

## Appendix 4 – Flooding Assessment

Ms Keenan has provided a summary of modelled flooding on the application site and surrounding area:

- In terms of the flooding nature of the site, this section of river is located within the highly tidal reach.
- The council land along the right bank of the river is raised compared to the levels originally in the application site and levels on the opposite bank. At current levels, this Council land would be expected to contain river flows within the river channel on this right bank in present day events up to and including the 1 in 200 year 'major flood event'.
- Sea level rise will result in some extension of flooding from the river on the remaining lower portions of the site following previous consented filling however due to tidal nature of the site, the effects of any displacement would be expected to be extremely limited.
- For the future modelled flood events (following up to one metre of sea level rise) that could have extended into the application site prior to filling, the peak of the critical storm events would be expected to be at high tide, often following a period of flow passing from the estuary to the upstream area even following a design rainfall event in the upstream catchment (i.e. the tidal levels dominate to the extent that very high river flows are paused and reversed for a period). During lower portions of the tidal cycle, even following one metre sea level rise, most events would still be expected to be able to pass downstream without extension beyond the pre-existing raised river margin. At the times where the tidal cycle limits and reverses these river flows, the floodplain would be expected to extend across a very expansive tidal area, with peak flood levels in Gould Crescent very similar to and very much driven by those in the estuary. Even in present day 1 in 10 year modelled events, the critical event resulting in the highest flood levels in the vicinity of Gould Crescent is a 1 in 10 year tidal event, not a 1 in 10 year rainfall event. As sea level rise progresses, this tidal dominance is going to get more pronounced in this area, very much limiting the potential effects of filling, even very extensive filling.

As Ms Keenan has noted displacement to adjacent residential properties is unlikely to be affected by filling on the site due to the tidal nature of flooding present in the Heathcote River. Ms Keenan notes that care should be taken when modifying ground levels to ensure it does not adversely impact on any natural drainage patterns between adjacent sites and that run off from these modified areas is appropriately managed. This is in relation to the sites directly connected to the application site and not sites across the waterway.

The flooding aspects of the application relate to previous works onsite, finished floor levels and retrospective filling of the reserve areas (haulage route and bunding). I discuss these in further detail below. I'd take out the , but again, it's your wording.

### *Existing filling on the application site*

The earthworks on the site (now of a sealed formation) have been previously assessed in the land use consent RMA/2013/1990 (RMA/2019/1823). Notwithstanding, members of the public has raised concerns regarding the development including flooding aspects. Ms Keenan has provided commentary on these aspects:

- Ms Keenan comments that Senior Planning Engineer Brian Norton has noted that the Portlink development will be adding a fractional increase to the flow in the Heathcote River (albeit only for storms where the basins are full and bypassing, so well in excess of 25mm rainfall depth), and this will have an infinitesimal effect on water levels in the river as opposed to the comparatively massive tidal fluctuations. This aspect has been addressed in previous consent processes, with the modified works consisting of landscaping areas that will have negligible stormwater runoff effects on sites in other portions of the river floodplain.
- A resident has commented that they were refused by Council to seal part of their driveway due to flooding effects in the rainwater catchment and question how the portlink development were able to seal their site. Council officers have been unable to locate any records of this matter. It is likely that this driveway sealing would currently be allowed with appropriate drainage provisions.
- *As noted, safety effects of containers toppling have been assessed above.*

### *Finished Floor levels*

The existing containers (if interpreted as buildings) are not meeting the required floor levels of the fixed floor level overlay within the flood management area. Ms Keenan has provided the following commentary.

*"I understand from the application (page 65 of 22/1718272) that existing ground levels across the site vary from approximately 11.9m to over 12.8m in the areas where containers and any other future buildings are to be placed (i.e. outside swale and vehicle access areas). Containers placed across the majority of the site would therefore be expected to comply with the District Plan FMA FFL compliance level of 12.3m. If any containers or future structures were to be placed without significant ground clearance in the lower portions of the site, these might fall slightly below this level. While not a materials expert, I suspect that this would not result in 'material damage' to the containers if they were inundated, however obviously there could be significant contents damage, and we wouldn't want to see contamination of the floodwaters from some of the products potentially transported in these. Any likelihood of inundation though is limited to significant flood events following significant sea level rise. The modelled 'major flood event' level at this site following one metre sea level rise is 12.02m. Any structure placed above the proposed ground levels is likely to exceed this level in FFL. There are significant uncertainties in this modelled level, especially relating to the extremity of future tidal and rainfall events with the changing climate, which is why the District Plan adopts a minimum 400mm freeboard above raw model results, however this has been modelled based on the best currently available projections of these factors. I would strongly recommend that any future permanent site structures be placed with a minimum FFL set 400mm above the 'major flood event' model results available at that time (i.e. 12.42m currently)."*