Frank Kitts Park Redevelopment

Natural Hazard Report for Resource Consent

Wellington City Council & Fale Malae Trust

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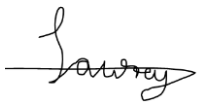
Author signature		Approver signature	
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1 Overview

1.1 Introduction

This report aims to collate information and address the natural hazard provisions included in the Partially Operative Wellington City Council (WCC) 2024 District Plan (Plan) to support the resource consents associated with the re-development of Frank Kitts Park and the development of the National Fale building. Both project teams, for the redevelopment of the park and in the design of the Fale building, have considered natural hazards throughout design to establish a resilient public and cultural area on the Wellington waterfront. The report outlines:

- The relevant requirements included in the Plan.
- How direct Plan requirements have been addressed for each of the consenting projects.
- Relevant RMA requirements.
- Relevant Ministry for the Environment guidance and how that compares with Wellington Water inputs into the Plan.

We believe the two projects address the relevant requirements and demonstrate consents can be granted for these projects with respect to the natural hazard requirements.

1.2 Brief

The core purpose of this report is to provide information to address the natural hazard provisions within the Plan, demonstrating compliance with the recently updated requirements.

1.3 Overview of Consenting Projects

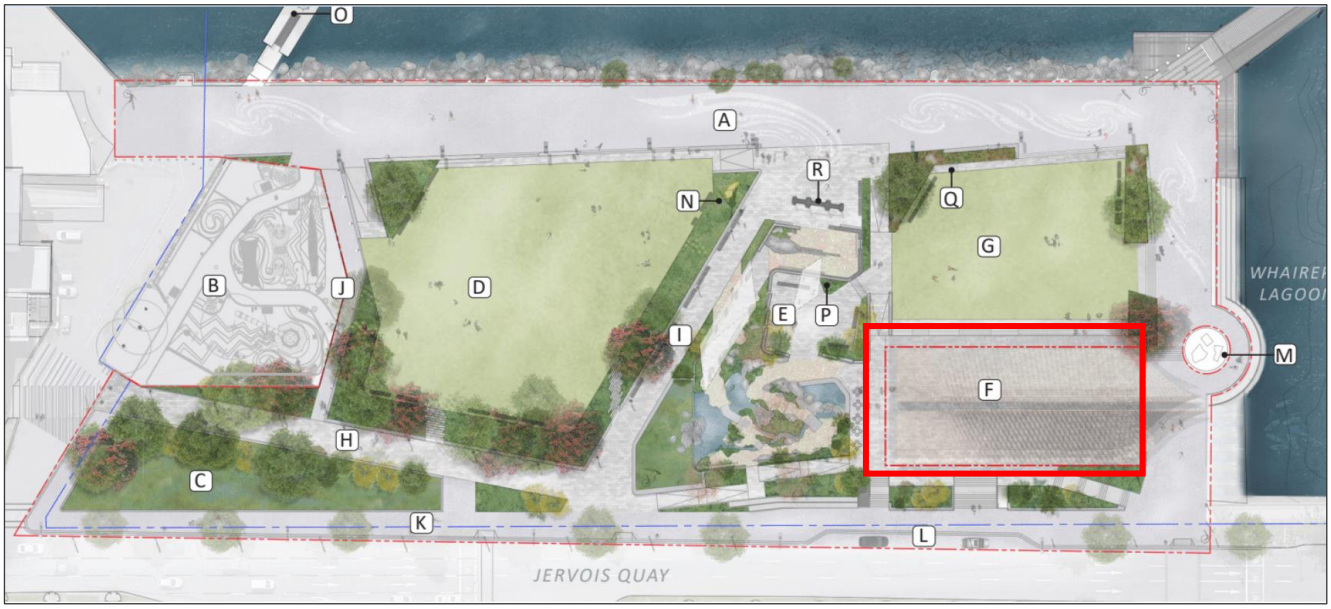

Figure 1-1 Project Plan

1.3.1 Frank Kitts Park Redevelopment

Frank Kitts Park is a prominent public space on the Wellington waterfront. The upgrade of the iconic playground has already been completed as part of a previous redevelopment scheme (marked on the plan above as B). The redevelopment proposed includes the removal of the existing earthquake prone underground carpark building on the southern side of the park, removal of the amphitheatre and the inclusion of a Chinese Garden as part of the redevelopment. The latter two were authorised in the previous redevelopment scheme along with the updated playground, though the carpark building demolition has made way for corresponding refinements to the Chinese Garden. The demolition will also enable the previously authorised 'city lawn' atop the carpark building to be established at grade with the waterfront promenade. This space is designed to also function as the Malae adjacent to the Fale building.

1.3.2 Development of the Fale Building

The development of the Fale building will act as a national Pasifika centre positioned in this prominent waterfront location to connect with the harbour, public spaces, and other civic and cultural buildings like Te Wharewaka o Pōneke. In addition to that main function of the building, a café is also proposed at first floor level. The basement level will replace existing dragon boat storage and public toilet facilities and provide toilet and kitchen facilities for the Fale.

1.3.3 Subdivision

A subdivision is proposed to create a new title around the proposed Fale building. A further strata title subdivision is proposed to delineate first floor and basement level.

