MEMO

TO	John Wadham
COPIED TO	
FROM	Alistair Osborne
DATE	24/05/2024
SUBJECT	Modelled Flooding at 23 Pomare Rd, Tirohanga

FOR YOUR INFORMATION

Purpose

To assess model predictions for flooding at 23 Pomare Rd, Tiroghanga, considering modelled topographic discrepancies between the model data input and actual ground topography.

Background

A customer has contacted Wellington Water (WWL) to ask for a review of the modelled flooding predicted at 23 Pomare Rd, Tiroghanga. A review of the model at the location indicated the flooding was predicted to originate from a gully in the northwestern corner of the property (Figure 1).

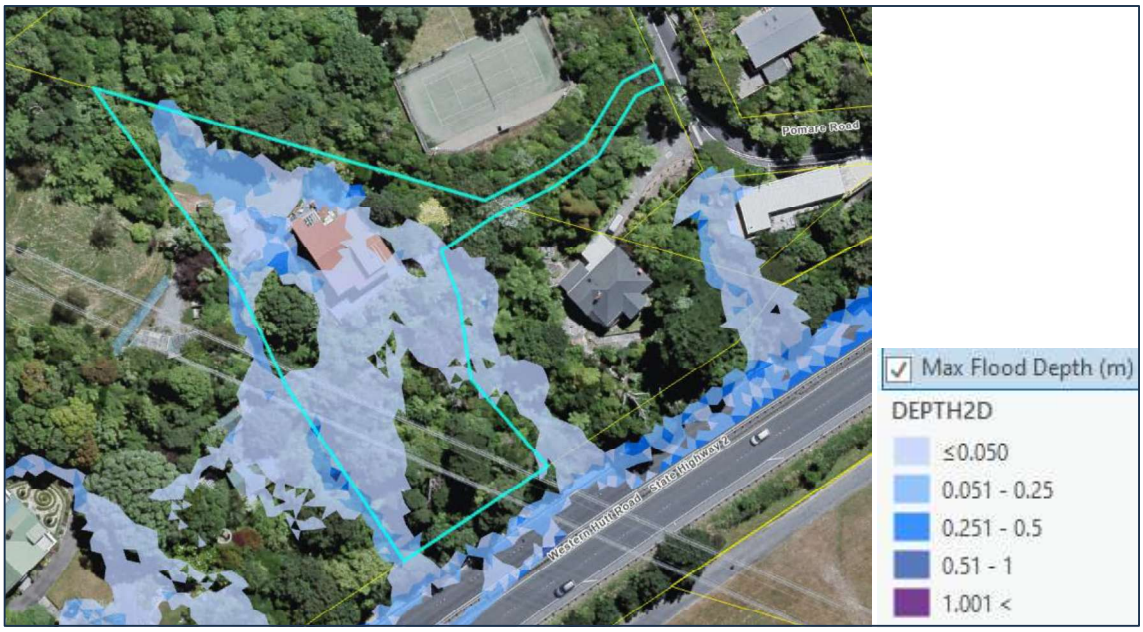

Figure 1: Current modelled flooding at 23 Pomare Rd during the 1% AEP event plus climate change

In a phone conversation with Wellington Water staff, it was noted by the customer that the local topography of the site and multiple features on the property meant that flooding on the property and, in particular, across the footprint of the dwelling was almost impossible. Wellington Water staff agreed to visit the property to discuss the site features and topography and update the hydraulic model if so needed.

Site Checks

A Wellington Water representative visited the site on the 30th of April and confirmed, via visual assessment, the site features and topography of the site that were expected to impact the modelled flooding on the property. The site features reviewed on the property that were considered most critical to flooding and are different to the existing topography within the model are shown in Figure 2, below, and include:

- Drains at the base of the hill slope in the western corner of the property and along the southwestern boundary.
- A raised retaining wall enclosing the southern edge of the tennis court (Figure 3).
- A brick wall along the eastern boundary of the tennis court (Figure 4).
- Gentle slope of the gravel carparking area falling towards the south (yellow arrows).

