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 — Appendices A to F

Revision 0 | 04 July 2025

Auckland Council
Te Kaunihera o Tāmaki Makaurau

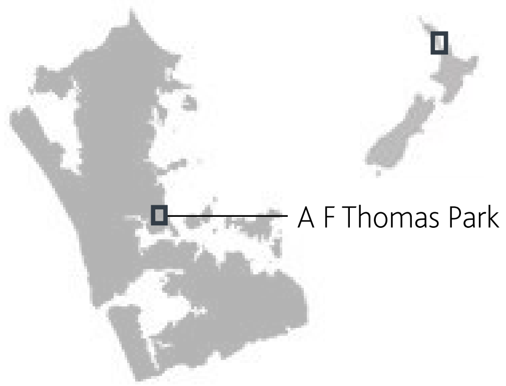
Appendix A - Healthy Waters Concept Design Option

Wairau Blue-Green Network

A F Thomas Park Concept Design Option

Rev 0.0 | For Discussion | 12 June 2025

Contents



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 groundwater 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

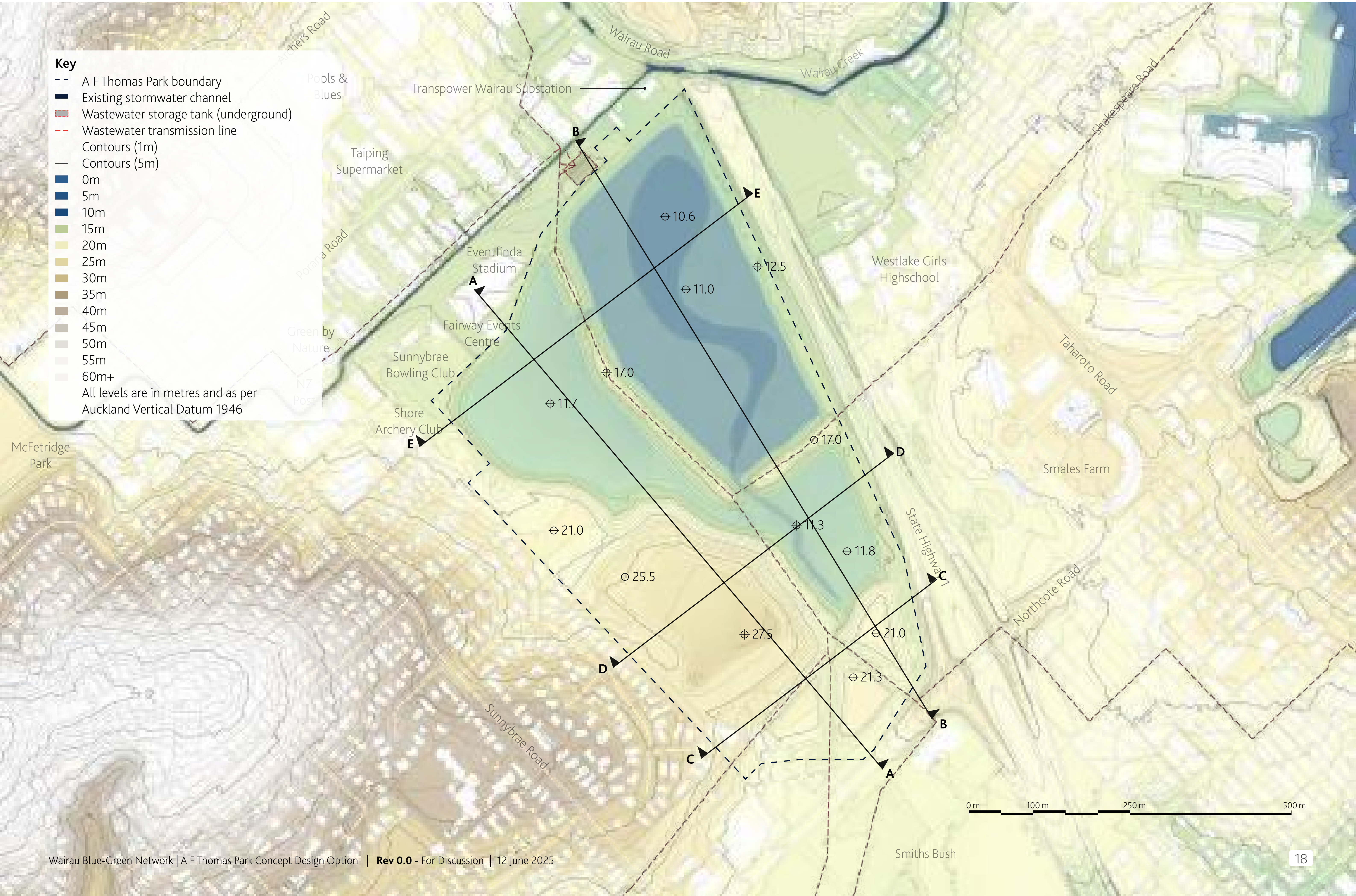
Scale 1:5000 @ A3

Park Zone Plan

Scale 1:5000 @ A3

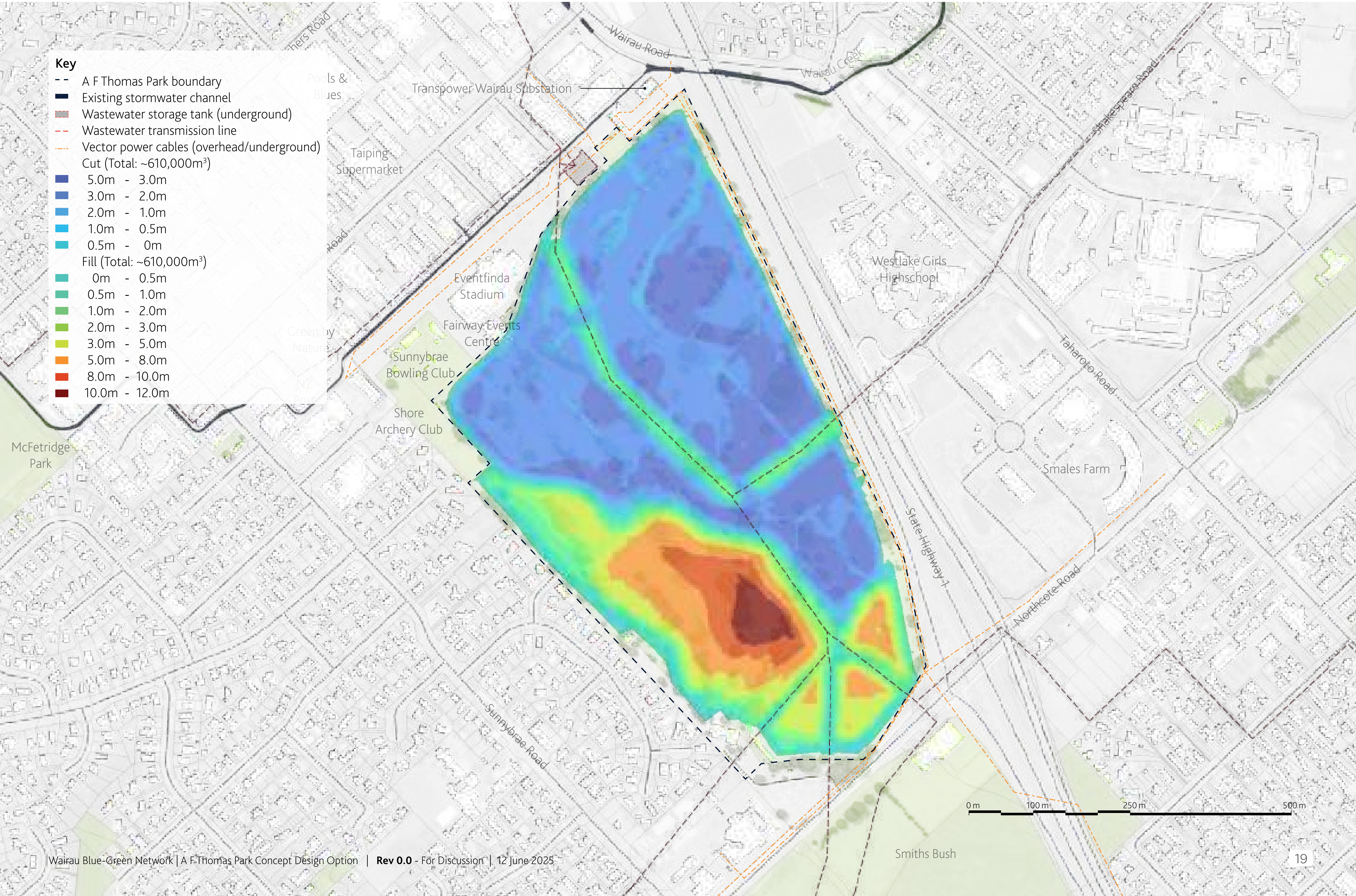
Proposed Topography

Scale 1:5000 @ A3