2 Relevant District Plan Requirements

2.1 Definitions

Table 2-1 Relevant Definitions WCC 2024 District Plan

Definitions	
HIGH COASTAL HAZARD AREA	*means the mapped extent within the District Plan for the following coastal hazards:* *a. Current sea level inundation;* *b. Coastal erosion from existing sea level; or* *Tsunami – 1:100 year inundation scenario with 1m of Sea Level Rise*
MEDIUM COASTAL HAZARD AREA	*means the mapped extent within the District Plan for the following coastal hazards:* *a. Coastal inundation with 1.43m of Sea Level Rise; or* b. *Tsunami – 1 in 500 year ARI inundation scenario with 1m of Sea Level Rise.*
LOW COASTAL HAZARD AREA	*means the mapped extent within the District Plan for the following coastal hazards:* *Tsunami – 1:1000 year inundation scenario with 1m of Sea Level Rise.*
LESS HAZARD SENSITIVE ACTIVITIES	*means the following land use activities:* *a. Accessory buildings used for non-habitable purposes* *c. Buildings associated with marina operations (above MHWS)* *d. Maritime emergency facilities* *e. Informal recreation activities and organised sport and recreation activities within the Sport and Active Recreation Zone, including those for maritime purposes in the Evans Bay Marine Recreation Area* *f. Parks Facilities* *g. Parks Furniture* *h. Quarrying activities*
POTENTIALLY HAZARD SENSITIVE ACTIVITIES	*means the following land use activities:* *a. Buildings associated with primary production (excluding Residential Units, Minor Residential Units, Residential Activities, buildings identified as Less Hazard Sensitive Activities or Quarrying Activities)* *b. Commercial Activity* *c. Commercial Service Activity* *d. Community Corrections Activity.* *e. Entertainment Facility* *f. Food and Beverage Activity* *g. Industrial Activities* *h. Integrated Retail Activity* *i. Large Format Retail Activity* *j. Major Sports Facility* *k. Offices* *l. Retail Activities* *Rural Industrial Activities*

HAZARD SENSITIVE ACTIVITIES	*means the following land use activities:* *a. Childcare Services* *b. Community Facility* *c. Educational Facility* *d. Emergency Service Facilities* *e. Hazardous Facilities and Major Hazardous Facilities* *f. Healthcare facility* *g. Hospital* *h. Marae* *i. Multi-unit housing* *j. Places of Worship* *k. Residential Units and Minor Residential Units (including those associated with Pakakainga)* *l. Retirement Village* m. *Visitor Accommodation*

2.2 Relevant Requirements

Table 2-2 Relevant Clauses WCC 2024 District Plan

Relevant Policies	Requirements	Relevant Project Components
NH-P3	***Less hazard sensitive activities*** *Allow for subdivision, use and development associated with less hazard sensitive activities and associated additions to buildings within the Natural Hazards Overlays, provided that:* 1. *It can be demonstrated that overland flowpaths are unimpeded and unobstructed;* 2. *The building, structure or the additions are not located within a stream corridor; and* 3. *The risk to people and property from the 1% Annual Exceedance Probability flood is minimised.*	▪ **Park Redevelopment** ▪ **Subdivision** ▪ **Fale building (dragon boat storge and public toilets)**
NH-P6	***Potentially hazard sensitive activities and hazard sensitive activities within the identified inundation areas of the Flood Hazard Overlays*** *Manage subdivision, development and use associated with potentially hazard sensitive activities and hazard sensitive activities within inundation areas by:* 1. *Ensuring subdivision, development and use incorporates mitigation to ensure the risk to people and property from the 1% Annual Exceedance Probability flood event is minimised; and* 2. *Avoiding the construction of new buildings, or the conversion of existing buildings that contain a hazard sensitive activity within identified inundation areas of the Flood Hazard Overlays where the finished floor level is below the 1% Annual Exceedance Probability flood levels.*	▪ **Subdivision** ▪ **Fale building (café)**
NH-P7	***Potentially hazard sensitive activities and hazard sensitive activities within the overland flowpaths of the Flood Hazard Overlays*** *Manage subdivision, development and use associated with potentially hazard sensitive activities and hazard sensitive activities within the overland flowpaths by:* 1. *Incorporating mitigation measures that minimise the risk to people and property from the 1% Annual Exceedance Probability flood;* 2. *Ensuring the conveyancing of flood waters through the stream corridor or overland flowpath is still able to occur unimpeded and is not diverted onto adjacent properties; and* 3. *Ensuring that people can safely evacuate from properties during a 1% Annual Exceedance Probability flood event.*	▪ **Subdivision** ▪ **Fale building (café)**
CE-P13	***Less hazard sensitive activities*** *Allow less hazard sensitive activities within all hazard areas of the Coastal Hazards Overlays*	▪ **Park Redevelopment** ▪ **Subdivision** ▪ **Fale building (dragon boat storage and public toilets)**

CE-P17	***Potentially hazard sensitive activities within the medium coastal hazard areas*** *Provide for potentially hazard-sensitive activities in the medium coastal hazard areas, or any subdivision where the building platform for a potentially hazard-sensitive activity will be within the medium coastal hazard areas where it can be demonstrated that:* *1. The activity, building, or subdivision incorporates measures that minimise the risk to people and property from the coastal hazard; and* *2. There is the ability to access safe evacuation routes for occupants of the building in case of a tsunami.*	▪ **Subdivision** ▪ **Fale building (café)**
CE-P18	***Hazard sensitive activities in the medium coastal hazard areas*** *Provide for hazard-sensitive activities in the medium coastal hazard area where, or any subdivision where the building platform for a hazard-sensitive activity will be within the medium coastal hazard area, where it can be demonstrated that:* *1. The activity, building, or subdivision incorporates measures that minimise the risk to people and property from the coastal hazard;* *2. There is the ability to access safe evacuation routes for occupants of the building from the coastal hazard;* *3. If the activity has a post disaster function, mitigation measures are incorporated to allow for the continued operation following a coastal hazard event; and* 4. *For healthcare facilities, retirement villages, educational facilities and childcare facilities, there is an evacuation plan that allows for the safe removal of all occupants prior to the arrival of the coastal hazard.*	▪ **Subdivision** ▪ **Fale building (excluding the café and dragon boat storage and public toilets)**
EW-P17	***Earthworks within Flood Hazard Overlays*** *Provide for earthworks in Flood Hazard Overlays only where:* *1. They would not significantly increase the flooding risk, when compared to the existing situation, to the site or neighbouring properties through the displacement of flood waters; and* *2. The ability to convey flood waters along overland flowpaths or stream corridors is not impeded as a result of the earthworks.*	▪ **Park Redevelopment** ▪ **Fale building**

