AUP Chapter E36.9 Flood Hazard Risk Assessment Report

Prepared by Ewaters New Zealand Ltd, Flood Assessment Engineering Consultants

Site Address: 360 Dominion Road, 88 Prospect Tce and 113 Grange Road, Mt Eden

Application No: tba

(a) The frequency, duration and scale of the flooding hazard;		
State If the site being developed will be impacted by flooding in more frequent events than 1 % AEP *If assessment is for overland flow, determine trigger event as well as 1% AEP scenario.* *An assessment of the duration of the flooding hazard for the 1 % AEP event should be made supported with a study of the hydrology of the contributing sub catchments* that is appropriate for the scale of the risk.* *Describe extent of flooding on site along with discharge rates, depths and velocities at critical points on the developed site.*	**Existing Development** The frequency of flooding relevant to the site comprises: the 2-year event and greater for the car park; and the 5-year event and greater for the existing building. The flooding duration is relatively short, less than a few hours. The flooding hazard is low. Although the frequency of flooding is relatively high for a developed commercial site the hazard to life is low. This is due to the relatively shallow flooding and low velocities. **Proposed Building** The proposed building has been designed to manage events up to and including the 1% AEP. An emergency overflow weir has been designed for storms events of a lower AEP or greater rainfall intensity. The proposed design discharges stormwater to the existing (pre-developed) locations and match the existing peak flow rates. Velocities are relatively low at the discharge points and do not increase flood depths	Low
(b) the type of activity being undertaken and its vulnerability to flooding events;		
Identify the activity or activities incorporated in the proposed development as listed in table E36.4.1. Described the vulnerability (exposure) of the activity or activities to the flood events determined by the investigation into the flooding hazards impacting the site described in E36.9(a). This should include whether the building footprint, any vehicle parking area and means of egress are within the flooding extent	**Existing Development** The type of activity being currently undertaken on site is of a commercial nature. The existing building erected on site is quite vulnerable to flooding. The building has been built in the direct path of the overland flow without proper design of infrastructure to manage the stormwater. The overland flow path enters the eastern boundary floods the carpark and the flow splits almost in half. Half of the overland flow passes through the building and discharges to Dominion Road. The other half is redirected by the building and discharges to Prospect Terrace. Pathway and depth of the 100-year flow path within the site area is detailed in the Flood Assessment Report (Ewaters New Zealand Limited). **Proposed Development** The proposed use of the site is for a new mixed-use development comprising a supermarket, retail, commercial and residential activities. The proposed development will limit stormwater to the designated stormwater infrastructure and not impact the ingress and egress of the new building.	Low
(c) the consequences of a flooding event in relation to the proposed activity and the people likely to be involved in that activity;		
Identify the impacts on the proposed activity during a flood event e.g. if the building footprint is fully or partially within the flooded area what level will the flooding reach in respect to the living areas and other components of the dwelling. If egress from the building will be flooded, to what depth and for what period of time. Identify any potential for damage to, or deterioration of, the structural and functional integrity of the building resulting from the intensity and or frequency of flooding.	**Existing Development** There has been little stormwater mitigation and control built into the existing development, which is why the current building is potentially subject to flooding in a 5-year event. The building, carpark and surrounding site do provide “unintentional” flood storage. These measures do provide flood mitigation for the wider catchment. Current measures to control runoff from the overland flow path are detailed in the Flood Assessment Report. **Proposed Development** Under the development proposal the existing buildings will largely be demolished. The proposed use of the site is for a new mixed-use development comprising ground level carparking, retail, commercial and residential activity. Ground floor activity is generally vulnerable to natural hazards however the development includes appropriate design cognisant of the overland flow path and it is worth noting the majority of commercial, retail and residential activity is located at first floor level or above.	Low
(d) the potential effects on public safety and on other property;		
Describe effects on public safety if the activity will include public use. Identify any potential flooding of upstream or downstream properties that may be affected by the proposed activity	With design measures employed consequences of a flooding event in relation to the proposed activity and the likely effect on people involved in that activity is minimised through best practice design. Note: the adjoining residential property potentially most effected by the overland flow path is 111 Grange Road. This property falls in contour from the street frontage to the rear boundary. While the dwelling is approximately at grade at the front of the site, being located on piles and with the natural fall of the site, the rear of the dwelling is sited well above (+1.5m) ground level and the natural low point of the overland flow path. Therefore, the proposed development does reduce flood risk for the property of interest and upstream properties. The design mitigates both flood hazard and flood risk and does not increase either for adjacent properties or public safety.	Low