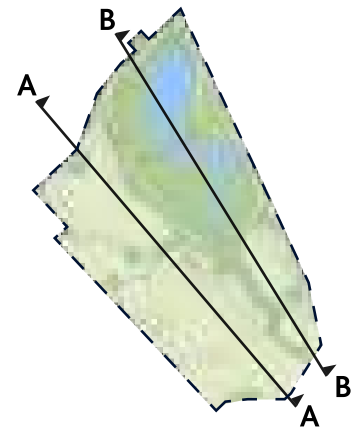


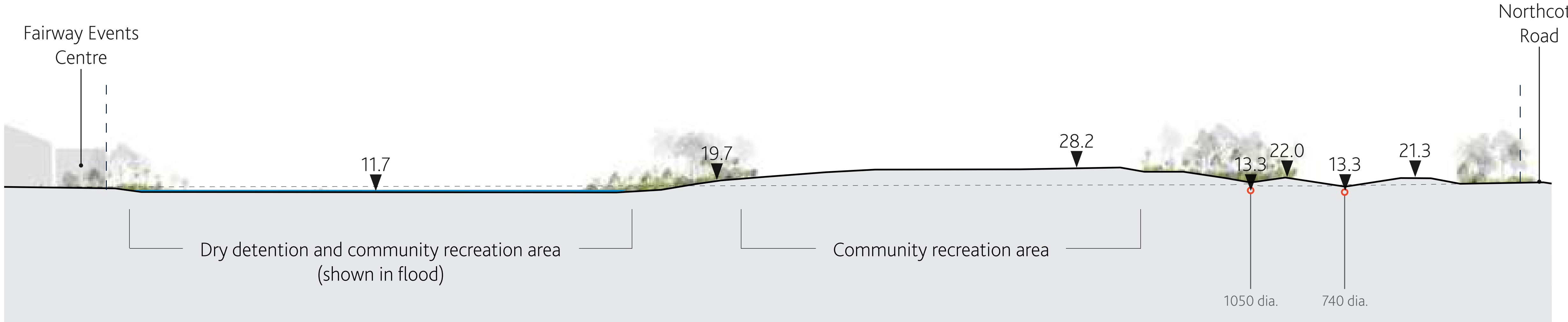
Cut and Fill Plan

Scale 1:5000 @ A3



Illustrative Long Sections

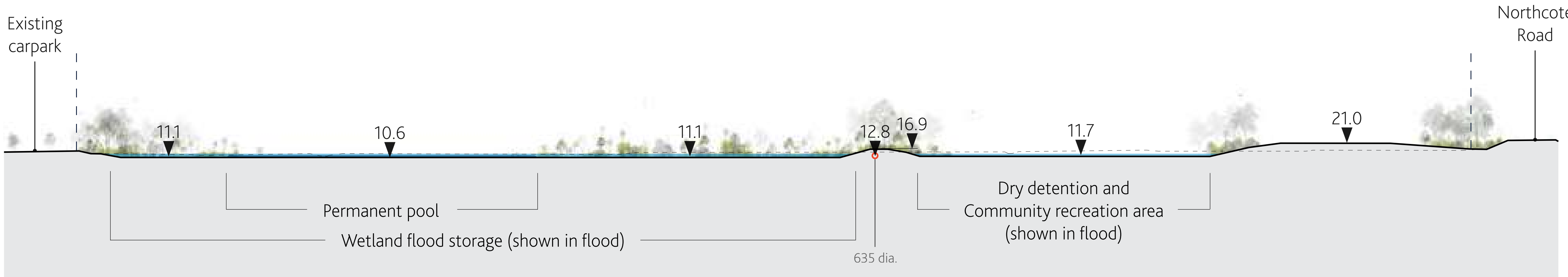




Key

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

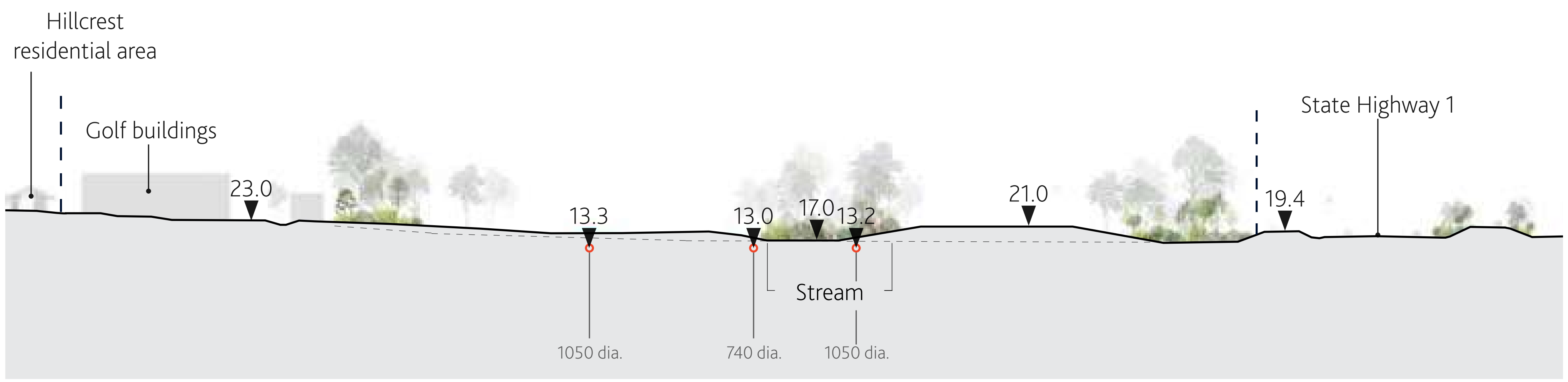
Long Section A - A
Scale 1:3000 @ A3



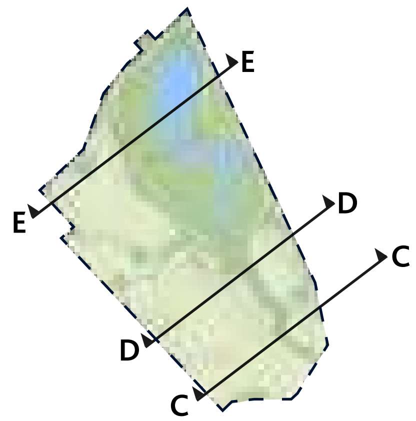
Long Section B - B
Scale 1:3000 @ A3

0 m 50 m 100 m 250 m

Illustrative Cross Sections

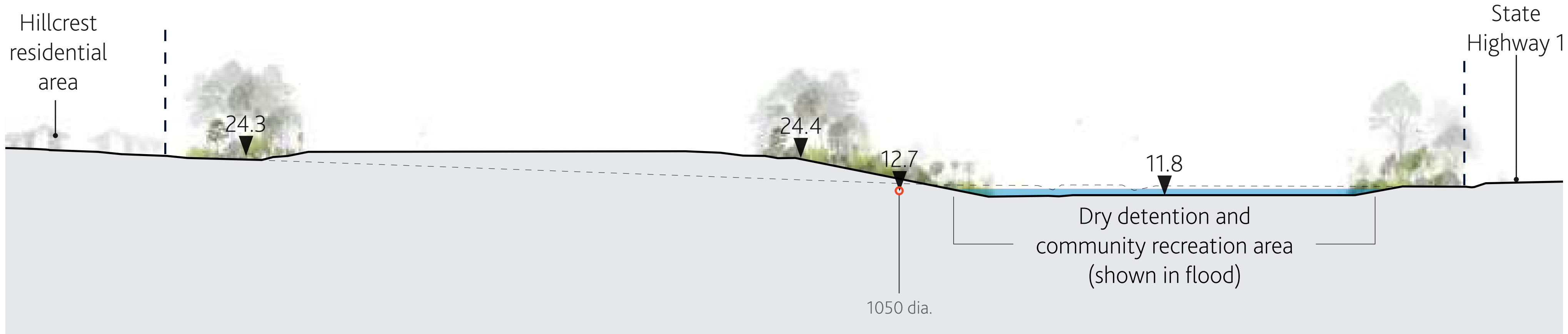


Cross Section C - C
Scale 1:2000 @ A3

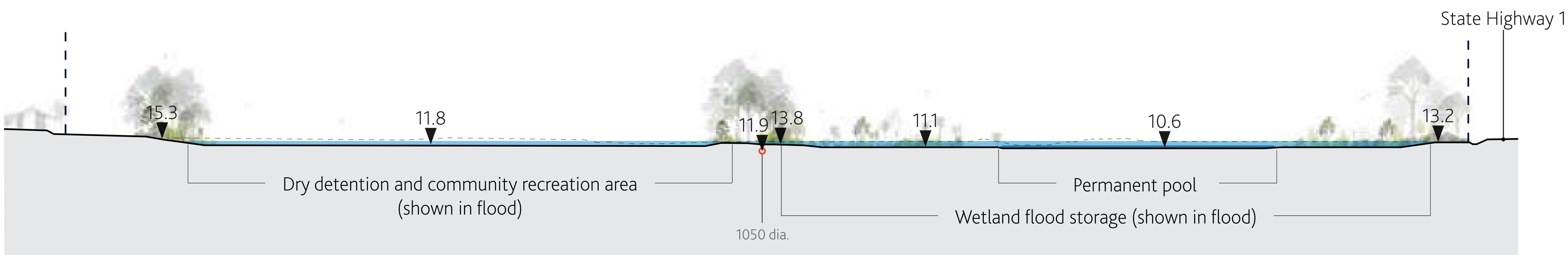


Key

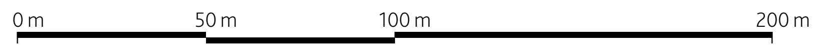
- A F Thomas Park boundary