2.3 Natural Hazard Overlays

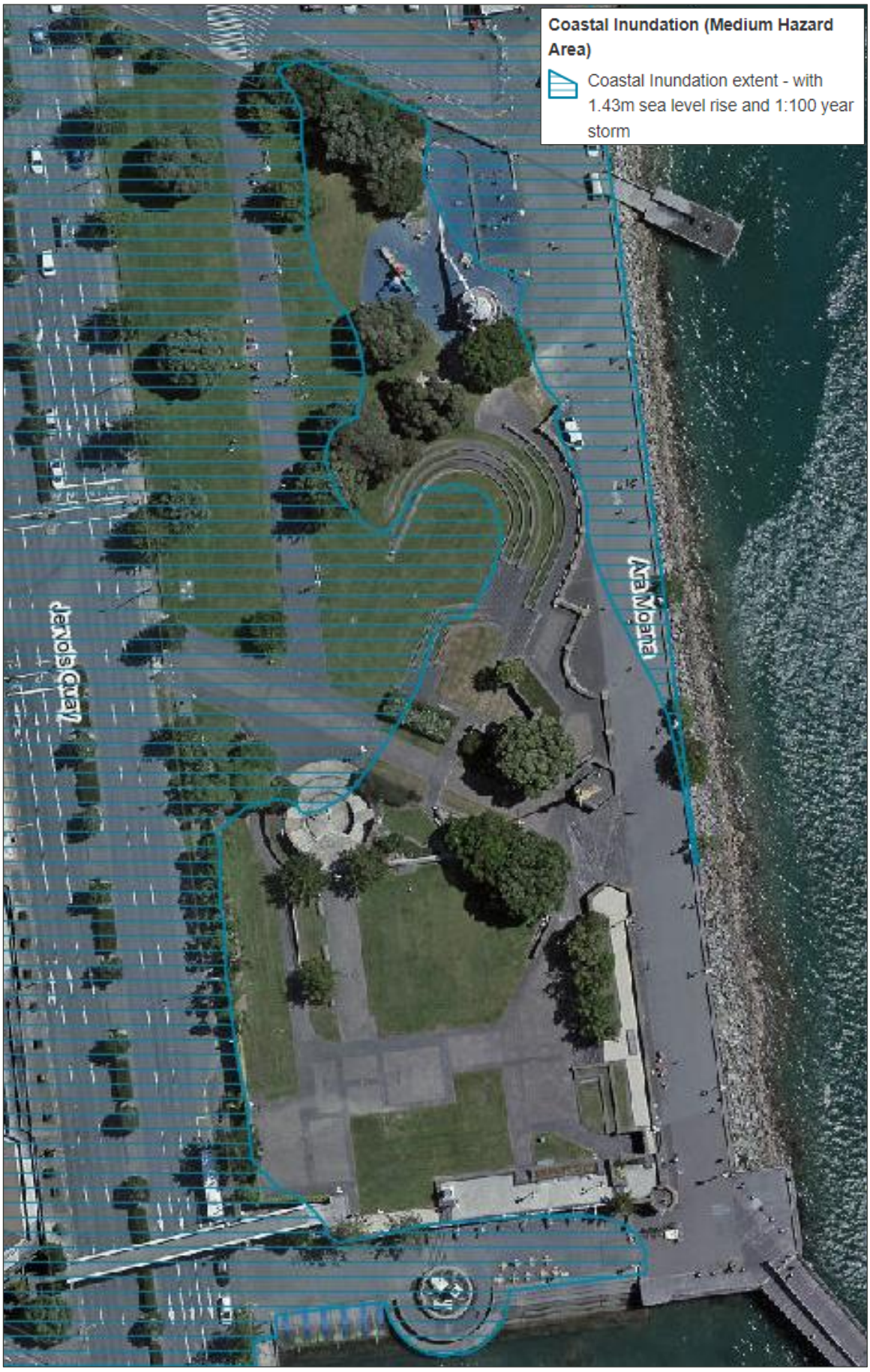

Figure 2-1 Coastal Inundation Overlay (WCC 2024 District Plan)