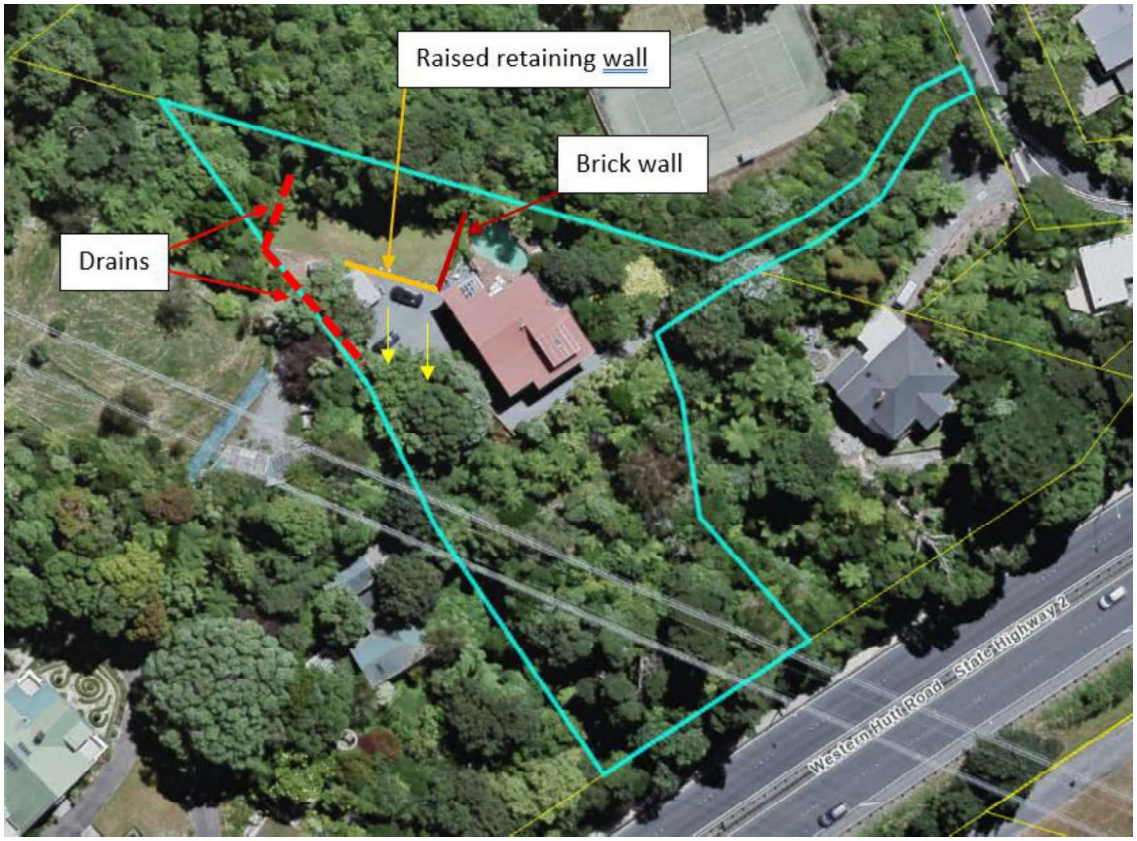

Figure 2: Critical site features

Figure 3: Raised retaining wall enclosing the southern edge of the tennis court.

Figure 4: Brick wall along the eastern boundary of the tennis court.

Model

The property, 23 Pomare Rd in Tirohanga, is within the extent to the Petone stormwater hydraulic model. The model was developed in alignment with the Wellington Water Stormwater Hydraulic Modelling Specification (Wellington Water, 2017) and was validated. It was then peer reviewed by consultants independent from the modelling programme. Final sign off of the model was provided on 10 March 2023.