(e) Any exacerbation of an existing flooding hazard risks or creation of a new flooding hazard risk;		
Describe results of investigation into any potential effects on other property if the activity results in diversion of flood flow or overland flow. Identify any new activity that results in an increase to the number of people exposed to an existing flood risk.	The proposal does not change the overland flow path route but it does change the way (medium) stormwater flows over the site. There is a consistent engineered fall in gradient from the flow path entry into the site until the flow path exit. The proposal reduces the risk of flooding associated with the existing overland flow path to the property and will not exacerbate flooding for any of the adjacent properties. The proposal will not create any new natural hazards. The proposal is to manage (control) the overland flow path to avoid flood water entering habitable spaces. The property owners and occupiers of the dwellings which immediately adjoin the eastern boundary and are proximate to the flow path are the most likely parties to be affected by any change. Any potential effects on public safety and on other property have been canvased in the Flood Assessment Report and are concluded from this report to be minimal and in some cases represent an improvement on current conditions. The entry and exit points of the overland flow path are the same as pre-development and the flow path extent and depth are largely unchanged.	**Low**
(h) the design and construction of buildings and structures to mitigate the effects of flooding		
Decribe how the potential flooding effects identified above, determined by investigation and described in detail in a flooding report, will be mitigated by the design and materials of the building.	The design and construction of buildings and structures include new mitigation measures to better manage the overland flow path and possible effects of flooding using best practice. These include a redefined overland flow path channel and appropriate planting of this area from the middle of the eastern boundary across the rear of the site to Prospect Terrace; an underground central diversion culvert; and associated detention and outflow regulators to manage stormwater. An emergency weir has been designed in the event the of a storm occurs with a greater return period than the regulatory requirements of 1 in 100 year. These mitigations are more fully described in the Infrastructure Report (Robert Bird, 3 March 2021).	**Low**
(j) site layout and management to avoid or mitigate the adverse effects of flooding hazard, including access and exit during a flooding event;		
Decribe how the potential flooding effects identified above, including any effects on upstream and downstream properties, determined by investigation and described in detail in a flooding report, will be mitigated by the design form of any structures and site works. Describe measures proposed to provide safe egress from property	Proposed earthworks have been designed to be consistent with the existing topography and involve the minimum possible excavation. There is no basement carparking located on the site largely to avoid the large extent of fractured basalt at depths ranging from 0.4m to 1.5m. The overland flow path enters into the subject site from the east, splits into two paths and exits into the site frontage on Dominion Road and Prospect Terrace as it does currently. Civil design includes a staged approach to construction that enables changes to be made to the overland flow path as described without reducing functionality during the construction programme. The site layout and design strategy employed manages, avoids or mitigates any potential adverse effects of flooding risk and hazard including access and exit during a flooding event. Onsite diversion and detention measures enables the ground floor carpark area to be operated without potential intrusion of stormwater other than in very exception circumstances. Additional mitigation is provided by normal kerb and channeling around the carpark.	**Low**
(l) any measures and/ or plans proposed to mitigate the flooding hazard or the effects of the flooding hazard.		
Describe any other measures to mitigate the flooding hazard which can include information about future works planned by Auckland Council in the wider catchment that will reduce the flooding risk. *Include any other measures to mitigate effects that are not described above.*	Along the eastern boundary special attention has focused on providing measures and/ or plans to mitigate the flooding hazard or the effects of the flooding hazard in this critical part of the overland flow path. The natural low point in contour of the overland flow path occurs close to the eastern boundary at the rear of 111 Grange Road and 86A Prospect Terrace properties. We are discussing with these owners how flooding hazard can be further alleviated with a deeper channel, more appropriate planting and fencing along the common boundary and in part on to their sites to ensure the most efficient passage of flow without obstruction.	**Low**