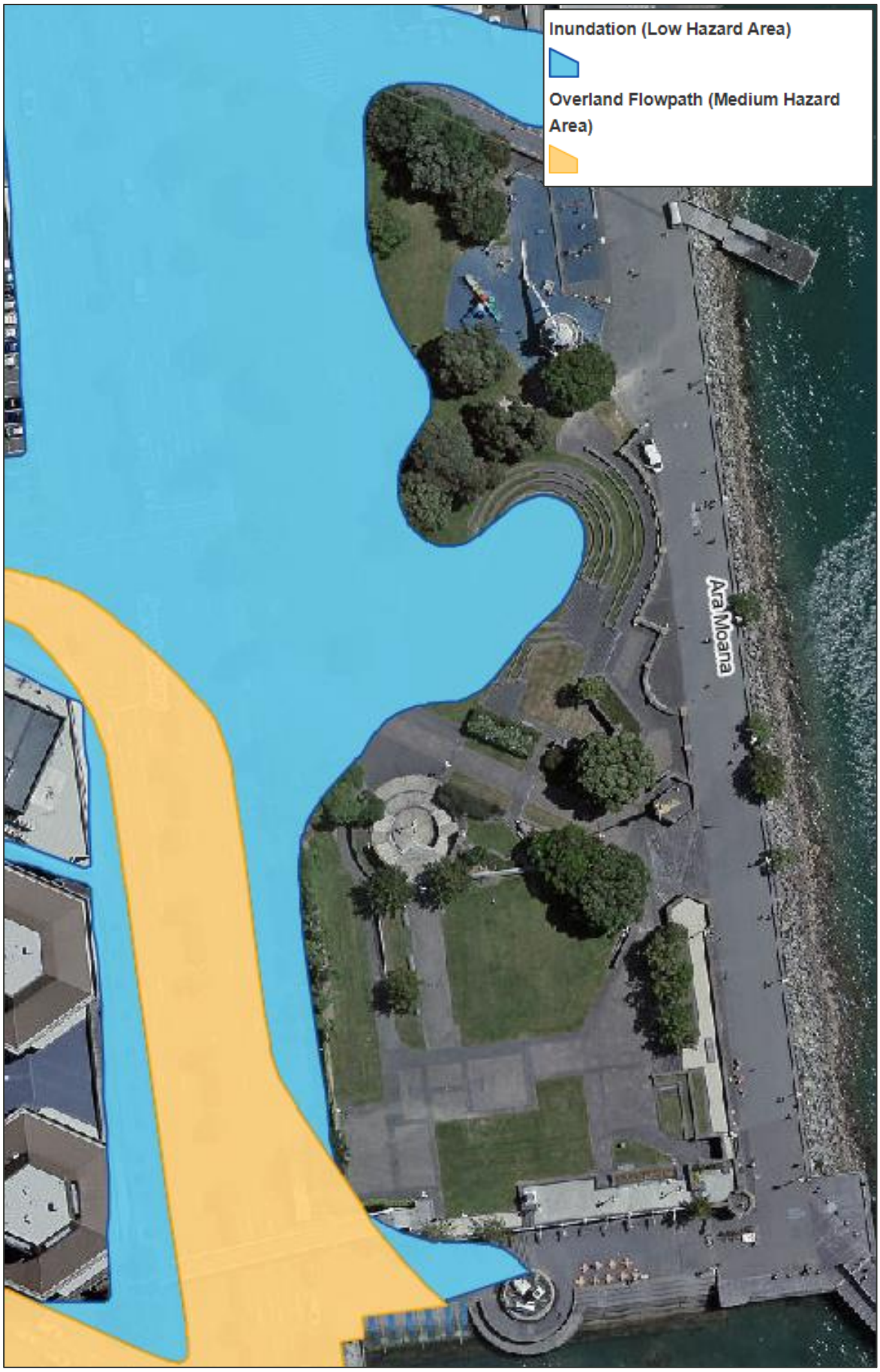

Figure 2-2 Flood Hazard Overlay (WCC 2024 District Plan)

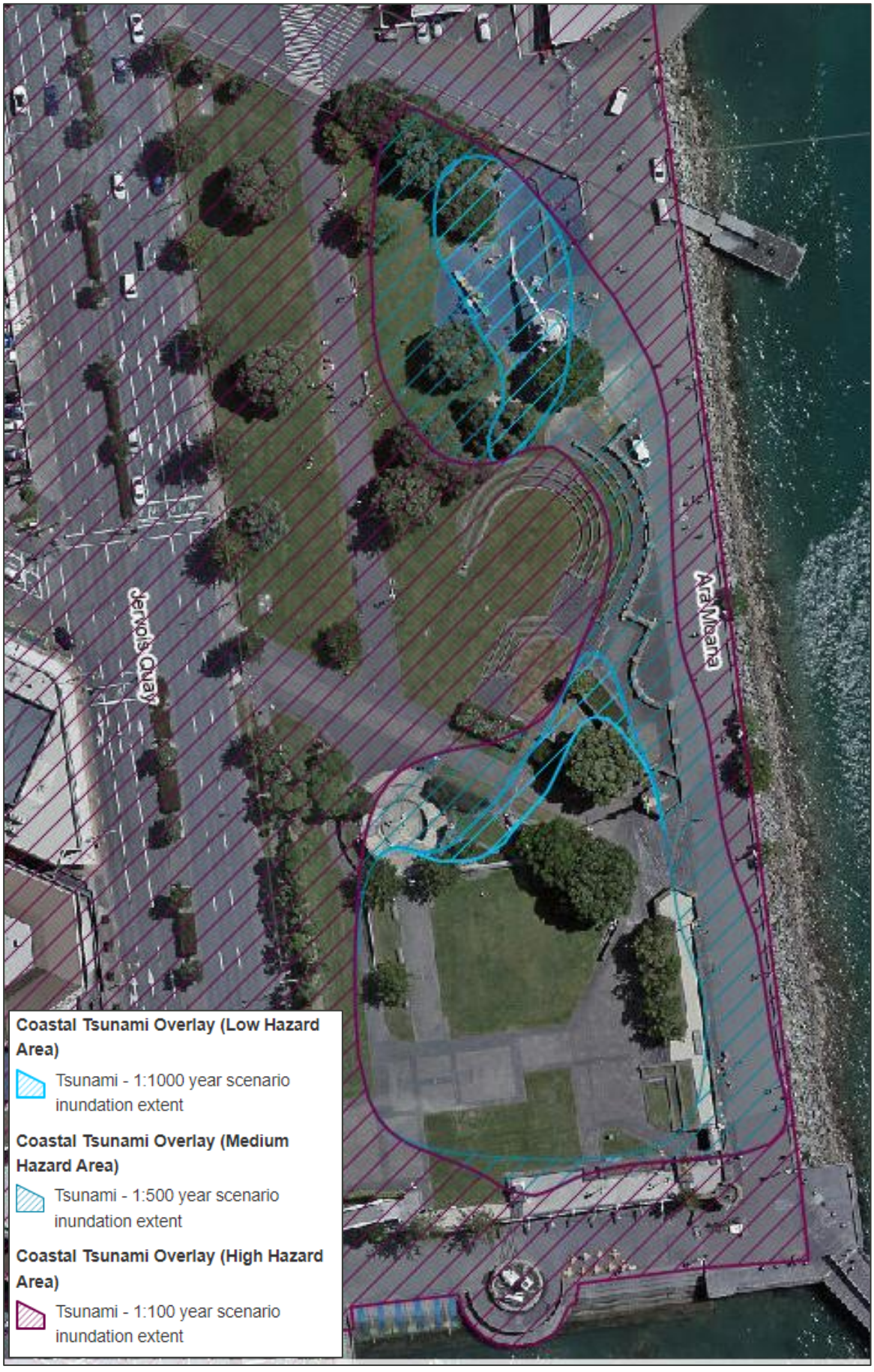

Figure 2-3 Tsunami Hazard Overlay (WCC 2024 District Plan)

Figure 2-4 Coastal Hazard Area Overlay (Blue = Medium, Red = High)

3 How Requirements Are Addressed

The redevelopment of Frank Kitts Park and the construction of the Fale building both include works situated within *medium coastal hazard areas* under the Plan (Figure 2-4).

