BEFORE INDEPENDENT HEARING COMMISSIONERS APPOINTED BY THE TASMAN DISTRICT COUNCIL

IN THE MATTER OF	The Resource Management Act 1991
AND	
IN THE MATTER OF	Application for resource consent by **Māpua Community Boat Ramp Trust**

STATEMENT OF EVIDENCE OF GARY CHARLES TEEAR

COASTAL ENGINEERING & PROCESSES

Dated: 1 November 2024

McFADDEN McMEEKEN PHILLIPS
LAWYERS

Level 2, 241 Hardy Street
Nelson

P O Box:	656
DX:	WC 70016
Phone:	+64 3 548 2154
Solicitor:	Nigel McFadden (nm@mmp.co.nz)

1. QUALIFICATIONS AND EXPERIENCE

1.1 My full name is Gary Charles Teear. I have the following qualifications: BE(Hons)(1st class) Civil Engineering, MCom(Hons) Economics, and the Coastal Studies paper at MSc level (Geography), University of Canterbury.

1.2 I am a Chartered Professional Engineer (CPEng) #34736 with a current practising certificate and a Chartered Member of Engineering NZ. I am currently a director of OCEL (Offshore & Coastal Engineering Ltd.) and have held that position since 1992.

1.3 My previous work experience includes Port and Harbour engineering - breakwater, wharf and coastal protection structure design, dredging, wave action, sediment movement - and Offshore engineering - structures, fixed and floating, moorings, pipelines and subsea engineering. My academic qualifications have been complemented by my practical qualifications and experience as a commercial diver to saturation level and surfing experience both as a surf competitor and a surf boat operator.

1.4 I am an experienced boat owner and operator. Consistent with OCEL's practical 'hands on' ethos, OCEL has a 7 m long power boat under MOSS (Marine Operator Safety System) used for diving support and survey work, plus inflatable boats for surf work.

1.5 I am fully familiar with the Mapua coastal environment having previously undertaken design and inspection and coastal processes analysis work there, respectively, on the wharf , marina and harbour entrance. I also have experience operating boats in the entrance channel.

1.6 My role in relation to the Mapua Boat Ramp Community Trust's (MBRCT)application to construct a boat ramp at Mapua on the west bank of outlet/inlet channel to the West end of the Waimea Estiary.has been to provide advice in relation to coastal engineering and coastal processes.

1.7 In preparing this statement of evidence I have considered the following documents:

- submissions relevant to my area of expertise;
- section 42A report
- The NZ Coastal Policy Statement 2010.

1.8 I became involved with the project in November 2022 and visited the Application Site on the 21st of March 2023.to undertake a tidal current survey during a Perigean Spring Tide event when the new moon was between the sun and the Earth and closest to the Earth and the tidal currents were at maximum.

2 CODE OF CONDUCT FOR EXPERT WITNESSES

2.1 While this is not a hearing before the Environment Court, I confirm that I have read the Code of Conduct for expert witnesses contained in the Environment Court of New Zealand Practice Note 2023 and that I have complied with it when preparing my evidence. Other than when I state I am relying on the advice of another person, this evidence is within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

3. SCOPE OF EVIDENCE

3.1 I have prepared evidence in relation to:

- the existing coastal environment of the Application Site.
- the key findings of my assessment of effects.

- matters raised by submitters to the Application.
- matters raised in the TDC staff reports (report issued under s42A of the RMA).

4 MAPUA BOAT RAMP CURRENTS

4.1 OCEL undertook a tidal current survey at the location of the proposed Mapua boat launching ramp on the 21st of March during a Perigean spring tide event when the new moon was in between the sun and the earth and closest to Earth. The peak high tide was 4.4 m at 0931.

4.2 The tidal currents were measured using an Oceanics 3 current meter - photograph no.1 - suspended from a moored boat at the end of the launching ramp. The current meter was connected to a computer onboard the boat to record the current speed during the tidal cycle. This is the Eulerian method of current measurement, measuring the current at a point. The boat streamed with the current but swung on its mooring moving inshore as low tide approached. A handheld current meter was also used to measure the currents along the launching ramp, the deployment was necessarily close to shore because of the speed of the tide.

4.3 The Lagrangian method of current measurement where the observer follows a water particle, represented in this case by a drogue, through space and time as it moves with the flow, was also used to pick up the flow circulation and flow streamlines. A number of drones, surface buoys with a bucket suspended from each, were released upstream of the launching ramp during the ebb tide and tracked using both a handheld Trimble DGPS unit and a drone as they were swept with the flow past the launching ramp location toward the wharf. Once out of the area of interest downstream of the wharf the drogues were picked up by the chase boat and taken back upstream.

