Blue-Green Network Programme

Artist impression only

Potential A F Thomas Park stormwater detention with integrated recreation outcomes - view looking south towards Takapuna and CBD

Wairau Blue-Green Network Stage 1 - A F Thomas Park

Concept Feasibility Report - Appendix A

Revision 1 | 06 August 2025

Auckland Council
Te Kaunihera o Tāmaki Makaurau

Appendix A - Healthy Waters Concept Design Option

Wairau Blue-Green Network

A F Thomas Park
Concept Design Option

Rev 0.0 | For Discussion | 12 June 2025

Contents

Auckland Council
Te Kaunihera o Tāmaki Makaurau

Overview, Benefits and Risks

Overview

The proposed option:

- Meets the **primary objective of reducing flood risk to homes** by storing a minimum of **550,000m³** of flood water (equivalent to 220 Olympic-sized swimming pools) during extreme rainfall.
- Has a **multitude of secondary benefits** including a revitalised urban park providing equitable recreation opportunities, environment benefits and enhanced pedestrian and cycling connectivity outcomes.
- **Retains all 610,000m³ of excavated material onsite**, significantly reducing costs, waste and carbon.
- Can be **delivered within the programme** outlined in the business case, enabling the government's 62% cost contribution to be fully leveraged.

This document summarises a concept design option for A F Thomas Park to confirm feasibility and to inform project planning. The design has been developed in consultation with subject matter experts, operation and maintenance teams, and utility providers to align with best practices and project requirements. It is based on key available information at the time it was developed. Further investigations, engagement and design optimisation will refine the design in the next stage.

Benefits

Primary flood benefits

- Provides 550,000m³ of flood storage, slowly releasing floodwaters downstream, lowering the peak flow of the main Wairau creek by 30% in an extreme rainfall event.
- Reduces the exposure to 'high danger flood risk' for 19 dwellings, 5 commercial buildings and reduces flood risk for 200 other homes.
- Reduces the risk of flooding across 10ha of residential properties as well as road flooding to Nile Road, Waterloo Road and Alma Road.
- Significantly reduces the frequency and severity of flooding to critical infrastructure including:
  - Wairau Road Transpower Substation which services North Shore hospital and other key infrastructure (1m reduction in flood level).
  - Alma Road Watercare wastewater pump station
- Required to enable the Stage 2 works in Nile Road which will significantly reduce flood risk in the area.

NB: Design optimisation has already led to additional flood level reductions for communities downstream beyond those outlined in the business case.

Secondary benefits

- An enhanced urban park offering diverse recreational opportunities, an ecological reserve and improved pedestrian and cycling accessibility.
- A restored and diverse 14.9ha wetland of regional significance, given only 0.5% of these critical environments remain.
- Provides 30.7ha area available for additional recreation activities to accommodate the needs of the local community.
- Potential to improve water quality, treating road runoff from surrounding areas.
- Maintenance paths that also provide passive recreation opportunities for local residents through restored natural environments.
- A natural and cultural heritage element that contributes to the regeneration of the Wairau catchment.

Figure 1: Greenslade Reserve, Northcote in flood during the 2023 Auckland Anniversary Weekend floods

Figure 2: Greenslade Reserve, Northcote on the day following the 2023 Auckland Anniversary Weekend floods.

Key Risks and Mitigation

A description of the key design risks, how they can be managed, and any associated assumptions for a concept level design, are outlined below. The cost estimate allows for the identified mitigations and has provided contingency for anything unforeseen. Additional risk mitigation measures are available if further mitigation is required.

Poor ground conditions require additional mitigation – design slopes may need adjustment resulting in more cut or less fill able to be retained. Based on historic investigations within the site, the design has assumed a minimum of 1:5 for high cut/fill slopes and 1:3 for low cut/fill slopes. The gentle slopes will allow mowing to occur and steeper slopes will be planted. Optimisation of slope design following site geotechnical investigations, including slope-stability measures, may enable steeper slopes in some locations. Settlement risks will be assessed and mitigated in preliminary design.