The following sections identify the current and proposed activities associated with each project component and outlines how they each address the requirements listed in the section above.

3.1 Park Redevelopment

3.1.1 Relevant Activities

Table 3-1 Relevant Activities Associated with Park Redevelopment

	Current Activities	Proposed Activities
Less hazard sensitive activities	▪ Park facilities, Parks furniture ▪ Accessory buildings used for non-habitable purposes (e.g. public toilets, dragon boat storage underground carpark)	▪ Park activities, Parks furniture
Potentially hazard sensitive activities	▪ Food and Beverage Activities, (Cafés on promenade). ▪ Commercial Activity (shops on promenade).	
Hazard sensitive activities	No *Hazard sensitive activities* identified.	No *Hazard sensitive activities* identified.

3.1.2 Flood and Coastal Inundation Hazard

Current Flood Impacts

The coastal inundation and 1% Annual Exceedance Probability flood events (as defined in the Plan) both have similar effects on this site (Figure 2-1 and Figure 2-2). During these events, the existing site has flooding along the western side of the site, at the base of the current amphitheatre area, and inside the underground carpark area.

Flood Impacts & Mitigations of Proposed Re-development

The proposed park design will include removed activities classed as *Potentially Hazard Sensitive Activities* with the removal of the eight commercial businesses on the park's promenade.

The park incorporates measures that reduce or do not increase the existing risk to people, and property from the coastal hazard.

The park redevelopment does not involve the removal or modification of a natural system or feature that provides protection to other properties from the coastal inundation hazard.

The risk to people and property from the 1% Annual Exceedance Probability flood inundation *and coastal inundation events* (as defined in the Plan) are minimised as:

- There is an increase in ground levels in the area prone to flooding (the amphitheatre and surrounds),
- The flood-prone underground carpark is removed.
- Te Papa Whenua (noted as C on the plan in section 1.3) is designed as a raingarden to act as permeable area to reduce flooding and slow overland flow.

As shown in Figure 2-2, only a small portion of the site is subject to the overland flow path (medium risk) with the only proposed park features within this area being two light poles, 1 Raukura sculpture and some hard and soft landscaping adjacent to Jervois Quay.

3.1.3 Tsunami

Figure 2-3 shows the extent of tsunami hazards mapped within the park area. The extent of the underground carpark and overlying park space currently overlaps with the 1:1000-year tsunami event (low hazard) overlay. The removal of the underground carpark and the subsequent park space on top, mean they would no longer be areas of the park that would remain above the 1:1000-year tsunami event overlay (Figure 2-3). Despite this, there are areas that would maintain elevation above the 1:100 and 1:500-year tsunami event overlay (Figure 2-3).

The park redevelopment aims to minimise the use of structural features and soil retaining in the landscape. The design also includes durable and robust furniture and finishes. These decisions have been made to reduce and minimise the effect of Tsunami to the park in a higher probability event.

The ground level within the main ‘active’ area of the proposed park within the high tsunami risk area is being raised by up to 2.5m per Figure 3-1.

In a low probability event, the focus will be on effective evacuation.

3.1.4 Earthworks

Earthworks involved in the redevelopment of this park would not significantly increase the flooding risk, when compared to the existing situation, to the site or neighbouring properties through the displacement of flood waters. This is illustrated in the hydraulic modelling undertaken and discussed in section 5 of this report (Figure 5-2 & Figure 5-3). The proposed earthworks raise ground levels in flood-prone areas reducing risk by better maintaining overland flow paths and avoiding ponding.

The ability to convey flood waters along overland flow paths or stream corridors is not impeded as a result of the earthworks.

