

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of a submission by **AMBURY PROPERTIES LIMITED** on the **PROPOSED WAIKATO DISTRICT PLAN** pursuant to Clause 6 of Schedule 1 of the Act seeking the rezoning of land at Ohinewai

**JOINT WITNESS STATEMENT OF EXPERTS IN
RELATION TO FLOODING**

1. INTRODUCTION

- 1.1 On 17 June, 2020 an expert conferencing session in relation to Flooding was undertaken by Ajay Desai (for Ambury Properties Limited), Dr Grant Webby (for Mercury NZ Limited), David Klee (for Waikato/ Auckland Fish & Game), Ghassan Basheer (for Waikato Regional Council) and Mark Pennington (for Waikato Regional Council). This Joint Witness Statement is a record of the outcome of this session.
- 1.2 The session was facilitated by Hearing Panel members, Dr Phil Mitchell and Paul Cooney.
- 1.3 Also in attendance as observers were:
- (a) Emily Buckingham, planner for the Waikato District Council;
 - (b) Stuart Penfold, planner for Ambury Properties Limited;
 - (c) Ian Mayhew, planner for Waikato Regional Council;
 - (d) Rick Liefing, team leader for Waikato Regional Council;
 - (e) Fraser Graaffhuis, planner for Mercury NZ Limited;
 - (f) Pranil Wadan, stormwater engineer for Ambury Properties Limited;
 - (g) Gavin Donald, planner for Waikato Tainui;
 - (h) David Payne, hydrologist for Mercury NZ Limited; and

(i) Angus McKenzie, planner for Mercury NZ Limited.

1.4 Notes were taken by Emily Buckingham.

Agenda - issues considered at conferencing

1.5 An introduction to the Lower Waikato Waipa Flood Control scheme (Ghassan Basheer, Waikato Regional Council).

1.6 The issues identified as forming the agenda for the conferencing were:

(a) What is the function of Lake Waikare and its flood storage zone? (Grant Webby)

(b) What are the inflow sources and the outflow points from Lake Waikare? (Grant Webby)

(c) How does Lake Waikare and its associated flood storage zone work to fulfil its function? (Grant Webby)

(d) What are the key levels for Lake Waikare and its associated flood storage zone? (Grant Webby)

(e) How does the APL development impact on Lake Waikare and its associated flood storage zone? (Grant Webby)

(f) Should the current design flood level for the Lake Waikare flood storage basin (RL 7.37m) be marked on the district plan maps? (Grant Webby)

(g) What is the expected total loss of storage for extreme events (100yr with climate change)? (Grant Webby)

(h) Did the flood modelling use 5.4RL as the relevant operational level for Lake Waikare levels to determine the potential adverse flooding effects? (para. 2.1 - David Klee)

(i) Has the flood modelling used multiple lake level scenarios as set out in the resource consent 101725? (para. 2.2 – David Klee)

(j) Has the flood modelling taken into account the potential lake levels that may result out of future flood control scheme re-consenting processes (currently unknown)? (para. 2.3 – David Klee)

(k) Is the encroachment on the floodplain as a result of the rezoning approximately 350,000m³ (0.4% of the total flood storage) and what

are the increase in lake levels as result? (para. 4.4, 4.5 – Grant Webby)

- (l) What is the potential for other development in the area to affect flood storage and can that be considered as leading to cumulative effects on the flood storage capacity? (para. 4.5 – Grant Webby)
- (m) Have the potential effects of the rezoning on the land drainage scheme been addressed sufficiently (commensurate for the proposed rezoning). Further, can detailed design matters be sufficiently addressed in consultation with WRC as part of future consenting processes? (para. 5.2, 5.3 – Ghassan Basheer)

1.7 The following sections of this joint witness statement addresses each of these issues or questions, noting where agreement has been reached and, in the event of disagreement, the nature of the disagreement and the reasons for that disagreement.

1.8 All levels stated in this statement are in Moturiki Vertical Datum 1953.

2. **ISSUE ONE – WORKING OF LAKE WAIKARE FLOOD STORAGE ZONE AND KEY LEVELS**

What is the function of Lake Waikare and its flood storage zone?

What are the inflow sources and the outflow points from Lake Waikare?

How does Lake Waikare and its associated flood storage zone work to fulfil its function?

What are the key levels for Lake Waikare and its associated flood storage zone?

2.1 The experts agree that the Lower Waikato Waipa Flood Control scheme is described accurately in the Tonkin & Taylor letter “Ambury development flood assessment” dated 8 June 2020 which was appended to the summary statement prepared by Ghassan Basheer.

