

IN THE MATTER of the Resource Management Act 1991

AND

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

SUMMARY STATEMENT OF AJAY DESAI

1. My full name is Ajay Desai. I am a Senior Technical Specialist – Three Waters at Wood and Partners Consultants Limited (“Woods”). I prepared a statement of evidence dated 9 July 2020, and a statement of rebuttal evidence dated 24 August 2020. The purpose of this document is to summarise those statements.
2. I outlined my qualifications, experience and commitment to comply with the Environment Court Expert Witness code of Conduct in my evidence in chief (“EIC”).

The Site and its catchment

3. The Sleepyhead Estate is a mixed-use development comprising industrial, commercial and residential zones. The total area of the Site is approximately 178ha. To achieve appropriate finished floor levels, the importation of 2,000,000m³ of fill to the Site is proposed (as set out in the evidence of Ben Pain) with approximately 400,000m³ of flood storage lost below the spillway level of Lake Waikare.
4. The Site is within the Lake Waikare catchment and affected by the Lower Waikato-Waipā Flood Control Scheme (“LWWFCS”). The Site is separated from the Waikato River by State Highway 1, the North Island Main Trunk Railway and Ohinewai North Road and Ohinewai South Road. There is very little or no interaction between the Waikato River and the Site as reflected in the Lower Waikato Zone Management Plan. The Site drains to Lake Rotokawau which flows into Lake Waikare. Lake Waikare has a total contributing area of 20,800ha. The LWWFCS provides for flows from Lake Waikare to be discharged to Whangamarino Wetland via the Waikare Control Gate in a controlled manner.
5. The operational level for Lake Waikare is between 5.40 – 5.75mRL. The proposed Sleepyhead Estate involves fill in the development area to raise the development platforms above the flood levels observed within the Lake for various storm events.

Flood Modelling

6. Flood modelling was undertaken to understand the flood hazard associated with the development of the Site. This was undertaken in close collaboration with WRC. The model extent was based on the areas contributing to Balemi and Tahuna drains which discharge to Lake Rotokawau and Lake Waikare.

7. At the outset, it was agreed with WRC that the existing WRC Waikato River model was not sufficiently reliable to provide a basis for analysis. Instead, a local model was developed using Mike by DHI. This is the same programme that WRC has used for the Waikato River Model which is currently being prepared by WRC. The modelling process followed best modelling practices and guidelines, in particular the WRC Stormwater Runoff Modelling Guideline (TR2018/02) and Auckland Council's Technical Publication 108 (TP108).

Modelled Scenarios

8. A number of models were developed to assess the effects for the pre and post development scenarios with conservative water levels applied to Lake Waikare. All these models were tested with rainfall uplift to account for climate change.
9. In accordance with WRC's direction, a conservative water level of 8.0mRL was used which is the crest level for northern foreshore stop bank (approximately 0.6m above the spillway design level of 7.37mRL) for Lake Waikare. Additional modelling was undertaken with a water level of 5.40mRL which is the minimum operating level for the Lake to test flood effects under a every day, i.e. non-severe storm scenario.
10. An Emergency Management Plan Assessment ("EMPA") was completed to understand flood risk to the OSPA associated with stop bank breach along River Waikato. Subsequently, additional modelling analysis has been undertaken with refinements in and around the Site to capture the topographical features like roads, the railway line, depressions and overland flow paths using InfoWorks ICM modelling programme.
11. A blockage assessment was undertaken to understand the risk associated with blockage of Lumsden Road and Tahuna Road culverts that discharge through the Site and will be culverted through the Site (as directed by WRC).
12. Sensitivity analysis was undertaken for the 10year post development scenario to assess whether there is an increased flood risk to the development or downstream environment with any loss of storage associated with the proposed stormwater devices within the Central Park Area.