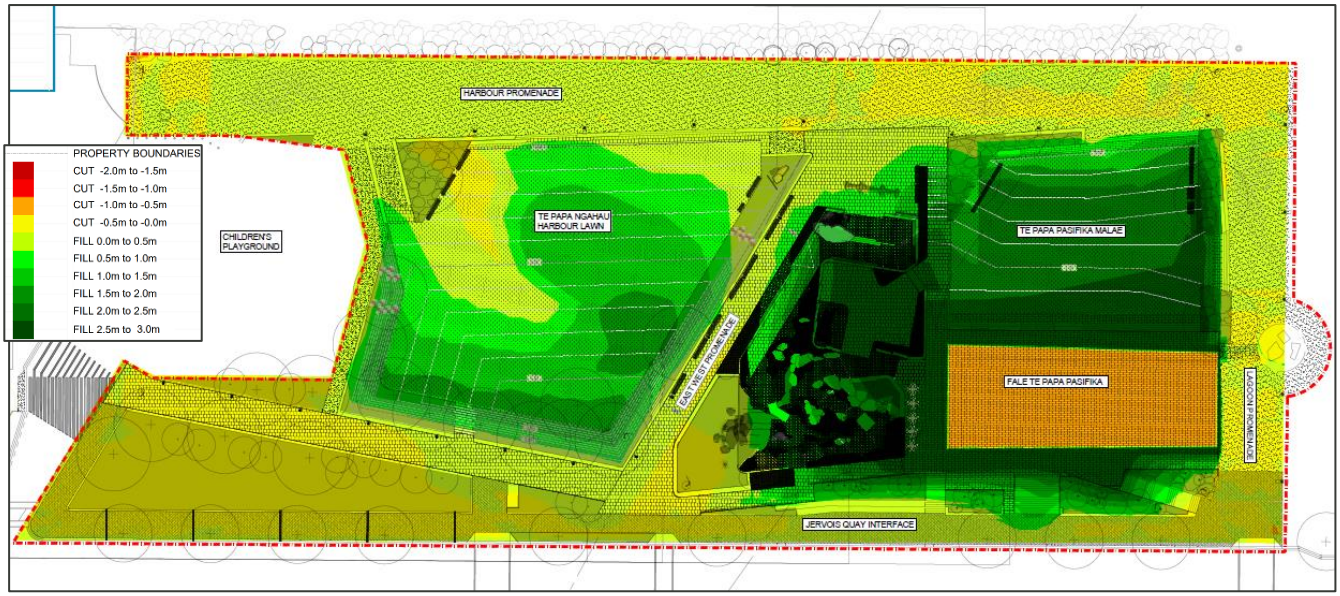

Figure 3-1 Cut/fill Plan (Tonkin+Taylor)

The contour plan shows the lower finished level of the bioretention garden (raingarden). See Figure 3-2 below. When this begins to fill, this area may pose as a hazard for users of the park. The project volunteers the requirement for a separation between the raingarden and the surrounding footpath. For example, this could be achieved though the inclusion of tall rushes/grasses around the periphery to create a natural barrier.

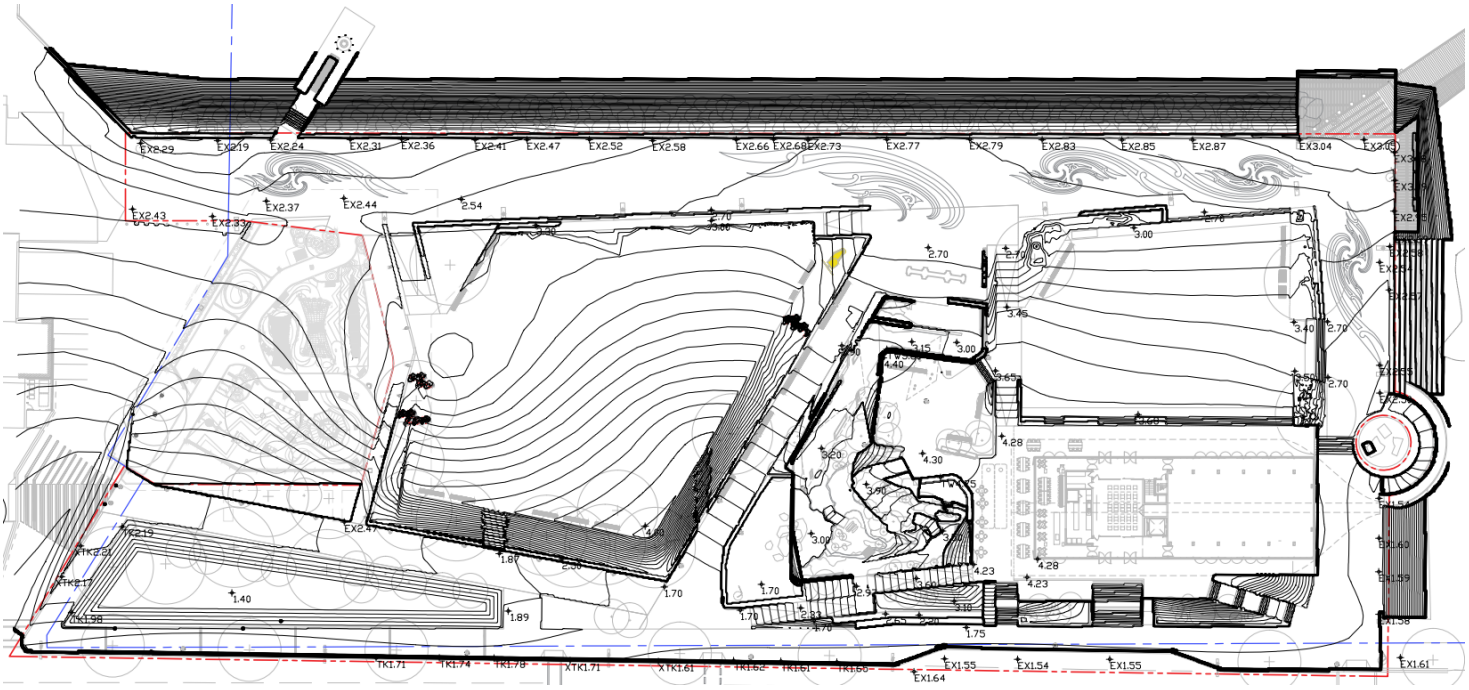

Figure 3-2 Contour plan of proposed site

3.2 Subdivision

3.2.1 Relevant Activities

Current Activities

The following activities are present in the area of the subdivision:

- Park facilities, Parks furniture (on top of carpark) - *Less hazard sensitive activities*
- Food and Beverage Activity- *Potentially hazard sensitive activities*.
- Accessory buildings used for non-habitable purposes (e.g. underground carpark building, public toilets, dragonboat storage) - *Less hazard sensitive activities*

Proposed Activities

The proposed subdivision, to facilitate the Fale building, may include a variety of activities including: *Less hazard sensitive activities, Potentially hazard sensitive activities,* and *Hazard sensitive activities*.

3.2.2 Flood and Coastal Inundation Hazard

It is proposed that the subdivision is conditional upon the following measures and restrictions:

- Any building spaces that include *potentially hazard sensitive activities* below the *1% Annual Exceedance Probability flood* event must include appropriate tanking, sealed penetrations, and any openings able to be sealed to submarine grade to minimise the risk to people and property.
- Any development associated with the subdivision should include provision to direct the existing overland flow path along Jervois Quay ensuring the flow path is not impeded.