2.2 Key levels are stated here as per the T&T report –

- i. Normal operating level range for Lake Waikare is between RL 5.4m and RL 5.75m
- ii. Current assessed 1% AEP level is RL 7.37m (referred to in this statement as the “current design flood level” for Lake Waikare)
- iii. Crest level for northern foreshore stop bank is 8.0mRL
- iv. Historic peak flood level for Lake Waikare is RL 8.38m in February 1958 (pre-Lower Waikato Waipa Control Scheme)

v. Peak recorded flood level for Lake Waikare is 6.29mRL in July 1998 (post Lower Waikato Waipa Control Scheme)

2.3 The experts also agree that Lake Waikare forms a critical component of the flood management regime for the Lower Waikato River.

3. **ISSUE TWO – IMPACT OF APL DEVELOPMENT IMPACT ON LAKE WAIKARE FLOOD STORAGE ZONE**

How does the APL development impact on Lake Waikare and its associated flood storage zone?

Is the encroachment on the floodplain as a result of the rezoning approximately 350,000m³ (0.4% of the total flood storage) and what are the increase in lake levels as result?

3.1 The experts agree that the two relevant issues include additional stormwater runoff generated by proposed development and infilling of the flood storage basin of Lake Waikare on the site of the development.

3.2 The experts agree that additional stormwater runoff generated by development will be small in relation to the natural catchment runoff and flood overflows from the Waikato River.

3.3 The experts agree that the table below sets out the implications of flood storage loss in the Lake Waikare flood storage basin and these figures will be used for assessments that may be presented in expert evidence.

Flood Level	Displacement Volume (Fill within development area)	Storage at level in Lake Waikare (provided by WRC)	% of storage lost
mRL	m³	m³	
5.65	550.0	55874866.7	0.00%
6.3*	47300.0	81992353.7	0.06%
7.0	236500.0	117670811.4	0.20%
7.27	352400.0	132618795.7	0.27%
7.37**	400700.0	138275873.1	0.29%
8.0	783000.0	175157224.6	0.45%
8.10***	783000.0	187214356.4	0.45%

**Between 11-20 July 1998, Lake Waikare steadily increased from 5.60m to peak at 6.29m, highest recorded flood level*

***The design flood level of the Lake Waikare / Whangamarino Wetland Gate Settings scheme (when lake floodwaters actually flow over farmland and into the wetland) is 7.37m*

****The survey data is available for the lake up to 8.1mRL and was further extrapolated to 8.2mRL assuming an increment of storage to be the same as between 8.0mRL and 8.1mRL*

- 3.4 Grant Webby however reserves his position on the details in the final column (% of storage lost) and reserves the right to check and verify these numbers although any changes are likely to be minor (approximately 0.1%) and within the bounds of data uncertainty and calculation accuracy.
- 3.5 Grant Webby notes that he has assumed the displacement volumes given in the second column are correct and has not independently verified them. The key displacement effect to be assessed is at the 7.37mRL level which is the current assessed design flood level for the Lake Waikare flood storage basin.
- 3.6 Following the expert conferencing session, Grant Webby has prepared the following alternative version of the table included in Paragraph 3.3. In this alternative table, the percentage of storage volume lost due to the proposed development has been calculated as a percentage of the net storage volume above a lake level of RL 5.65 m. This explains the difference between the values of percentage storage volume lost in the alternative table and the corresponding values in the table in Paragraph 3.3. The values of percentage storage volume lost in Table 3.3 have been calculated relative to the absolute storage volume of Lake Waikare based on an assumed lakebed of RL 4.0 m. Other minor differences between some of the values of total lake storage volume in the alternative table and corresponding values in the table in Paragraph 3.3 are considered to be due to a difference in the method of interpolation.

Flood Level	Displaced Storage Volume <i>(Fill within development area)</i>	Total Storage Volume in Lake Waikare <i>(provided by WRC)</i>	Net Storage Volume in Lake Waikare above RL 5.65 m	Increased Flood Level within Lake Waikare	% Net Storage Volume Lost
RL m	m³	m³	m³	RL m	
5.65	550	55,881,677	0	5.650	0.00%
6.3*	47,300	81,992,354	26,110,677	6.301	0.18%
7.0	236,500	117,670,811	61,789,135	7.004	0.38%
7.27	352,400	132,625,555	76,743,878	7.276	0.46%
7.37**	400,700	138,282,156	82,400,479	7.377	0.49%
8.0	783,000	175,157,225	119,275,548	8.013	0.66%
8.10***	783,000	181,185,791	125,304,114	8.115	0.63%