- Existing ground level
- Proposed ground level
- Permanent pool
- Predicted 1% AEP max flood level
- Existing wastewater pipe



Cross Section D - D
Scale 1:2000 @ A3



Cross Section E - E
Scale 1:2000 @ A3



Artist Impression - Normal Conditions

Artist impression only
View Looking south towards Takapuna and CBD

Artist Impression - Flooded Conditions

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.

Appendix B - Takapuna Golf Club Concept Design Options TGC-R0 and TGC-R1

NOTES:

STAGE 1

1.1. STAGE 1 INCLUDES ALL DRAINAGE INLETTING AND OUTLETTING STRUCTURES INTO THE PARK, EXISTING WATERCARE PIPE BRIDGE SUPPORT IMPROVEMENTS (2NO.) IF REQUIRED, AND EARTHWORKS WITHIN THE RED/PINK SHADED AREA.

1.2. FILL AREA IS WITHIN DRIVING RANGE AREA, AND IS SUBJECT TO GEOTECH INVESTIGATIONS AND CONFIRMATION FROM WATERCARE ON ACCEPTABILITY OF WORKS OVER TRANSMISSION WW LINE. THIS WORK IS TO BE PROGRESSED DURING PRELIMINARY DESIGN.

1.3. HOLES TO CONTINUE TO BE PLAYED IN STAGE 2 AREA IN THE ORDER AS FOLLOWS OR AS DETERMINED BY OTHERS:

1.3.1. 1, 2, 18, 10, 11, 12, 13, 17, 9

STAGE 2

1.1. STAGE 2 COMPLETES EARTHWORKS WITHIN THE BLUE SHADED AREA.

1.2. HOLES TO CONTINUE TO BE PLAYED IN THE STAGE 1 AREA IN THE ORDER AS FOLLOWS OR AS DETERMINED BY OTHERS:

1.2.1. 8, 6, 5, 3, 4, 16, 14, 15, 7

Kurapa Kore
KURA
GOLF COURSE DESIGN

CIVILPLAN
CONSULTANTS

Level 12, 17 Albert Street, Auckland Central. Phone: 09 222 2445

PROJECT TITLE:
TAKAPUNA GOLF COURSE
NORTHCOTE ROAD
TAKAPUNA

SHEET TITLE:
PROPOSED LAYOUT PLAN
OPTION 6

SCALE: (A1/A3)	1:2000 / 1:4000		
SCALE BAR 1:4000@A3	0 40 80 120 160 200m		
ISSUE STATUS:	PRELIMINARY DRAFT		
PROJECT NUMBER: HPCL1945	DRAWING NUMBER: SK07-1	REV: 1	
REVISION DETAILS: PRELIMINARY DRAFT TO HWFR		REVISION DATE: 24 025	
DRAWN: RJP	CHECKED: RJP	APPROVED: RJP	

Printed by: RYAN@24.04.25 // Filepath: S:\JOBS\HPCL1945 - TAKAPUNA GOLF CLUB\CIVILPLAN\CAD\1945-01-SK07-1-OPTION 6.DWG

TGC Option R0 (24th April 2025)

NOTES:

1. IF IN DOUBT PLEASE ASK.
2. DO NOT SCALE FROM THE DRAWINGS.
3. LEVELS ARE IN TERMS OF AVD 1946.
   ORIGIN OF LEVELS - AUCKLAND COUNCIL GIS
4. EXISTING CONTOURS ARE SHOWN AT 0.5m INTERVALS.
5. DESIGN CONTOURS ARE SHOWN AT 0.5m INTERVALS.
6. DESIGN CONTOURS SHOWN ARE FINISHED SURFACE LEVELS.
7. EROSION AND SEDIMENT CONTROL IS TO BE DESIGNED AT PRELIMINARY DESIGN TO COMPLEMENT THE STAGING ON SHEET SK07-1.
8. IT IS INTENDED THAT THE CONTRACTOR SHALL GRADE THE EARTHWORKS TO THE FINISHED CONTOURS SHOWN. HOWEVER, THE FINAL MARRYING AND SHAPING OF THE EARTHWORKS AREAS IS SUBJECT TO THE ENGINEERS AND GOLF DESIGNER'S APPROVAL.
9. DESIGN IS SUBJECT TO THE RESULTS OF THE FOLLOWING INVESTIGATIVE REPORTING TO BE COMPLETED BY HWFR OR OTHERS:
   - 9.1. GEOTECHNICAL REPORT
   - 9.2. GROUNDWATER REPORT
   - 9.3. CONTAMINATION REPORT
   - 9.4. ECOLOGY REPORT
   - 9.5. STORMWATER CATCHMENT FLOOD MODELLING REPORT
   - 9.6. WATERCARE WASTEWATER TRANSMISSION PIPE AND STRUCTURES INTEGRITY REPORT
   - 9.7. ELECTRICAL STUDY AND LINES REPORT

LEGEND

- 10.0 — EXISTING CONTOUR
- PROPOSED MINOR CONTOUR
- 10.0 — PROPOSED MAJOR CONTOUR
- EARTHWORK EXTENT
- PROPOSED 14m RL CONTOUR

Kotuku Kōr KURA GOLF COURSE DESIGN

CIVILPLAN CONSULTANTS

Level 12, 17 Albert Street, Auckland Central. Phone: 09 222 2445

PROJECT TITLE: TAKAPUNA GOLF COURSE
NORTHCOTE ROAD
TAKAPUNA

SHEET TITLE: FINISHED CONTOUR PLAN
OPTION 6

SCALE: (A1/A3) 1:2000 / 1:4000

SCALE BAR 1:4000@A3: 0 40 80 120 160 200m

ISSUE STATUS: PRELIMINARY DRAFT

PROJECT NUMBER: HPCL1945 DRAWING NUMBER: SK07-2 REV: 1

REVISION DETAILS: PRELIMINARY DRAFT TO HWFR REVISION DATE: 24 27 025

DRAWN: RJP CHECKED: RJP APPROVED: RJP

Printed by: RYAN@28.04.25 // Filepath: S:\JOBS\HPCL1945 - TAKAPUNA GOLF CLUB\CIVILPLAN\CAD\1945-01-SK07-1-OPTION 6.DWG

TGC Option R0 (24th April 2025)

REBUILD GRAVEL FOOTPATH AS NEEDED WHERE EARTHWORKS OVERLAPS, WITH CONNECTIONS TO THE NORTH AND WEST.

LEGEND

-1.0	PROPOSED CUT ISOPACH
-1.0	PROPOSED FILL ISOPACH
	EARTHWORKS ZERO CUT/FILL LINE
	EARTHWORK EXTENT
CUT	PROPOSED CUT
FILL	PROPOSED FILL
	EXG POWER O/H OR U/G ALIGNMENT CLOSEST TO EARTHWORKS
	2.5m OFFSET FROM EXG POWER
	5.0m OFFSET FROM EXG POWER
	7.5m OFFSET FROM EXG POWER
	10.0m OFFSET FROM EXG POWER

NOTES:

1. DO NOT SCALE FROM THE DRAWINGS.
2. PROPOSED DEPTH CONTOURS ARE SHOWN AT 0.5m INTERVALS.
3. AUCKLAND COUNCIL CONFIRMED AT A MEETING ON 21 MARCH 2025 THAT:
   - 3.1. THE REQUIRED VOLUME TO ACHIEVE UNDER THE SITE'S SPILLWAY HEIGHT OF 14mRL = 550,000m^3. THIS WILL ENSURE THAT DETENTION STORAGE VOLUME IS LINKED TO MAIN WAIRAU CATCHMENT IN MAIN CHANNEL TO NORTH-WEST OF SITE.
   - 3.2. PEAK FLOW IN MAIN CHANNEL IS 110m^3/S.
   - 3.3. TRIBUTARY TO THE WEST OF SITE HAS PEAK FLOW OCCURRING 1HR PRIOR TO MAIN CHANNEL FLOW, THEREFORE DETENTION OF THIS FLOW IS NOT RECOMMENDED AND SHOULD BE PASSED THROUGH CATCHMENT WITHOUT DETENTION PRIOR TO THE MAJOR PEAK FLOW OCCURRING.
   - 3.4. PEAK FLOW IN WESTERN TRIBUTARY IS 60m^3/S.
4. EXISTING/CURRENT FLOOD STORAGE IN GOLF COURSE FROM EXISTING GROUND LEVEL TO SPILLWAY HEIGHT OF 14mRL = 90,600m^3.
5. AREA OF PROPOSED EARTHWORKS = 38.57ha.
6. EARTHWORK VOLUMES ARE FROM EXISTING SURFACE TO FINISHED SURFACE
7. EARTHWORKS VOLUMES ARE:
   - 7.1. CUT VOLUME = 722,000 m^3
   - 7.2. FILL VOLUME = 119,000 m^3
   - 7.3. SURPLUS = 603,000 m^3
8. PROPOSED FLOOD STORAGE IN GOLF COURSE FROM PROPOSED FINISHED GROUND LEVEL TO SPILLWAY HEIGHT OF 14mRL = 562,000m^3 WHICH PROVES THIS CONCEPT TO ACHIEVE THE REQUIRED 550,000m^3.
7. EROSION AND SEDIMENT CONTROL IS TO BE DESIGNED AT PRELIMINARY DESIGN TO COMPLEMENT THE STAGING ON SHEET SK07-1.
8. IT IS INTENDED THAT THE CONTRACTOR SHALL GRADE THE EARTHWORKS TO THE FINISHED CONTOURS SHOWN. HOWEVER, THE FINAL MARRYING AND SHAPING OF THE EARTHWORKS AREAS IS SUBJECT TO THE ENGINEERS AND GOLF DESIGNER'S APPROVAL.
9. DESIGN IS SUBJECT TO THE RESULTS OF THE FOLLOWING INVESTIGATIVE REPORTING TO BE COMPLETED BY HWFR OR OTHERS:
   - 9.1. GEOTECHNICAL REPORT
   - 9.2. GROUNDWATER REPORT
   - 9.3. CONTAMINATION REPORT
   - 9.4. ECOLOGY REPORT
   - 9.5. STORMWATER CATCHMENT FLOOD MODELLING REPORT
   - 9.6. WATERCARE WASTEWATER TRANSMISSION PIPE AND STRUCTURES INTEGRITY REPORT
   - 9.7. ELECTRICAL STUDY AND LINES REPORT

Kura Golf Course Design

CIVILPLAN CONSULTANTS

Level 12, 17 Albert Street, Auckland Central. Phone: 09 222 2445

PROJECT TITLE: TAKAPUNA GOLF COURSE NORTHCOTE ROAD TAKAPUNA

SHEET TITLE: DEPTH CONTOURS OPTION 6

SCALE: (A1/A3) 1:2000 / 1:4000

SCALE BAR 1:4000@A3 0 40 80 120 160 200m

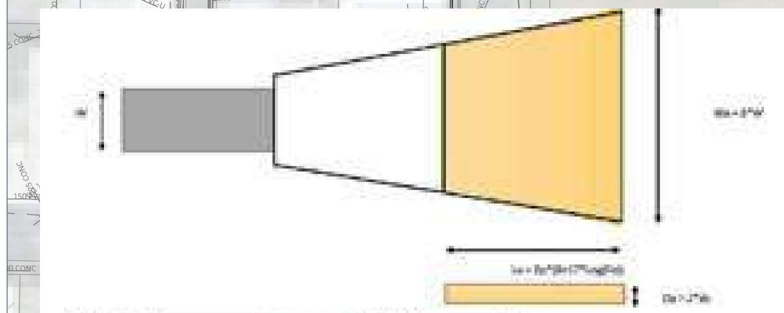
ISSUE STATUS: PRELIMINARY DRAFT

PROJECT NUMBER: HPCL1945 DRAWING NUMBER: SK07-3 REV: 1

REVISION DETAILS: PRELIMINARY DRAFT TO HWFR REVISION DATE: 24 28 025

DRAWN: RJP CHECKED: RJP APPROVED: RJP

TGC Option R0 (24th April 2025)