- Any critical plant to support continued occupation of a building (e.g. ventilation and electrical systems) to be located above the *1% Annual Exceedance Probability flood and coastal inundation* (as defined in the Plan) levels.
- It is also volunteered that this subdivision includes a restriction that a flood management plan is developed before occupation of a building and includes flood evacuation plan ensuring that people can safely evacuate from the site in the event of a *1% Annual Exceedance Probability flood or a coastal inundation event.*

3.3 Fale Building

3.3.1 Relevant Activities

Table 3-2 Relevant Activities Associated with Fale Building

	Current Activities Associated with Relevant Park Area	Proposed Activities
Less hazard sensitive activities	▪ Park facilities, Parks furniture (on top of carpark) ▪ Accessory buildings used for non-habitable purposes (e.g. public toilets, dragon boat storage underground carpark)	▪ Accessory buildings used for non-habitable purposes (e.g. public toilets, dragon boat storage).
Potentially hazard sensitive activities	▪ Food and Beverage Activity, (cafe activities on promenade)	▪ Food and Beverage Activity (Café),
Hazard sensitive activities	No *Hazard sensitive activities* identified.	▪ Community Facility (Fale)

3.3.2 Flood and Coastal Inundation Hazard

The coastal inundation and 1% Annual Exceedance Probability flood events (as defined in the Plan) both have similar effects on this site (Figure 2-1 and Figure 2-2).

The building incorporates measures that reduce or not increase the existing risk to people, and property from the coastal hazard and the building does not involve the removal or modification of a natural system or feature that provides protection to other properties from the natural hazard.

Despite the presence of more hazard sensitive activities associated with the development, the *risk to people and property from the 1% Annual Exceedance Probability flood and coastal inundation events* (as defined in the Plan) *are minimised* as:

- The area affected in these events is reduced with removal of the underground carpark (this included a large entrance onto Jervois Quay and hence the flow path).
- Direct risk associated with the flow path is mitigated due to removal of the underground carpark (this included large entrance onto Jervois Quay and hence the flow path), better assisting an unimpeded flow path.
- The proposed building will be protected from the flow path thereby assisting an unimpeded and unobstructed flowpath.
- All key sensitive and potentially sensitive activities occupy the ground floor (RL 4,280mm), which is 1,610mm above modelled 100yr ARI flood level (Figure 3-3).
- The proposed consent conditions will require basement design to prevent water entering including sealed penetrations and basement entrance from street level including submarine door. Safe internal egress will be provided to the basement. Design details and consent conditions will require no key plant to be located at basement level (e.g. ventilation and electrical systems).
- Key plant is located in the mezzanine at RL 7,280mm (over 4,000mm above the 100yr ARI flood level, see Figure 3-3).
- The proposed consent conditions will require a flood response plan to be developed before occupation to include consideration for evacuation during 100yr ARI flood *or coastal inundation events* (as defined in the Plan). This will include clear directives to evacuate when extreme events are predicted so safe evacuation can be undertaken before access is reduced by overland flow path.

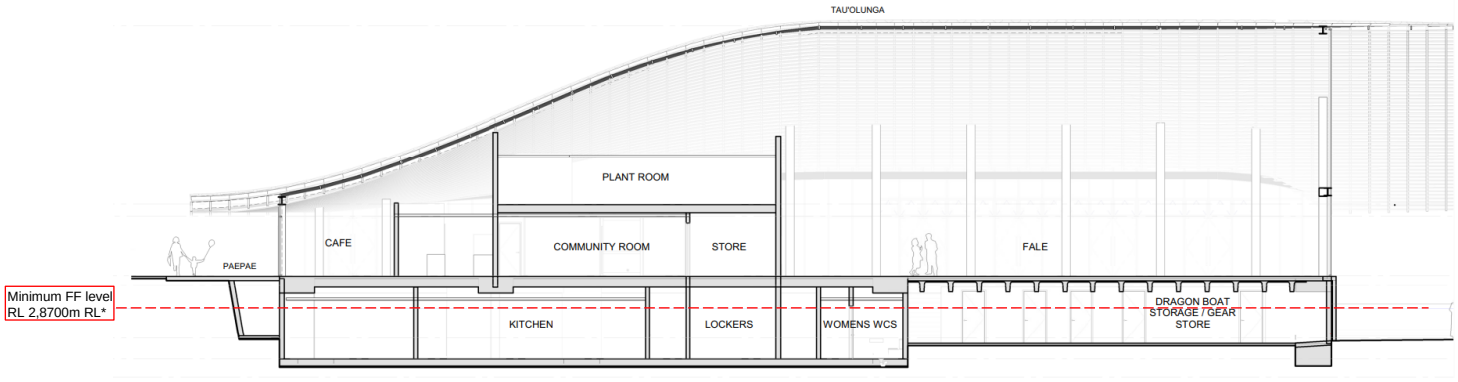

Figure 3-3 Fale Malae Levels

**Modelling established a flood level of 2,870m Wellington Vertical Datum (WVD-53), including a 200mm freeboard allowance. This level is 0.37m higher than the level sourced from Wellington Water. See section 5 for further discussion about how this level was established.*

3.3.3 Tsunami

The Fale building has been designed to have its ground floor level at RL 4,280mm and be positioned 40m away from the direct harbour side edge. These decisions have been made to reduce and minimise the effect of tsunami to the building in a higher probability event 1:100 and 1:500-year tsunami event overlay (Figure 2-3).

In a lower probability event, the focus is life preservation rather than post disaster functionality, so the focus will be on effective evacuation. Consent conditions will require a tsunami evacuation plan to be developed establishing a suitable evacuation route to a safe zone which will be displayed on the building and made familiar to facilities management staff.

3.3.4 Earthworks

Earthworks involved in the development of this building would not significantly increase the flooding risk, when compared to the existing situation, to the site or neighbouring properties through the displacement of flood waters. These works will principally be for establishing building foundations.