4.4 Photograph no.2 shows an aerial view of the location on the incoming tide, the currents in the area of the ramp are low, the area gains some protection from the wharf and the shoreline downstream of the wharf, for the incoming flow, deflects the current away from the ramp area. The currents of concern are on the outgoing tide.

4.5 Representative flow paths are shown in drawing nos. DR-230202-005 just after high tide and 006 at mid tide, drawings attached to this evidence. There is no evidence of an eddy in the vicinity of the launching ramp the drogues track straight towards the Mapua wharf, some passing under it and the offshore ones running along the berthing face.

4.6 What is evident from the drogue tracks and from personal experience with launching the chase boat is that the current close to the waterline is relatively slow, of the order of 0.2 - 0.3 m/sec 5 m out from the water line, and manageable when launching a boat. 10 m out from the waterline the speed picks up to 0.5 – 0.6 m/sec, ≈ 1 – 1.2 knots.

4.7 The slow flow area moves down the ramp with the tide so that it is possible to put a boat trailer in the water without being subject to really strong currents at all stages at the tide. The weaker currents in the shallow water close to the waterline as it drops down the ramp are the result of bottom friction effects at the shore.

4.8 Drawing no. DR-230202-007 shows the variation of flow speed out from the waterline at high, mid and low tide. The current is slow < 0.2 m/sec within 5 m of water level then rises close to 0.6 m/sec ≈ 1.2 knot, 10 m out. This reflects our own launching experience on site, startup then back out and in a short distance the boat is being swept downstream.

4.9 This in itself is not a problem unless there is an obstruction in the form of a moored vessel or buoy in the way and a potentially damaging collision or at worst overturning for a small boat hitting a substantial partially submerged buoy is a possibility.

4.10 The maximum flow speed recorded on the boat moored at the end of the launch ramp was 0.75 m/sec ≈ 1.5 knot however the boat swung on its mooring and moved inside the end of the ramp as the tide dropped. The current meter was suspended 1 m under the boat and not fully representative of the surface current. The current speed plot is shown in figure no.1.

4.11 The current speeds confirm the figures picked up by the earlier ADCP (Acoustic Doppler Current Profile) survey undertaken by the TDC over the full width of the tidal channel. The figures for the OCEL survey are lower than the ADCP figures because they are averaged figures for the drogues rather than the instantaneous figures picked up by the ADCP.

5 IMPLICATIONS FOR BOAT LAUNCHING & RECOVERY

5.1 Based on the flow measurements and the experience in operating on the location the proposed launching ramp can be used as an all tide launching ramp for experienced boat operators aware of the strong flow conditions once the boat is off the trailer. The skippers need to be situationally aware of how the flow is moving their boat, a situation can deteriorate rapidly in these conditions.

5.2 Because of the strong flows across the ramp I do not recommend using a floating jetty aligned with the ramp, normal to the shore and perpendicular to the tidal currents in this situation, boats can be pinned against the jetty pontoons and find it difficult to get away from the pontoon. In the worst case with passengers or crew on the up-current side of the boat causing it to list while alongside the floating pontoon the boat can be overturned.

5.3 The pontoons represent an obstruction to the flow. From photographs OCEL has seen there can be large accumulations of timber, logs and slash trapped against the Mapua wharf, these drifting elements would impact the pontoons and potentially damage them, or at a minimum, result in higher maintenance costs. At the time of the survey there was a large tree downstream of the wharf snagged on the seabed.

5.4 The use of floating jetties consisting of a string of pontoon modules, either plastic (PE) or polystyrene encased in concrete, connected end to end, is a common and popular feature of boat launching ramps in sheltered locations. Boats being either launched or recovered can be moored alongside close to the point of launching or recovery and boarded step on/step off from the floating pontoon. As the tide falls the pontoons settle down onto the launching ramp and the launching/recovery activity moves down the ramp following the tide.

5.5 OCEL has designed a number of these– Tauranga, Whakatane, Auckland, Northland and Bluff - working with Anchorage Pontoons a company producing plastic pontoon modules. These work very well in sheltered locations set back into the bank of the channel, or protected by a groyne that, in the Mapua location, could deflect the logs and debris coming down the river.

5.6 Setting the ramp back into the bank is not possible at Mapua because of the contaminated ground so it has to be groyne protection but just for the ebb tide. The flood tide currents are lower and manageable. A solid groyne would have a significant effect of the local coastal processes and would require further investigation and modelling.