Site is contaminated – this could affect the amount of material that can be re-used and increase cost. A desktop study has been undertaken which indicates that contamination in localised areas is expected, and soil sampling and testing are planned. It is anticipated that the vast majority of material can be re-used onsite. At this stage, an allowance of 500m³ has been made in the cost estimate for disposal of some contaminated soil.

High groundwater levels influence land use – it is almost certain that excavation will be required below the ground-water table. The culvert (outlet), groundwater levels and recreational use will determine the minimum ground levels. Groundwater drains will be required in low-lying areas designated for sports and recreation. The design has assumed groundwater to be 1.5-2m below existing ground in higher areas and at ground level in the lower areas of the reserve. Groundwater level monitoring is proposed to better understand levels and flows. The presence of groundwater will help in establishing and maintaining the wetland. Excavation has been setback from buildings and assets to reduce the risk of settlement from groundwater drawdown. The risk of settlement on the wastewater pipes will be assessed and mitigated as required.

Maintenance Approach and Opportunities

Clashes with power cables – existing and proposed power cables in the vicinity of the substation, carpark and the eastern boundary could constrain the proposed works. A 10m setback from the existing overhead cables at the eastern boundary of the reserve has been provided. Service locating to determine the depth of the cables will be undertaken to optimise the spillway through the carpark into the reserve.

Existing wastewater pipes cannot accommodate fill – filling over the wastewater pipes help achieve a neutral cut and fill, avoiding carting significant material offsite. If no fill is placed over the pipes up to 150,000m^3 of surplus material is estimated to need disposing of offsite. Some filling is anticipated to be achievable and at this stage this has assumed to be approximately 2m in height. Significant filling will require detailed assessment and may necessitate pipelining to strengthen the pipe or bridging over the pipe to distribute the soil load at additional cost. Minimising the fill over the pipes also helps mitigate the risk of differential settlement.

Vegetation removal – any works in the reserve will likely result in significant vegetation removal. Existing vegetation that can remain will be identified and protected, and additional vegetation will be incorporated in the current plans once the future recreational use has been determined. The future vegetation will be developed in close collaboration with the urban ngahere (forest) team, mana whenua and community. It is expected that there will be a significant increase in native vegetation, including a net increase in trees following the works.

Consideration of streams – the reserve contains a highly modified, yet to be assessed stream channel of poor quality, flowing south to north. At this stage, it is assumed that provision for its integration and restoration will be necessary, with diversion or some elevation changes considered acceptable.

Wetland function – the wetland will primarily be groundwater-fed, supplemented by surface runoff and the surrounding stormwater network from the 75ha catchment. Continuous water flow and regular refreshing are expected. The shape and size of the wetland and permanent pool area (currently set at 0.5m deep) can be readily adjusted to integrate inflows, ensuring optimal functionality, performance and amenity. Additionally, low flows from the Marlborough sub-catchment tributary can be redirected to the wetland if required. Undulations will be incorporated into the design surface to enhance variability and ecological diversity. The steady inflows and flexible design will prevent any prolonged stagnant water. The wetland design will be refined in the next stage, informed by groundwater investigation findings, with plant species carefully selected to suit saturation gradients and hydrological conditions.

Spillway into the reserve – the primary location for the spilling of flood waters into the reserve is currently planned to be just south of the substation on Council owned land. An approximate 40m wide area has been provided for at this stage. The dimensions and associated spill level will be optimised in the next stage of design.

Maintenance Approach

Healthy Waters and Flood Resilience's Operations team have provided advice on the operations and maintenance needs of the proposed wetland. Further advice will be sought as the design is refined to optimise operational requirements and costs.

Initial considerations and potential mitigation:

- **Maintenance access** – Walkways will be designed to accommodate maintenance vehicles, ensuring easy access to all areas of the wetland. There is a potential to establish an additional access point from the Eventfinda carpark to the north.
- **Rubbish** – As the wetland is offline to the main Wairau Creek, it will only be utilised for flood attenuation infrequently in an extreme event. After such events, some rubbish and litter removal may be necessary. Any litter entering from the existing stormwater network can be managed using litter traps.
- **Weeds** – The spread and control of invasive weeds such as alligator weed and parrot feather will need to be carefully managed through maintenance activities. Community groups, such as the Kaipātiki Project, could play a valuable role in supporting these efforts.
- **Desilting** – At this stage, significant sediment discharging into the wetland is not anticipated, as the current catchment discharging to the wetland is predominately groundwater 'fed'. If the Marlborough sub-catchment tributary is partially diverted to the wetland for water quality treatment, a forebay and/or a gross pollutant trap can be accommodated within the footprint to minimise desilting.
- **Pest control** – Although pest control is not typical for stormwater wetlands, this site has the potential to be an ecological haven. To maximise ecological benefits, targeted pest control may be advantageous and could be carried out by volunteer groups, such as Pest Free Kaipātaki.
- **General maintenance** – Shared recreation areas will be refined and agreed with the Kaipātiki Local Board and any tenants once future uses are known. All stormwater assets will be the maintenance responsibility of Healthy Waters and Flood Resilience.

Figure 3: Awaruku Wetland, Long Bay (Boffa Miskell)