Flood Modelling Results

13. Modelling indicated that the development of the Site would result in a negligible increase in water levels or flood extents within the Site or any of the neighbouring lots. This is because the total Site area of 178ha, or 1.79sq.km, is insignificant when compared to the downstream floodplain extents (34.66sq.km) and the total of the total contributing area to Lake Waikare (208sq.km).
14. The initial modelling (reported in the Flood Assessment Report) showed some ponding around Lumsden Road, but this was caused by the model representation in this area which does not include the existing culvert under the road. This results in 'no flows' through the culvert and flows backing upstream with no downstream conveyance. Subsequent modelling included the Lumsden Road culvert. This showed some local increased flood levels which can easily be managed at the detailed design stage: a new culvert at this location will be necessary to direct flows towards the Central Park Area to maintain the predevelopment flood levels.
15. Flooding is observed within the Site itself but limited to the low-lying Wetland Park Area adjoining Lake Rotokawau in pre and post development scenarios. There is no flooding observed in areas within the Site where development

(buildings and roads) is proposed, as the proposed design involves fill within these areas to provide for the future development form.

16. The additional storage volume analysis undertaken to assess whether there is any increased flood risk arising from the loss of flood storage for Lake Waikare associated with the proposed importation of fill showed that the loss of storage would be:
 - (a) Less than 0.06% of the available storage capacity at a Lake level of 6.3mRL (maximum level observed at the Lake);
 - (b) Approximately 0.29% at a Lake level of 7.37mRL which is the design spillway level; and
 - (c) Approximately 0.45% at a Lake level of 8.0mRL which is the maximum water level that the Lake can ever achieve before the northern stop bank overtops.

Stormwater Management Approach

17. The general approach for the Site is to pass flows forward before the flows from the upstream catchment discharge to Lake Waikare. Holding flows from the development within the Site for a longer duration could result in coinciding of peak flows from the Site and upstream catchment area resulting in higher risk to the development as well as neighbouring properties. Modelling undertaken indicates that flows from the Site can be passed forward into the receiving environment i.e. Lake Waikare / Lake Rotokawau without impacting on predicted flood levels within the lakes.

Emergency Management Plan Assessment

18. The stop bank breach scenario model showed flooding along State Highway 1, the North Island Main Trunk Railway and all properties along Ohinewai North Road and Ohinewai South Road leading towards the Site. The initial modelling undertaken (reported in the Flood Assessment Report) showed that a portion of the Site (in the Industrial zone) would be subject to flooding.
19. Additional detailed modelling undertaken subsequently confirms that the stop bank breach flows are generally contained to the west of State Highway 1 and flows crossing the State Highway 1 do not enter the Site, and instead flow along the northern boundary eastwards towards Lake Waikare.
20. Based on the latest modelling results, the proposed development is not at risk from stop bank breach from the Waikato River.

Culvert Blockage assessment

21. Blockage scenarios assessment confirmed that there is no overtopping across Tahuna Road and Lumsden Road and there are no increased flood effects on the proposed development in the event that the culverts under these roads are completely blocked.

Sensitivity Model Scenario

22. Sensitivity analysis with no Central Park Area storage confirmed that there is no increased flood risk within the Site or to the neighbouring properties and that there is also no increase in flood extents or flood levels within Lake Waikare. This suggests that the stormwater devices located within the Central Park Area would not have any effect on flood extents or levels.

23. There is a general agreement with statement of evidence by Mr McKenzie (Mercury NZ Limited) with no rebuttal evidence.

WRC Rebuttal – ongoing discussions

24. It has been agreed that the 1% AEP with Climate Change flood level within Lake Waikare and the APL site is 8.0mRL.
25. It has also been agreed to use the term 'Building Platforms' instead of 'Finished Floor Levels' in plan provisions.
26. Issue 2 raised in Mr. Basheer's Statement (clause 7.4 – 7.6) of evidence has been addressed and resolved by sharing all the flood models developed along with the associated data and flood results in GIS format with WRC via OneDrive link for further discussions and comments. We agreed that any local effects of increased stormwater runoff as a result of the development can be addressed through design and construction of appropriate stormwater devices and assessed at the resource consent stage.
27. In terms of Clause 7.11 and 9.1c, it is agreed that the highest recorded Lake level is 8.38mRL during 1958 flood but also noted that flood event was prior the LWWDCF scheme was operative.
28. The following clauses from Mr. Basheer's Statement are acknowledged as below –
- (a) Corrections noted in Clause 7.7 – 7.10 are accepted;
 - (b) Shand Properties Ltd details in Clauses 8.1 – 8.2 are noted; and
 - (c) Clause 9.1a – 9.1b are accepted.

Ajay Desai
9 September 2020