Model review

WWL modelling staff reviewed the schema of the Petone stormwater hydraulic model in the vicinity of 23 Pomare Rd. It was found that two aspects of the model did not adequately represent the topography in the area; the first being the ground surface data applied in the model, and the second the subcatchment delineation around the property.

The ground surface data applied in the model was developed from LiDAR (collected in 2013), which has known issues with penetrating dense vegetation cover. In the modelled topography there is a rise in the ground surface on the western boundary of the site in the vicinity of the shed/garage (under the yellow circle in Figure 5). On site this is an open space (below tree cover) on the western side of the shed with a formed drain that can convey water through. In the model water is pushed around the rise onto the tennis court and across the footprint of the dwelling, Figure 5. Further, the topography did not include any representation of the drains on site, which would convey most, if not all water away from the tennis court area. These drains were not previously included as they were unknown due to a lack of definition in the ground surface data applied in the model. This lack of definition was likely due to the dimensions of the drains and vegetation cover in the area.

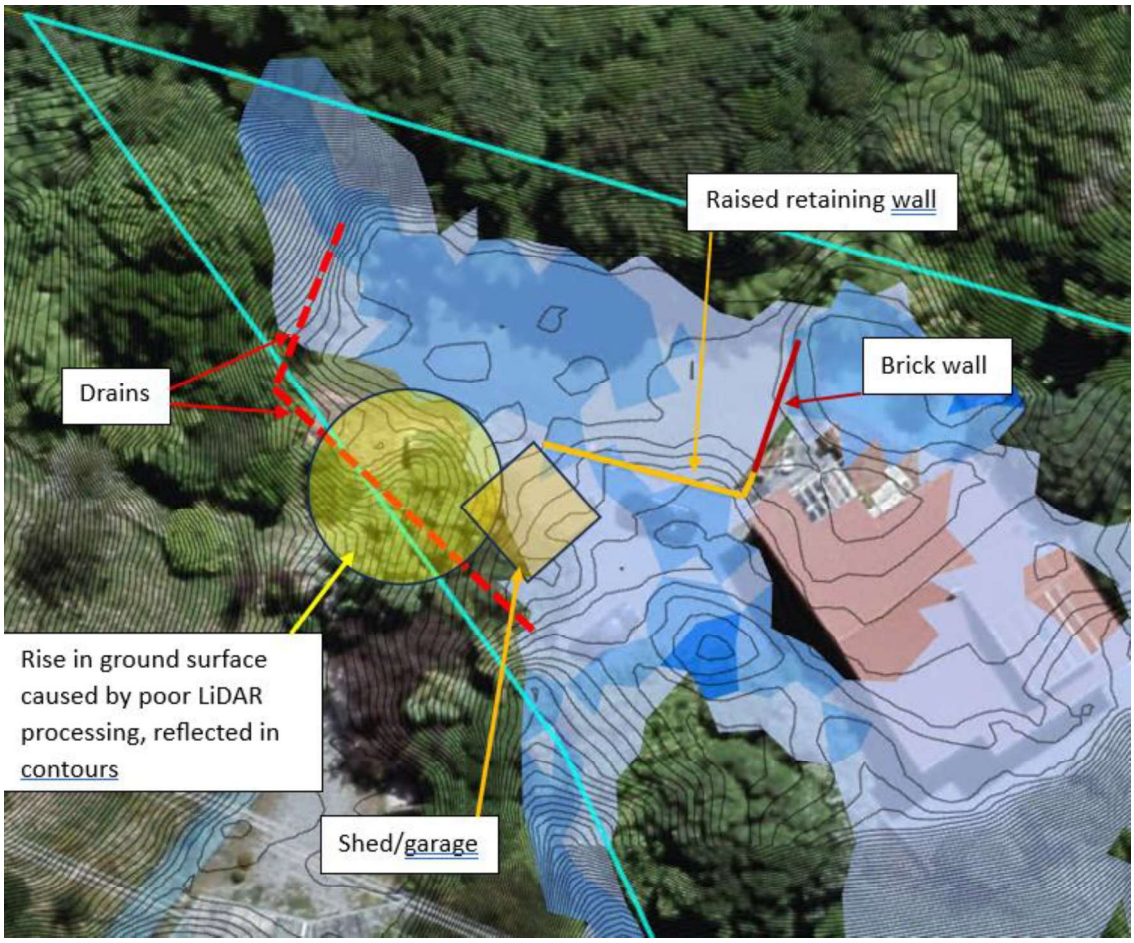

Figure 5: Critical site features and topographic discrepancies in the modelled ground surface

There are two subcatchments that have been delineated in the model that represent the rainfall runoff generated in the vicinity of 23 Pomare Rd. These are shown in Figure 6. The smaller of the two subcatchments sits upstream to the west of the property and the location it discharges on the model surface is upstream of the topographic rise described above which causes the modelled flooding across the property. The larger of the two subcatchments captures the remainder of the hillslope affecting 23 Pomare Rd but discharges it to the model surface downstream of the property (in the vicinity of State Highway 2).