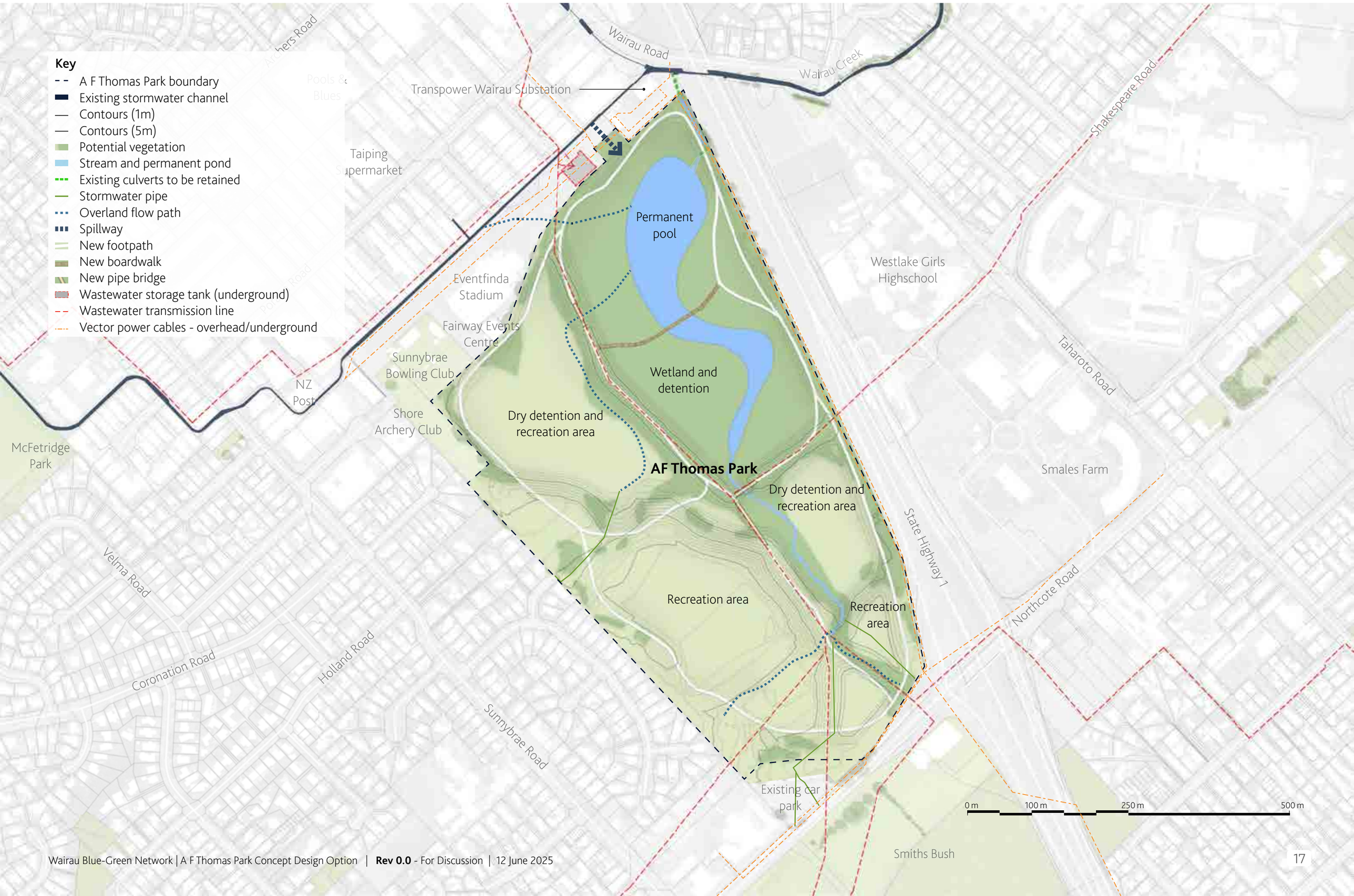
Opportunities

More enhancement opportunities will be explored during the preliminary design phase, including:

- Refining the landform to better integrate sports and recreational use, or accommodating additional storage or fill within the reserve.
- Increasing the flood storage capacity in the reserve to maximise the downstream flooding benefits, provided groundwater levels are lower than anticipated.
- Collaborating with mana whenua, the Kaipātiki Local Board and the community to accommodate their aspirations and feedback.
- Adjusting earthworks slopes based on the detailed ground investigations when they become available.
- Refining the wetland shape, dimensions and permanent pools to maximise environmental benefits.
- Potential to establish an ecological corridor between the Wairau Creek and the habitats of Smiths Bush, Barry's Point Reserve, and Shoal Bay to the south.
- Improving downstream water quality by treating surrounding areas in the wetland.
- Further optimising the spillway design to maximise benefits to surrounding and downstream areas.
- Working closely with Auckland Council's Operation and Maintenance teams to reduce long-term management demands.