The ability to convey flood waters along overland flow paths or stream corridors is not impeded as a result of the earthworks.

4 Resource Management Act (RMA)

4.1 Section 106 RMA:

Section 106 of the RMA outlines that subdivision consent may be refused where there is a significant risk from natural hazards. This document provides information to demonstrate that the actual and potential effects from natural hazards are not anticipated to be significant, and subdivision consent need not be refused.

Through addressing flooding, coastal inundation, and tsunami this report has addressed the key natural hazards posed to the site via flooding, coastal inundation, and tsunami. The project has analysed the likelihood of the hazards and discussed how potential damage has been identified and mitigated.

In terms of *likely subsequent use of land,* subsequent land use is not permitted meaning further consent would need to be sought and should address whether it would *accelerate, worsen, or result in material damage of the kind* which are identified and mitigated as part of this project.

5 Wellington Water & Ministry for the Environment Guidance

Due to the projects' location, natural hazards have been considered since early design. Both redevelopment and construction projects have undertaken climate change risk assessments and integrated mitigation into the design. As part of this process, hydraulic modelling was undertaken to quantify impacts of changes in finished form of Frank Kitts Park on flooding in the area as well as to provide input to support design developments. The modelling was undertaken using more up to date climate projections than the existing Wellington Water stormwater modelling specifications[1].

Ministry for the Environment guidance[2] states that changes in land use and redevelopments should aim to avoid new hazard risk by considering Sea-Level Rise (SLR) out to at least 100 years using the the SSP5-8.5 H+ *(described as the upper likely range)* scenario and should include the relevant Vertical Land Movement (VLM) from the area. The hydraulic modelling was undertaken for the 1% Annual Exceedance Probability storm event for both existing climate and future climate change conditions.

Table 5-1 Hydraulic Modelling Undertaken

	Wellington Water Stormwater Modelling Specifications	**Modelling undertaken (existing and proposed) aligning to MfE guidance**
SLR projection timeframe	2100	2124
Increase in rainfall intensity and volume (12hr Rainfall Depth)	20% (147mm)	33% (163mm)
Sea level Rise	1m	1.5 m (SSP5.8.5 H+ + VLM at 2124) *Sea level during event modelled shows level of 2.61 mWVD.*
1:100yr ARI peak flood level (mWVD)	2.31 mWVD	2.67 mWVD

The modelling shows that proposed design generally reduces future flood risk (e.g. by raising what was the amphitheatre to what will be the Harbour Lawn).

The modelling established a flood level for the project that is best aligned with government guidance. The resulting level is 2.67m Wellington Vertical Datum (WVD-53) excluding 200mm freeboard allowance. This is 0.37m higher than the flood level sourced from Wellington Water. The minimum finished floor level adopted for the building as a result is 2.87mWVD. The build design has a finished floor level of 4.28m placing it significantly above this established minimum finished floor level. To appreciate how high the building's finished floor level is, please see Figure 5-1 below for context[3].

[1] Wellington Water, 2019, Reference Guide for Design Storm Hydrology
[2] Ministry for the Environment, 2022, Interim guidance on the use of new sea-level rise projections.
[3] NIWA, 2012, Sea-level variability and trends: Wellington Region

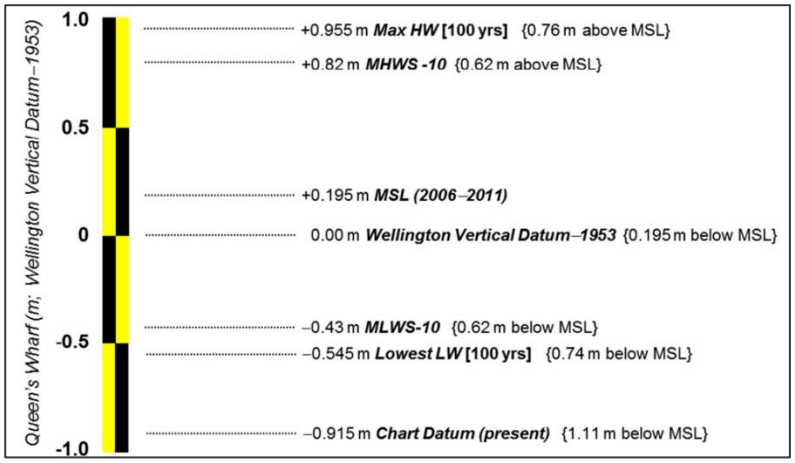

Figure 5-1 Wellington Tide Marks WVD-53 (NIWA, 2012)

Figure 5-2 Flood Depth for Existing Scenario (100yr ARI - RCP8.5 Climate Change). Proposed location of Fale outlined in red. Extensive flooding shown within the underground carpark underlying & adjacent to the building.

Figure 5-3 Flood Depth for Proposed Scenario (100yr ARI - RCP8.5 Climate Change)

6 Conclusion

In conclusion, this report has comprehensively reviewed the natural hazard provisions included in the Partially Operative Wellington City Council (WCC) 2024 District Plan, specifically in relation to the redevelopment of Frank Kitts Park and the development of the Fale Building. Both project teams have integrated considerations for natural hazards into their designs, ensuring the creation of a resilient public and cultural space on the Wellington waterfront.

The report detailed the relevant Plan requirements and demonstrated how each project has adhered to these requirements. In addressing the Resource Management Act (RMA) requirements, we have shown that the projects meet all necessary standards for mitigating natural hazards. Additionally, a comparison between the Ministry for the Environment guidance and Wellington Water inputs was provided, highlighting how these projects have considered natural hazard risks beyond the Plan.

Overall, the projects have successfully addressed the pertinent natural hazard requirements, supporting the case for the necessary consents to be granted. The thorough consideration of natural hazards in the planning and design phases underscores the commitment to resilience and safety in the redevelopment efforts.

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