5.7 For the Anchorage pontoon installations in Tauranga Harbour in channel locations where there are similarly strong flow conditions the pontoons are not subject to these conditions the ramps being set back into the bank. In these cases there is normally a pontoon just outside the protection set in line with the flow making it easy for a boat to come alongside and drop off passengers or the boat recovery driver. The boat launch and recovery operations are in sheltered water and easy to achieve.

6 EFFECTS ON THE COASTAL PROCESSES & MORPHOLOGY OF THE INLET CHANNEL

6.1` In response to question 34 of the Tasman District Council (TDC) Request for Information (RFI) document issued on the 31st of Augustv2023 which requests an assessment of *(a) the potential for scour of the inlet channel through interaction between the ramp structure(s) and tidal currents, and (b) the potential for scour of the channel to undermine the clay bund and rock armouring that lines the edge of inlet channel to protect the former fruit growers site* I respond as follows:.

6.2 The area of the boat ramp is subject to the existing tidal currents and is stable under these flows because of the nature of the seabed which is exposed at low tide. The area is covered by a combination of gravel and cobbles evident in photograph nos. 3 & 4. The area of the ramp located at a bend in the coastline is a shallow embayment, in both the horizontal and vertical planes, that has some protection from the wharf for the incoming tide and from the coast upstream of the location for the ebb tide. The construction of the ramp will not change the circulation in the area of the ramp there will only be localised effects as the flow diverts around the obstruction created where the ramp is above the current seabed level.

6.3 The strongest currents occur for the ebb tide but are not strong at the top of the ramp where the ramp leaves the shore and represents the greatest obstruction to the flow. Where it is obstructed the flow will divert around, and flow across, the ramp. The accelerated flow, such as results, will occur across the top of the ramp but will not have any erosive effect on the concrete surface of the ramp. The current speed increase will be minor and localised. The sides of the ramp will have rock armour that prevent any erosion due to current effects.

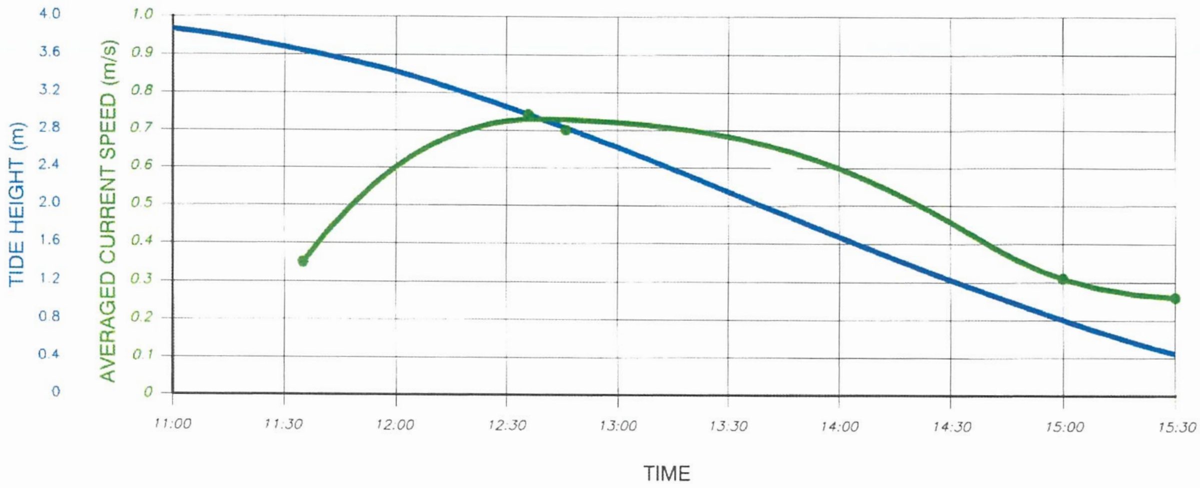
6.4 The results of the current study, and personal experience with launching the current drogue chase boat, show that that the current close to the waterline is relatively slow, of the order of 0.2 - 0.3 m/sec 5 m out from the water line, and manageable when launching a boat. That will remain the case on the boat ramp even with the minor accelerated flow diversion across the ramp.

6.5 Due to the slow current speeds at the edge of the inlet channel at the top of the tide there is limited potential to scour the side of the inlet channel to undermine the clay bund and the rock armour that lines the channel bank.

6.6 10 m out from the waterline the speed picks up to 0.5 – 0.6 m/sec, ≈ 1 – 1.2 knots. The slow flow area moves down the ramp with the tide so that it is possible to put a boat trailer in the water without being subject to strong currents at all stages at the tide. The weaker currents in the shallow water close to the waterline as it drops down the ramp are the result of bottom friction effects at the shore.