Layout Plan

Scale 1:5000 @ A3

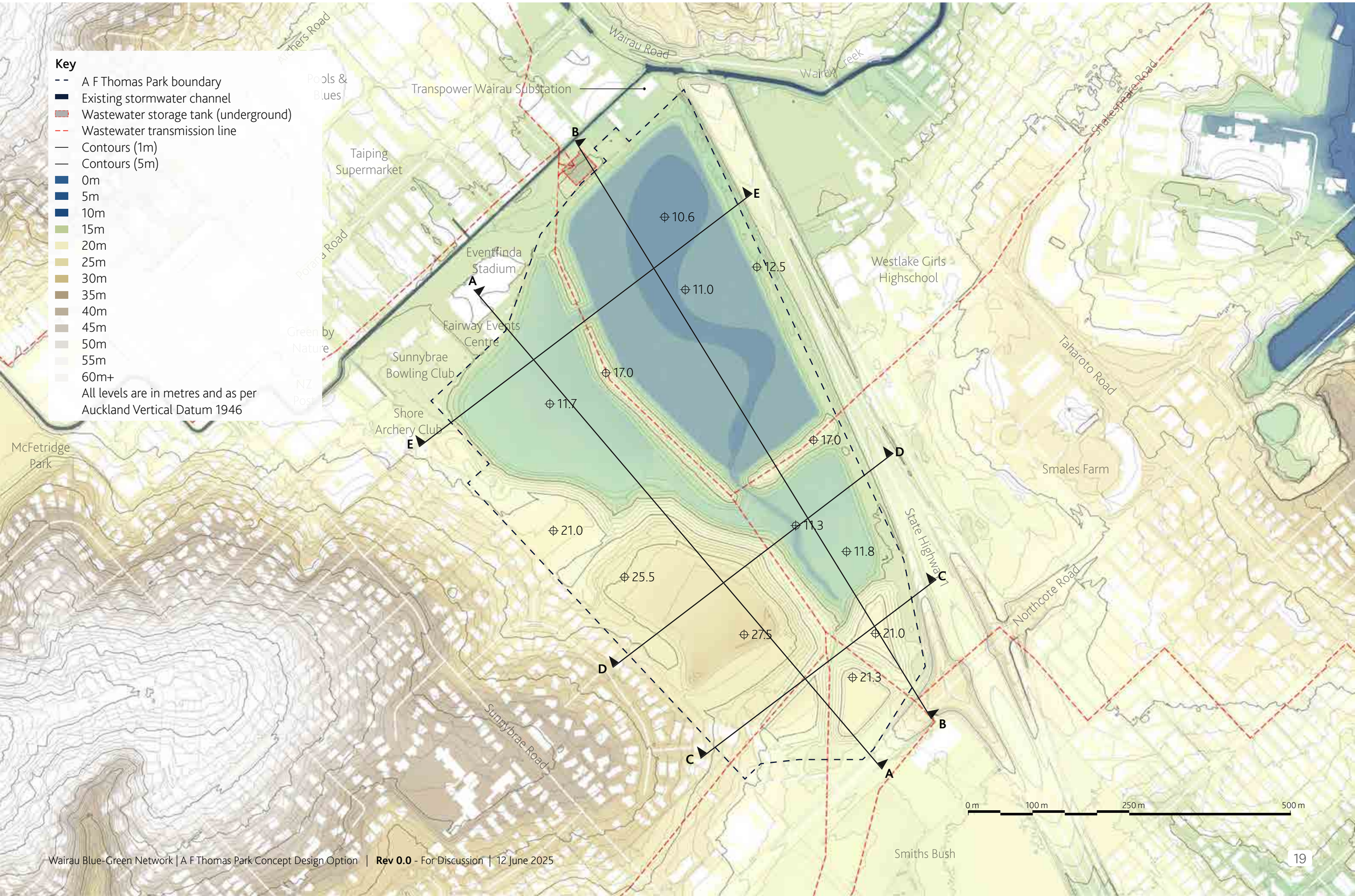


Park Zone Plan

Scale 1:5000 @ A3

Proposed Topography

Scale 1:5000 @ A3