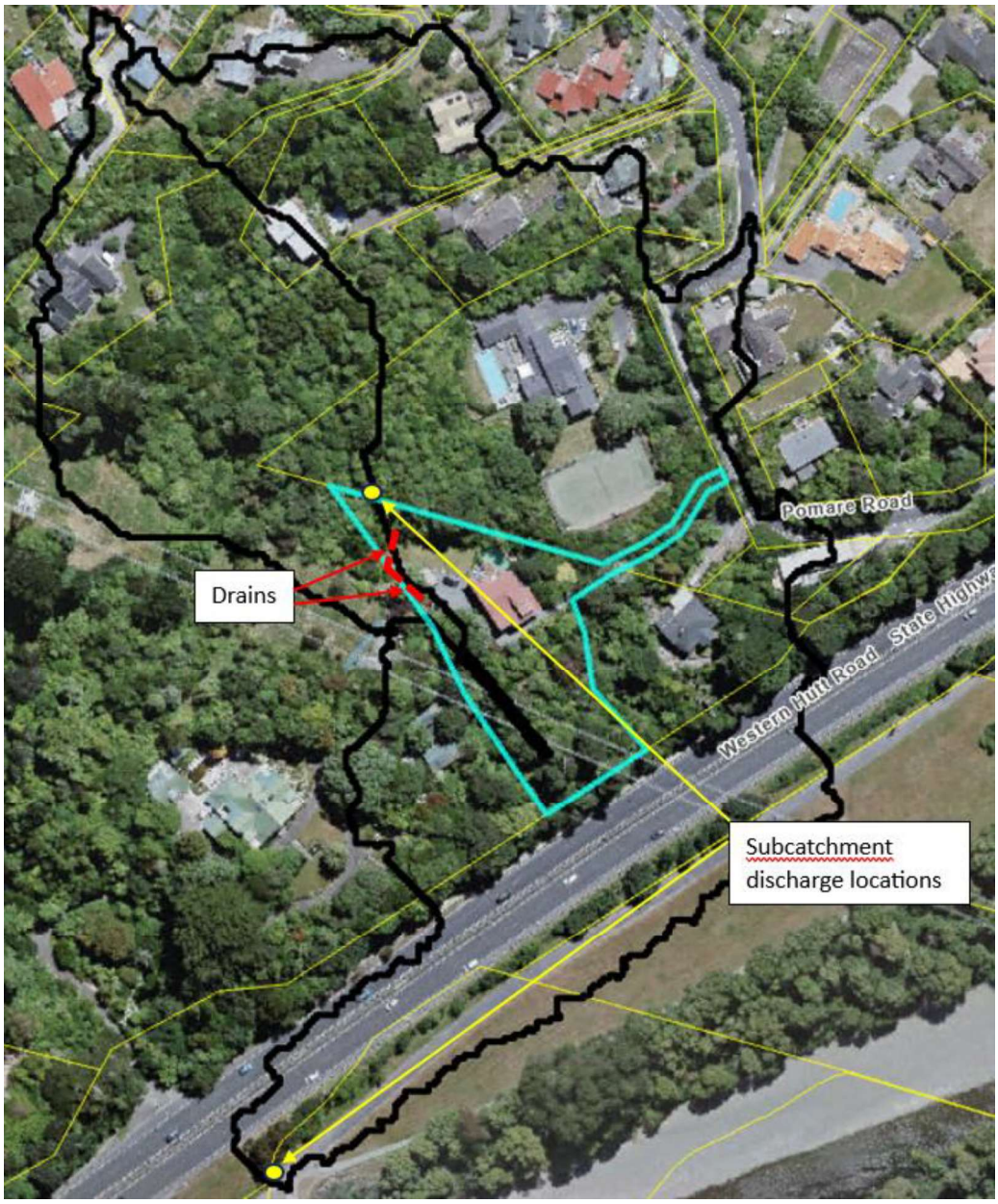

Figure 6: Subcatchments in the existing model

Model update

The site visit to 23 Pomare Rd and the review of the Petone stormwater hydraulic model confirmed that the model should be updated to better reflect the nature of the topography and features of the property. The first step to updating the model comprised re-delineating and splitting the subcatchments to better represent the local topography. To this end, the two original subcatchments

were split into 4, as shown in Figure 7. It is considered that the 4 subcatchments provide a better representation of the topography and expected runoff pathways in this area.