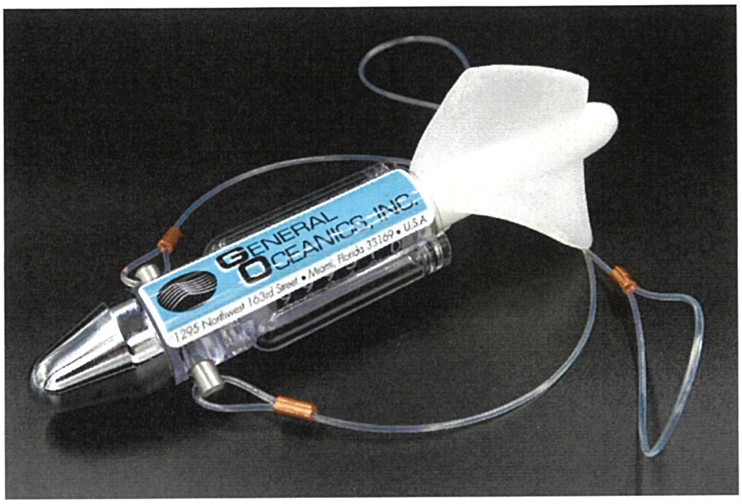
6.7 The coastline either side of the ramp has light armour, heavier toward the wharf as is evident in photograph nos.4 & 5, and will not erode in response to the construction of the ramp. The construction of the ramp will not significantly change the tidal circulation in the area of the ramp, the effects will be localised.to the waterline as the tide rises and falls.

Gary TEEAR
1st November 2024



OUTGOING TIDAL CURRENT VELOCITY VS TIME
AT END OF PROPOSED BOAT RAMP

Figure no.1

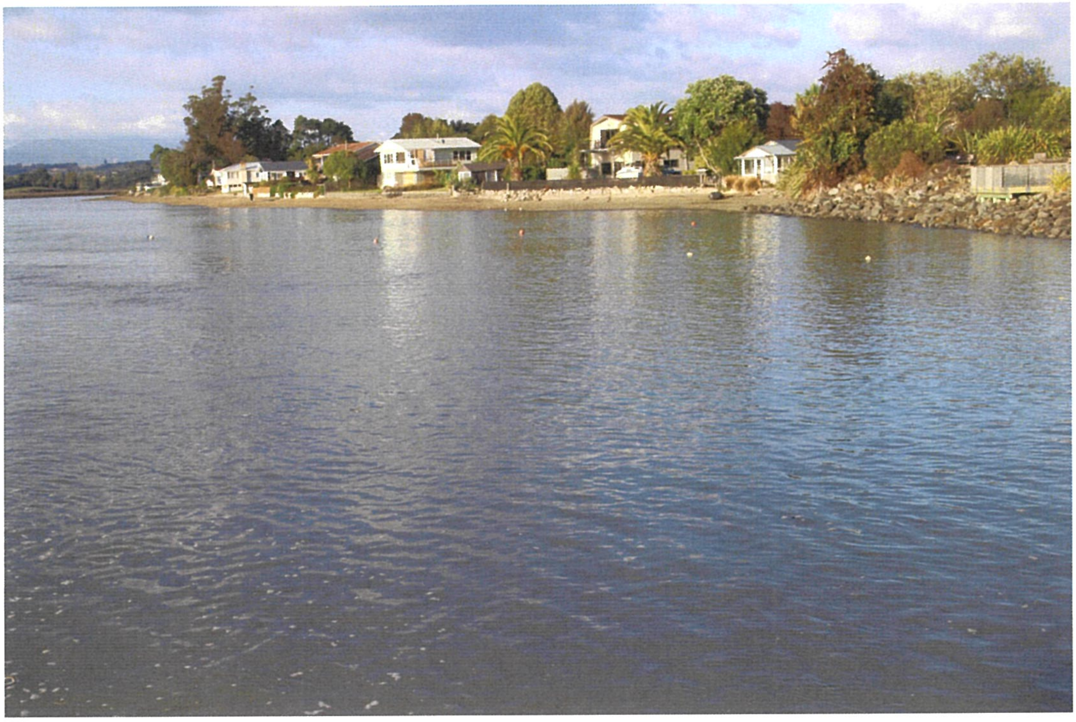


Photograph no.1

Photograph no.2

Photograph no.3

Photograph no.4



Photograph no.5