Cut and Fill Plan

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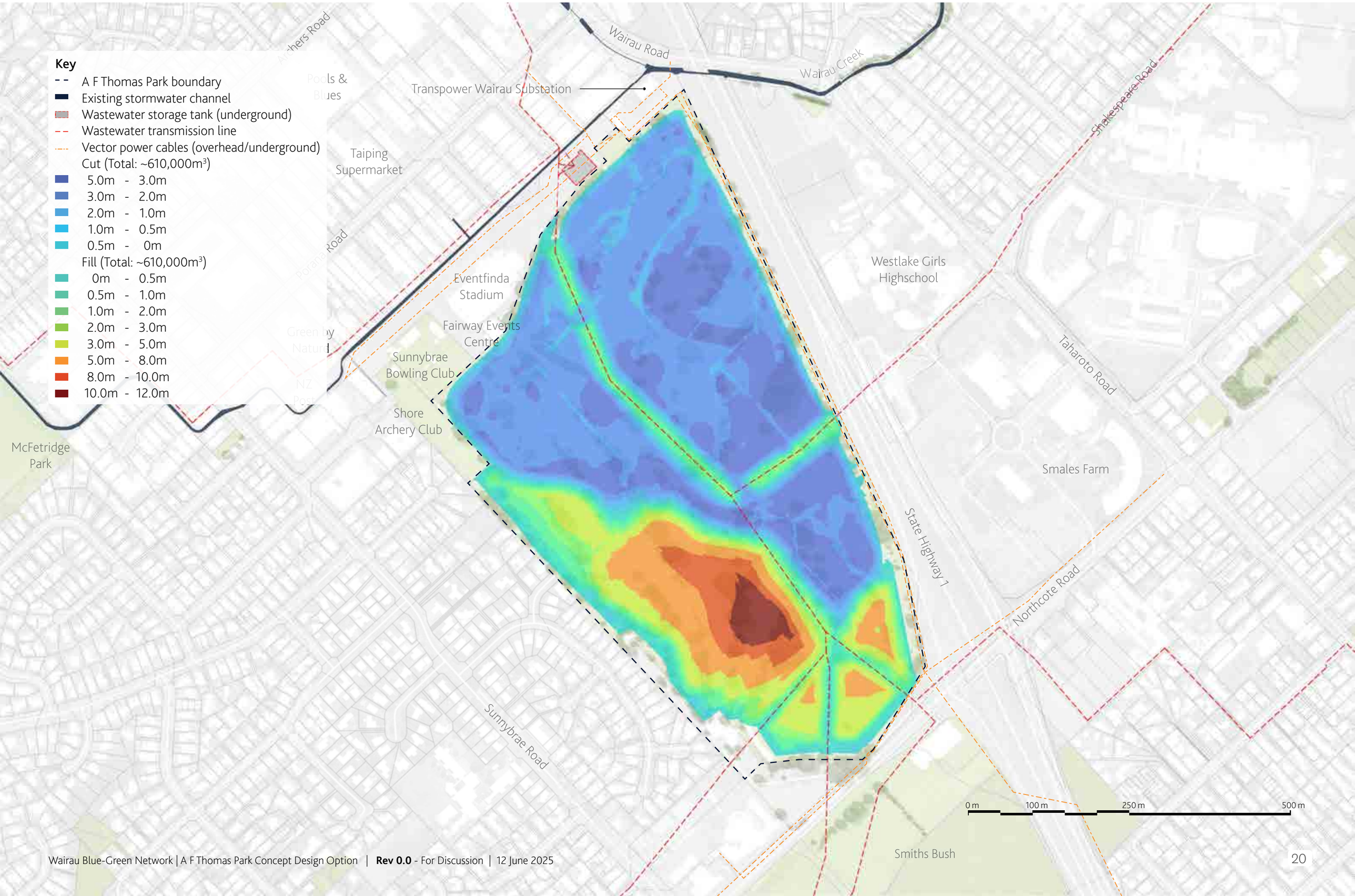
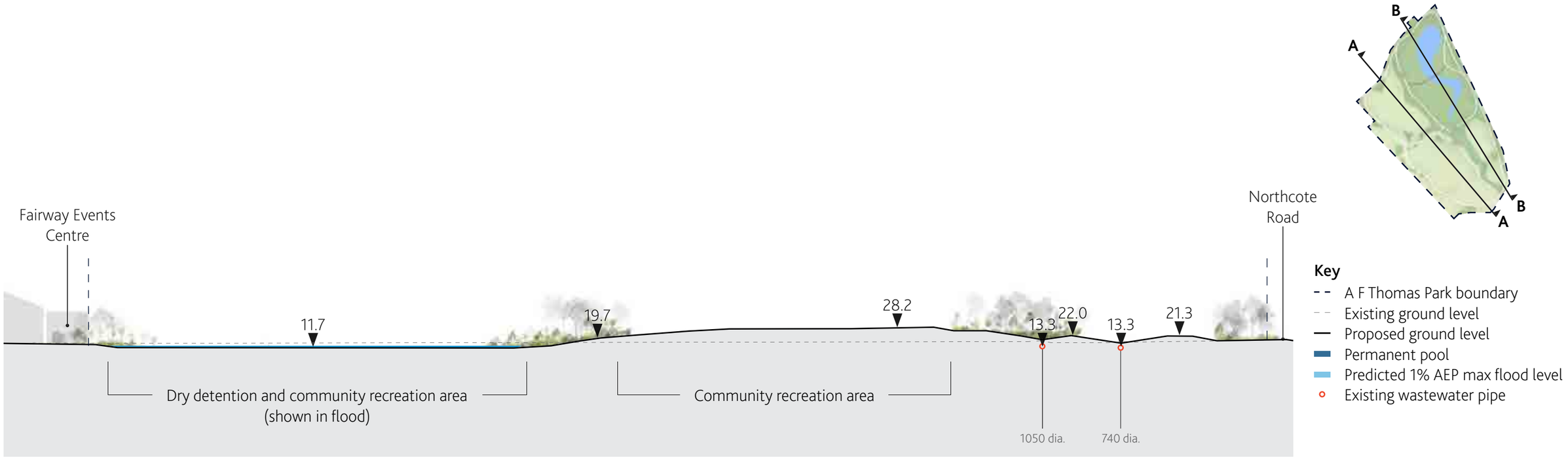