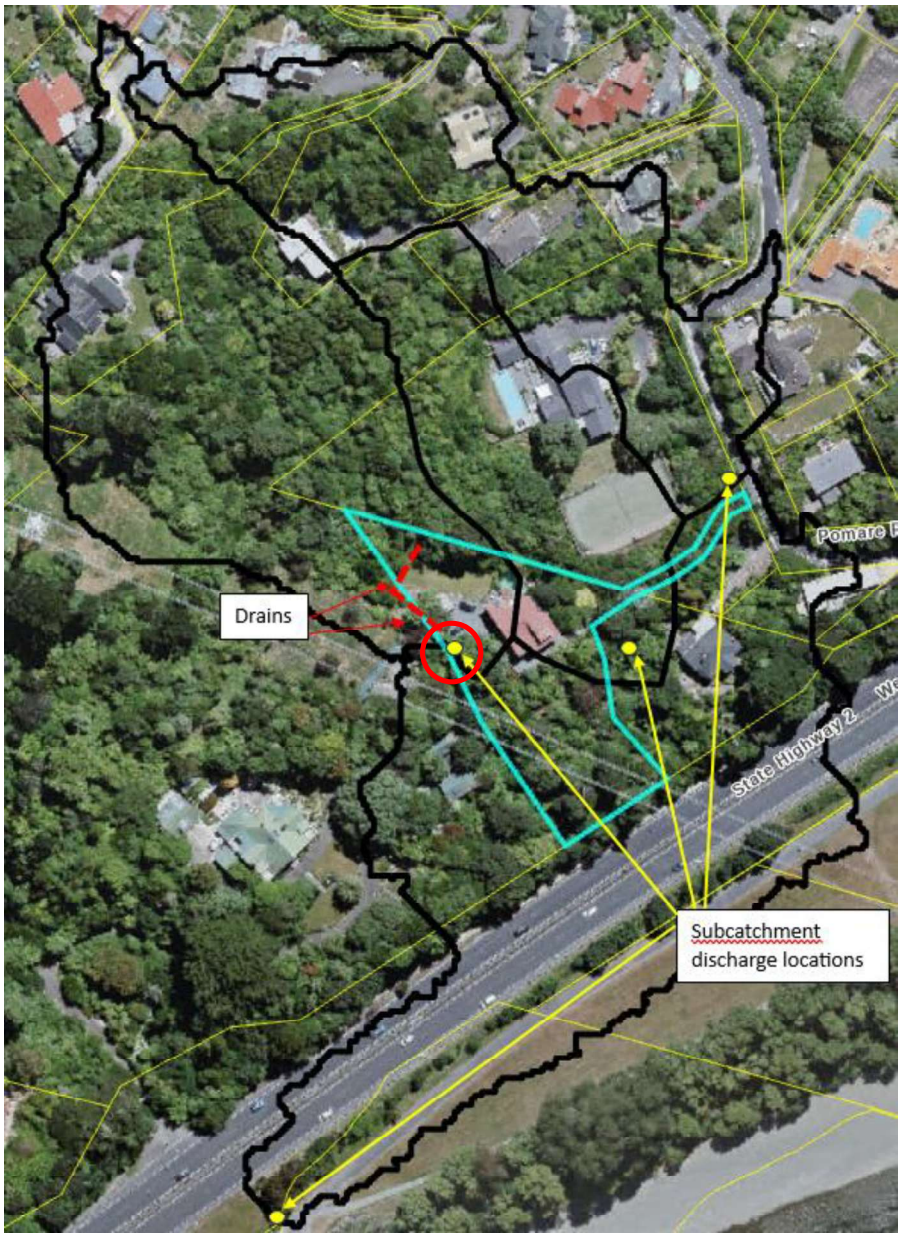

Figure 7: Updated model subcatchments

In addition to the use of 4 subcatchments, the location the subcatchment northwest of 23 Pomare Rd discharges to the model surface (circled in red in Figure 7), was shifted to the downstream end of the two drains on the property. This approach was taken as it meant the correct topography as well as the impact of the site features (the drains and walls) could be accounted for within the subcatchment

rather than the model surface. The new location (circled in red in Figure 7) discharges the subcatchment runoff to the model surface at the top of a gully that runs along the boundary between 23 Pomare Rd and 760 Western Hutt Rd.

The result of these model updates is shown below in the flood depth map **Figure 8.** The updated flood modelling results indicate 23 Pomare Rd is only impacted by flooding along the western boundary of the property.

Figure 8: Updated model results in the vicinity of 23 Pomare Rd during the 1% AEP event plus climate change (a larger version of this map is provided at the end of this document)

Wellington Water undertakes additional analysis of the mapped flooding generated by the stormwater hydraulic modelling to develop the flood hazard maps applied by Hutt City Council. The Council are currently updating the flood hazard classification approach to align with the Greater Wellington Regional Council method (outlined in the GWRC document *Flood Hazard Planning Guidance, March 2023*).

Wellington Water is still working through the updated hazard mapping for the Petone stormwater model (covering Tirohanga) into which this work will be incorporated and do not have a final hazard layer available at this time. However, Figure 9 below shows the expected extent of the updated flood hazard mapping in the vicinity of 23 Pomare Rd.

Figure 9: Updated flood hazard extents in the vicinity of 23 Pomare Rd

Statement

Wellington Water has updated the Petone stormwater hydraulic model to better reflect the topography and site features at 23 Pomare Road, Tirohanga. This modification was completed following a discussion with the property owner and a visit to the property to confirm the site features discussed.

The updated model results show that the property is only impacted by modelled flooding along its western boundary. This change will be reflected in the upcoming Hutt City Council notified Proposed District Plan superseding the current Draft District Plan maps. In addition, Wellington Water confirms they are satisfied with the outcome and consider the current building footprint to be flood free during the modelled design event.

For further information or additional details regarding the modelling please email the Modelling Team at Modelling.Team@wellingtonwater.co.nz.