*Between 17-20 July 1998, Lake Waikare steadily increased from RL 5.60m to peak at RL 6.29m, highest recorded flood level since February 1958

**The design flood level of the Lake Waikare / Whangamarino Wetland Gate Settings scheme (when lake floodwaters actually flow over farmland and into the wetland) is RL 7.37m

***The survey data is available for the lake up to RL 8.1m

4. **ISSUE THREE – CURRENT DESIGN FLOOD LEVEL FOR THE LAKE WAIKARE FLOOD STORAGE BASIN AND EXPECTED TOTAL LOSS OF STORAGE FOR EXTREME EVENTS**

Should the current design flood level for the Lake Waikare flood storage basin (RL7.37m) be marked on the district plan maps?

What is the expected total loss of storage for extreme events (100yr with climate change)?

- 4.1 The experts agree that this level is based on the original 1960s Scheme design.
- 4.2 The experts agree that the level could change as a result of a forthcoming review of climate change impacts on the Lower Waikato-Waipā Flood Control Scheme by Waikato Regional Council.
- 4.3 Grant Webby considers that the current design flood level for Lake Waikare should be marked on the maps.
- 4.4 However, the experts agree that it is not solely for them to determine how this gets carried through (to be revisited in Stage 2 Natural Hazards hearing).

5. **ISSUE FOUR –LAKE WAIKARE LEVELS USED TO UNDERTAKE FLOODING ASSESSMENT**

Did the flood modelling use 5.4RL as the relevant operational level for Lake Waikare levels to determine the potential adverse flooding effects?

Has the flood modelling taken into account the potential lake levels that may result out of future flood control scheme re-consenting processes (currently unknown)?

- 5.1 Ajay Desai confirmed that flood modelling considers the effects of stormwater from the development on Lake Waikare and neighbouring properties without inflows from the Waikato River using lake levels of 5.4mRL and 8.0mRL

6. **ISSUE FIVE – USE OF MULTIPLE LAKE LEVELS FOR FLOOD MODELLING TO UNDERTAKE FLOODING ASSESSMENT**

Has the flood modelling used multiple lake level scenarios as set out in the resource consent 101725?

- 6.1 The experts agree that there is no need to consider the other operating levels (5.6mRL, 5.65mRL and 5.75mRL) at this stage as both ends of the spectrum for Lake Waikare levels have been considered (5.4mRL and 8.0mRL)

7. ISSUE SIX – POTENTIAL FOR OTHER DEVELOPMENT AFFECTING FLOOD STORAGE & CUMULATIVE EFFECTS

What is the potential for other development in the area to affect flood storage and can that be considered as leading to cumulative effects on the flood storage capacity?

- 7.1 The experts agree that any development involving volume infill in the flood storage basin area will contribute to cumulative development effects on the flood storage capacity.

8. ISSUE EIGHT–EFFECTS ON THE WRC LAND DRAINAGE SCHEME

Have the potential effects of the rezoning on the land drainage scheme been addressed sufficiently (commensurate for the proposed rezoning). Further, can detailed design matters be sufficiently addressed in consultation with WRC as part of future consenting processes?

- 8.1 Ghassan Basheer: The concern is that the current assessment was based on the 5.4mRL level for Lake Waikare which is not the normal level and it is usually above 5.5mRL. For example, the worst-case scenario may be that the lake is at 5.75m with 10% AEP natural catchment event occurring. Storage and devices will be required on the APL site so that the drainage system is not affected. Details of these are not yet known but they have been indicated. The need is acknowledged, details are to be addressed through regional discharge consent (physical space for the devices may affect development yield but there is available open space within the Wetland Reserve park located within the APL development extent).

Ghassan Basheer would like to record that detailed design can be sufficiently addressed as part of future consenting process but that costs should not fall upon the ratepayer.

9. PARTIES TO JOINT WITNESS STATEMENT

- 9.1 The signatories to this Joint Witness Statement confirm that:
- (a) They agree with the outcome of the expert conference as recorded in this statement;

- (b) They have read Appendix 3 of the Environment Court's Practice Note 2014 and agree to comply with it; and
- (c) The matters addressed in this statement are within their area of expertise.

SIGNATURES:



Ajay Desai

Date: 18/06/2020



Grant Webby

Date: 18/06/2020



David Klee

Date: 19/06/2020



Ghassan Basheer

Date: 18/06/2020



Mark Pennington

Date: 18/06/2020