Illustrative Long Sections



Long Section A - A
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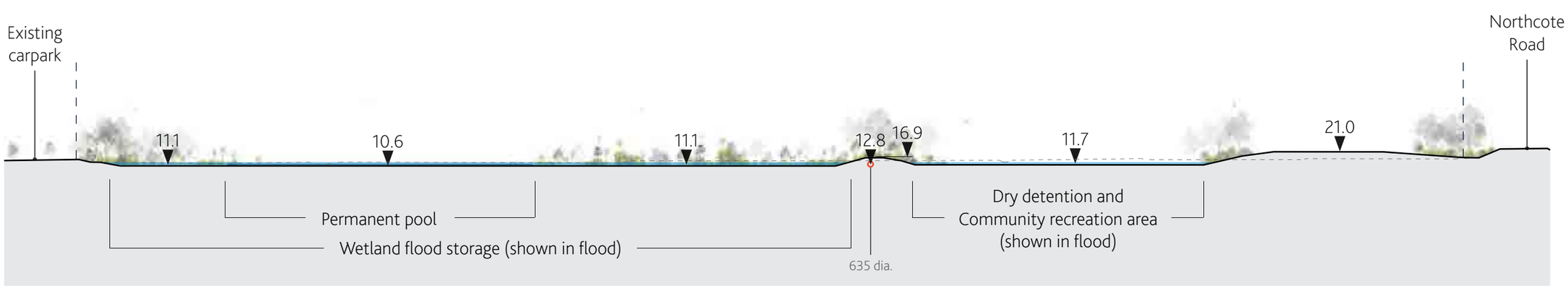
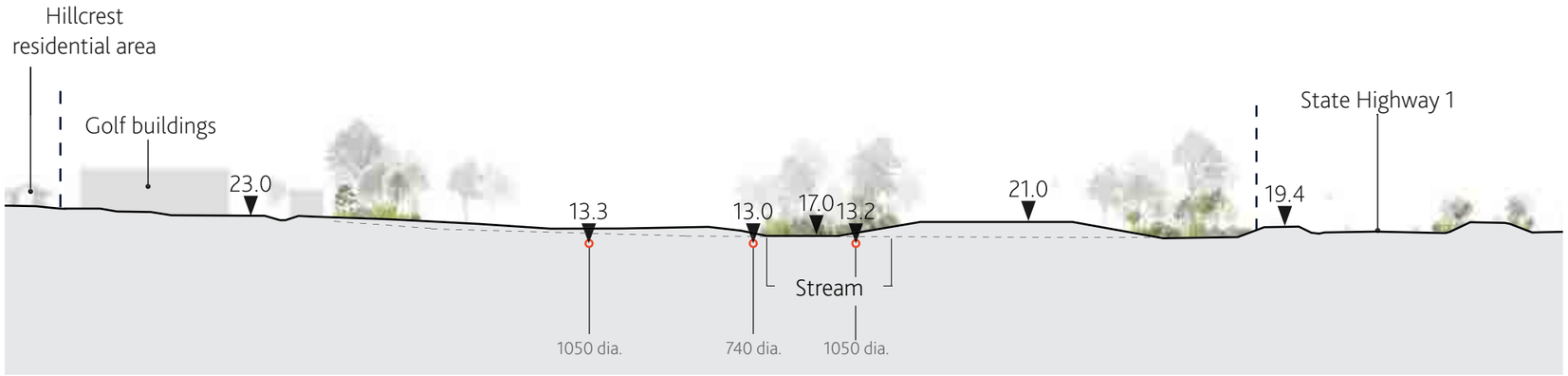