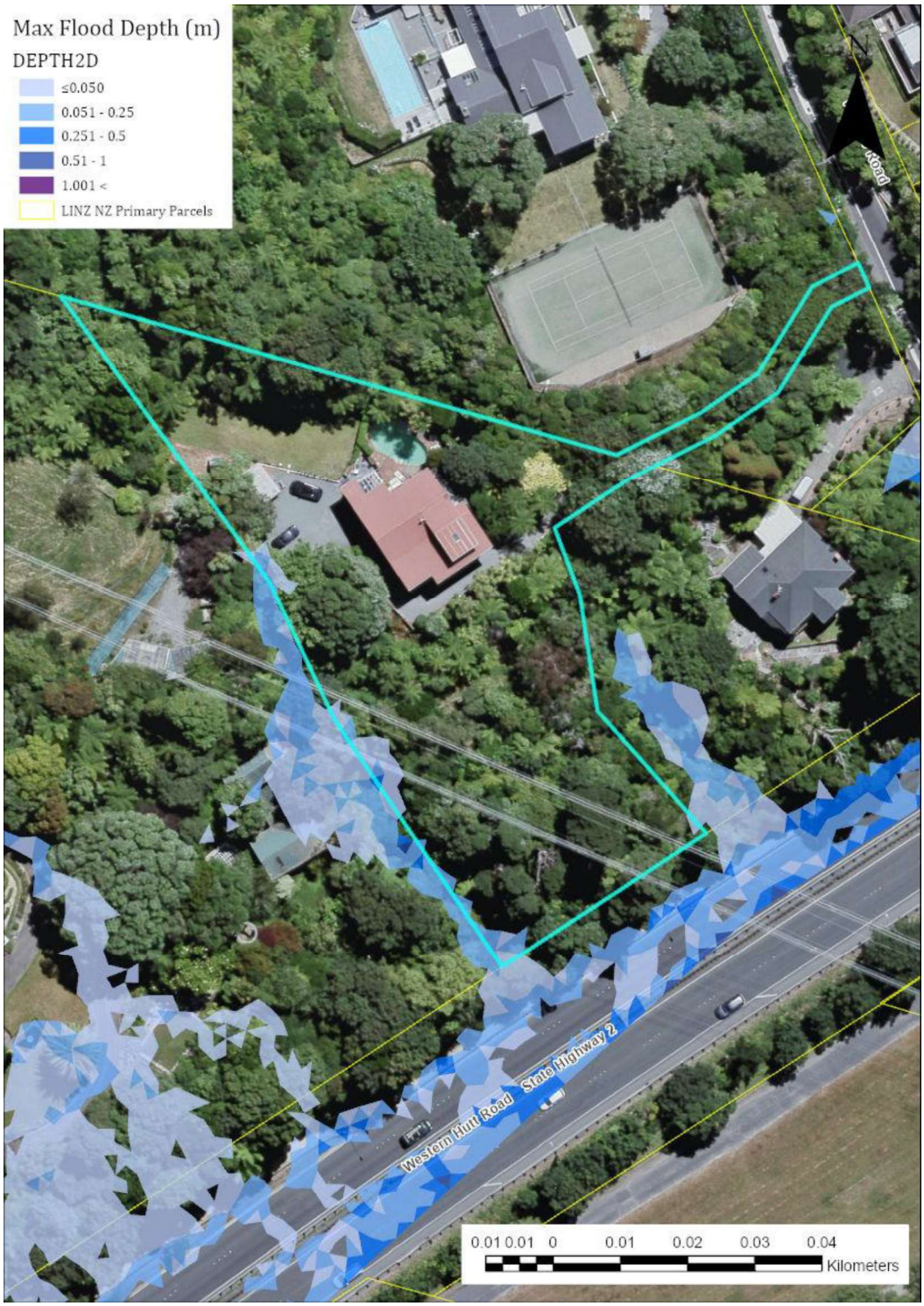

Figure 8a: Updated model results in the vicinity of 23 Pomare Rd during the 1% AEP event plus climate change