). But based on ten years' experience, any time of year, no apparent correlation".*

3.9 In response 3.1(c) where submitters, specifically point 9 raised in Valley RAGE Memorandum of Counsel (repeated below), state that the October to March operational window allows for deeper extraction:

> *"The Applicant proposes to quarry and place fill, subsoil and topsoil only during the months of October to March inclusive to ensure a cover is established before winter to reduce the risk of sediment discharges entering the Motueka River and/or Peach Island overflow channel (Dr MacNeil, Supplementary Evidence dated 16 March 2023, para 2.7) a) and to avoid quarrying in winter when groundwater levels are higher (Mr Aiken, JWS, page 4). <u>This would therefore allow deeper extraction</u>".*

3.10 The original proposal by the applicant did not constrain excavation activities by season. The interpretation that the October to March operational window this allow deeper extraction than originally proposed is incorrect.

3.11 I agree with Dr Mike Harvey that there is an unavoidable probability that the Stage 1 area may be inundated during normal operations. However, I disagree with Dr Harvey's interpretation of the flood records[3] (Table 2) provided by Coralie Le Frantz:

[3] Statement of evidence of Dr Michael Harvey on behalf of valley residents against gravel extraction (flood plain, stopbank and erosion impacts) dated 11 November 2022

"…Local records indicate that the backchannel where Stage 1 of the mining is proposed has been flooded 10 times between 2013 and 2022 (10 years), which indicates that the annual probability of flooding is approximately 100%..."

Year	No. of floods	Year	No. of floods
2013	3	**2018**	1 (Tropical Cyclone Gita)
2014	1	**2019**	0
2015	0	**2020**	0
2016	1	**2021**	2
2017	1	**2022**	1

Table 2: Flooding observations provided by Coralie Le Frantz

3.12 In addition to no information on the depth and duration of these flooding events further examination of the records provided by Coralie Le Frantz indicates that there were three years (2015, 2019 and 2020) where no flooding was recorded. This suggests that on an annual basis the probability of the back-channel flooding is lower than the 100% probability suggested by Dr Harvey. Contrary to paragraph 9 of the Memorandum of Counsel for Valley Rage, it was not "accepted by all the experts participating in the JWS" that large floods occur annually.

3.13 Dr Harvey raises concerns about the potential erosion of the extraction pit headwall and upstream erosion. He supports his opinions by reference to Douglas Road quarry. I acknowledge that pit erosion is possible; but draw attention to the following:

(a) The Douglas Road gravel pit is located on the main branch of Motueka River. Conditions experienced on the Douglas Road floodplain area during the July 17-18th 2021 flood event would be different to the conditions at proposed Peach Island Stage 1 works area.

(b) The July 17-18th 2021 flood event was an approximately 30-year ARI event. Therefore, the comparison between the head cut[4] erosion that occurred at the Douglas Road gravel pits with the inference that similar erosion could be expected to occur frequently (annually) at Peach Island is not appropriate.

[4] See Figures 6 and 7 from Statement of evidence of Dr Michael Harvey on behalf of valley residents against gravel extraction (flood plain, stopbank and erosion impacts) dated 11 November 2022

3.14 In terms of risk to the stopbanks and potential surface water impacts, I accept that there is an unavoidable probability that the Stage 1 area may become inundated prior to the backfill material becoming stabilised by grass cover. Should this occur:

(a) The direction of erosion of headwall erosion will be in an upstream direction[5], which, based on hydraulic modelling is generally away from the Peach Island stopbanks.

(b) Dr Harvey states that the potential erosion is increased when permissible velocities are exceeded. This statement is correct. However, in addition to the volunteered three tranche approach the applicant has proposed a twenty-metre-wide vegetated buffer strip adjacent to the Peach Island stopbanks. Considering that the existing pasture landcover prevents erosion of the floodplain it is reasonable to assume that the vegetated buffer strip will further decrease the potential for erosion and therefore minimize head erosion risk to the stopbanks.

3.15 It is outside my area of expertise to comment on the effect of eroded sediment on downstream receiving environments. In these matters I defer to Dr. Calum MacNeil's supplementary evidence[6] which deals with these matters in more detail.

3.16 In response Mr Peter Taia[7], I observe that Mr Taia's evidence largely deals with ecological matters outside of my expertise; however, I response to Mr Taia's statement below:

> "*The landscape assessment suggests the Stage 1 area is considerably altered and does not represent the original character of the locality. In my view the historical alteration, whether purposely altered or naturally changed, of both river and berm lands over time requires the site to continue to be maintained if not managed as a floodplain, particularly now as we are subjected to heavy rain events more frequently and intensely. The Tasman District Council (TDC) is currently working with landowners to reduce the vegetation that impedes or inhibits water flow from the flood plain during flood events, specifically where the Back channel intersects with the*

[5] See Barman et al (2018)
[6] Supplementary evidence of Dr Calum MacNeil on behalf of CJ Industries Limited (Surface water quality and ecology) 16 March 2023
[7] Statement of evidence of Peter John Taia on behalf of valley residents against gravel extraction (Landscape planting
and mitigation) dated 11 November 2022

Shaggery River prior to the Peach Island bridge. TDC plans to be able to clear the 'blockade' caused by the built-up vegetation to relieve high flood waters from the area"

3.17 Based on analysis of LINZ Aerial photography[8], LiDAR derived contours[9] and Google Street View[10] the area immediately upstream (200 m) of the Peach Island Bridge (where the Shaggery River intersects the Back Channel) is different to the proposed Peach Island Stage 1 area, located some 1,700 m upstream.

3.18 At the Peach Island Bridge location, the true left bank is constrained by the valley margin while the right bank is constrained by the Peach Island stop banks. The area immediately upstream of the bridge appears heavily vegetated. I agree that in this location there are impediments and potential blockages to flood flows.

3.19 The planting plan for the Peach Island Stage 1 has been developed to manage flood risk (i.e., not impede or inhibit flood flows) through the following measures:

(a) Species selection will maximise smaller flaxes and sedges that can "fold away" during large flood flows.

(b) Planting will occur parallel to flood flows and

(c) The central area of the floodplain will be cleared of the current woody vegetation and reinstated as clear pasture.

3.20 These measures have included input from Tasman District Council's (TDC) River Engineering specialist.

3.21 As part of the rehabilitation of the Whakarewa Street stopbanks planting similar to what is proposed for Peach Island was undertaken (see Figure 2)

[8] Basemaps | Land Information New Zealand (LINZ) accessed 15th November
[9] https://www.topofthesouthmaps.co.nz/app/ accessed 14th November
[10] https://goo.gl/maps/b7owXFSSXTUreNry6 accessed 15th November

Figure 2: Planting of the floodplain as part of Whakarewa Street stopbank improvements

3.22 Based on the points raised above and matters presented in my prior evidence Mr Taia has not presented any new information that would change my previous conclusions.

4. CONCLUSION

4.1 The applicant's volunteered conditions, in particular the tranched approach for the Stage 1 area are a pragmatic and reasonable approach for stabilisation of the backfill material and minimisation of erosion during flood events. In my opinion this approach is aligned with the best practical option framework within the RMA and is proportional to the flooding risk and effect (as described by others) present at the site.

4.2 Based on the above and matters presented in prior evidence there is no new evidence to or information that would change my previous conclusions.

Simon Aiken

21 April 2023