Long Section B - B
Scale 1:3000 @ A3

0 m 50 m 100 m 250 m

Illustrative Cross Sections



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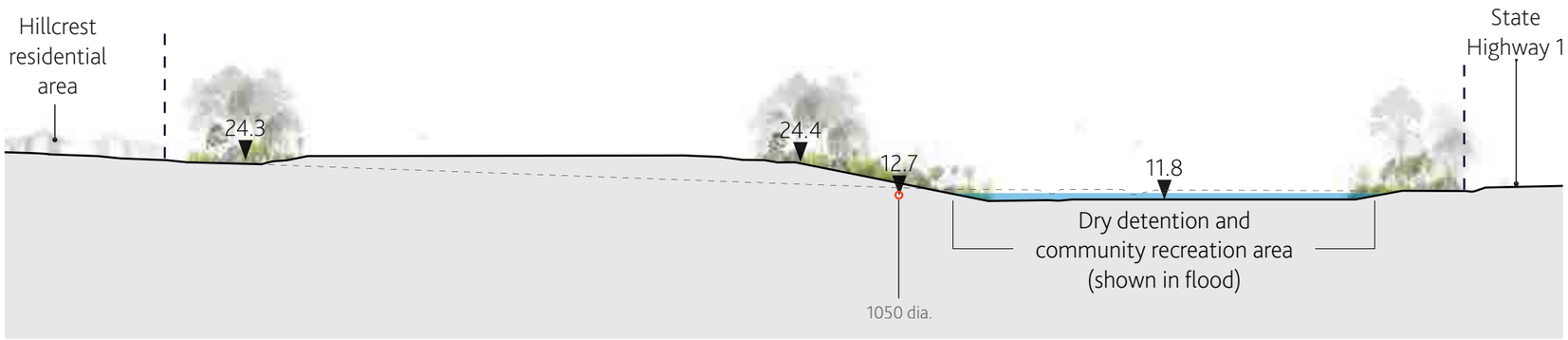

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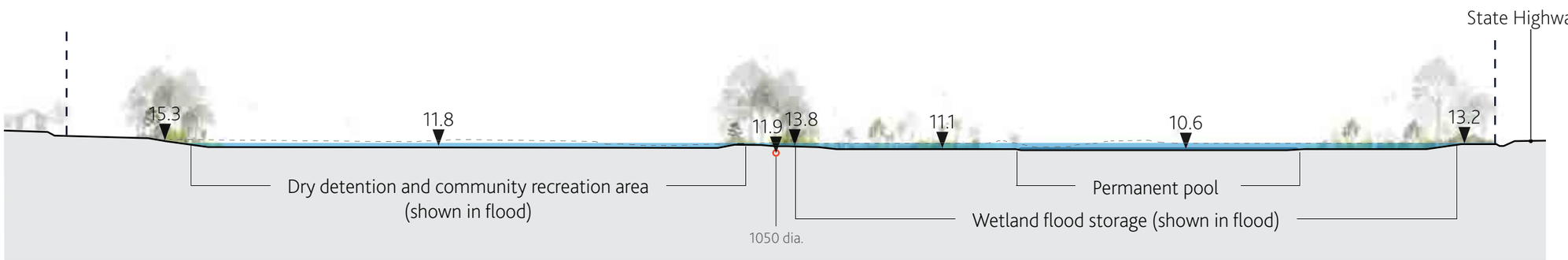

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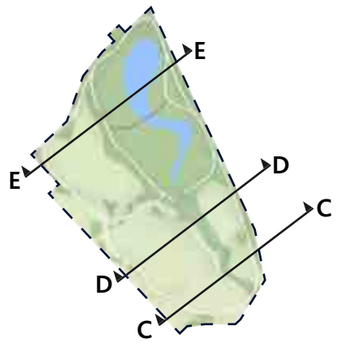
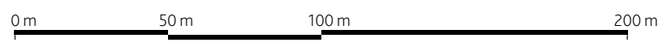


Key

- A F Thomas Park boundary
- Existing ground level
- Proposed ground level
- Permanent pool
- Predicted 1% AEP max flood level
- Existing wastewater pipe



Artist Impression - Normal Conditions

Artist impression only
View Looking south towards Takapuna and CBD

Artist Impression - Flooded Conditions

Artist impression only
View Looking south towards Takapuna and CBD

Disclaimer

This document ('Document) has been prepared by WSP New Zealand Limited ('WSP') exclusively for Auckland Council ('Client') in relation to the concept design for A F Thomas Park ('Purpose') and in accordance with the Wairau Blue-Green Network – Concept Design (Stage 1) Statement of Work dated 07 May 2025. The findings in this Document are based on and are subject to the assumptions specified in the Document. WSP accepts no liability whatsoever for any use or reliance on this Document, in whole or in part, for any purpose other than the Purpose or for any use or reliance on this Document by any third party. In preparing this Document, WSP has relied upon data, surveys, analyses, designs, plans and other information provided by or on behalf of the Client.