LEGEND

EXISTING

(CR)	PLOTTED FROM COUNCIL RECORDS
DN300	STORMWATER LINE AND MANHOLE
	WASTEWATER LINE AND MANHOLE

PROPOSED

DN300	STORMWATER LINE AND MANHOLE
	EXISTING LINE TO BE REMOVED
	STORMWATER CATCHPIT
	SCRUFFY DOME INLET/OUTLET MANHOLE
	STORMWATER INLET / OUTLET
	STORMWATER RIP RAP
	LOW AREAS SUBSOIL DRAIN REFER TO DETAIL ON SK07-5
	TEE SUBSOIL DRAINAGE REFER TO DETAIL ON SK07-5
	FAIRWAY / BUNKER SUBSOIL DRAINAGE REFER TO DETAIL ON SK07-5
	GREEN SUBSOIL DRAINAGE REFER TO DETAIL ON SK07-5
	FEATURE WETLAND BELOW FLOOD STORAGE - TOP WATER LEVEL 11.1mRL

Kaupapa Kura
KURA
GOLF COURSE DESIGN

NOTES:

1. IF IN DOUBT PLEASE ASK.
2. DO NOT SCALE FROM THE DRAWINGS.
3. ALL PUBLIC DRAINAGE WORKS AND MATERIALS ARE TO COMPLY WITH THE AUCKLAND COUNCIL CODE OF PRACTICE - CHAPTER 4 STORMWATER
4. ALL PRIVATE DRAINAGE WORKS AND MATERIALS ARE TO COMPLY WITH THE NZ BUILDING CODE - CHAPTER E1 SURFACE WATER AND CHAPTER G13 FOUL WATER.
5. ALL WORKS ON EXISTING STORMWATER INFRASTRUCTURE ARE TO BE CARRIED OUT BY AN APPROVED, LICENSED CONTRACTOR.
7. DESIGN IS SUBJECT TO THE RESULTS OF THE FOLLOWING INVESTIGATIVE REPORTING TO BE COMPLETED BY HWFR OR OTHERS:
   - 7.1. GEOTECHNICAL REPORT
   - 7.2. GROUNDWATER REPORT
   - 7.3. CONTAMINATION REPORT
   - 7.4. ECOLOGY REPORT
   - 7.5. STORMWATER CATCHMENT FLOOD MODELLING REPORT
   - 7.6. WATERCARE WASTEWATER TRANSMISSION PIPE AND STRUCTURES INTEGRITY REPORT
   - 7.7. ELECTRICAL STUDY AND LINES REPORT

CIVILPLAN CONSULTANTS
Level 12, 17 Albert Street, Auckland Central. Phone: 09 222 2445

PROJECT TITLE: TAKAPUNA GOLF COURSE, NORTHCOTE ROAD, TAKAPUNA

SHEET TITLE: DRAINAGE LAYOUT OPTION 6

SCALE: (A1/A3) 1:2000 / 1:4000

SCALE BAR 1:4000@A3: 0 40 80 120 160 200m

ISSUE STATUS: PRELIMINARY DRAFT

PROJECT NUMBER: HPCL1945 DRAWING NUMBER: SK07-4 REV: 1

REVISION DETAILS: PRELIMINARY DRAFT TO HWFR REVISION DATE: 24 29 025

DRAWN: RJP CHECKED: RJP APPROVED: RJP

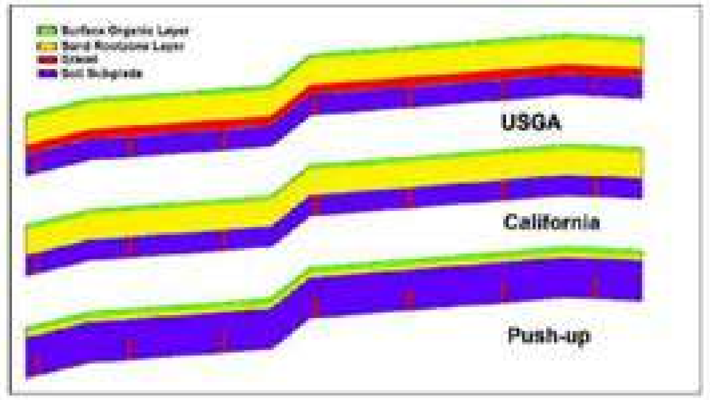
Printed by: RYAN@24.04.25 // Filepath: S:\JOBS\HPCL1945 - TAKAPUNA GOLF CLUB\CIVILPLAN\CAD\1945-01-SK07-1-OPTION 6.DWG

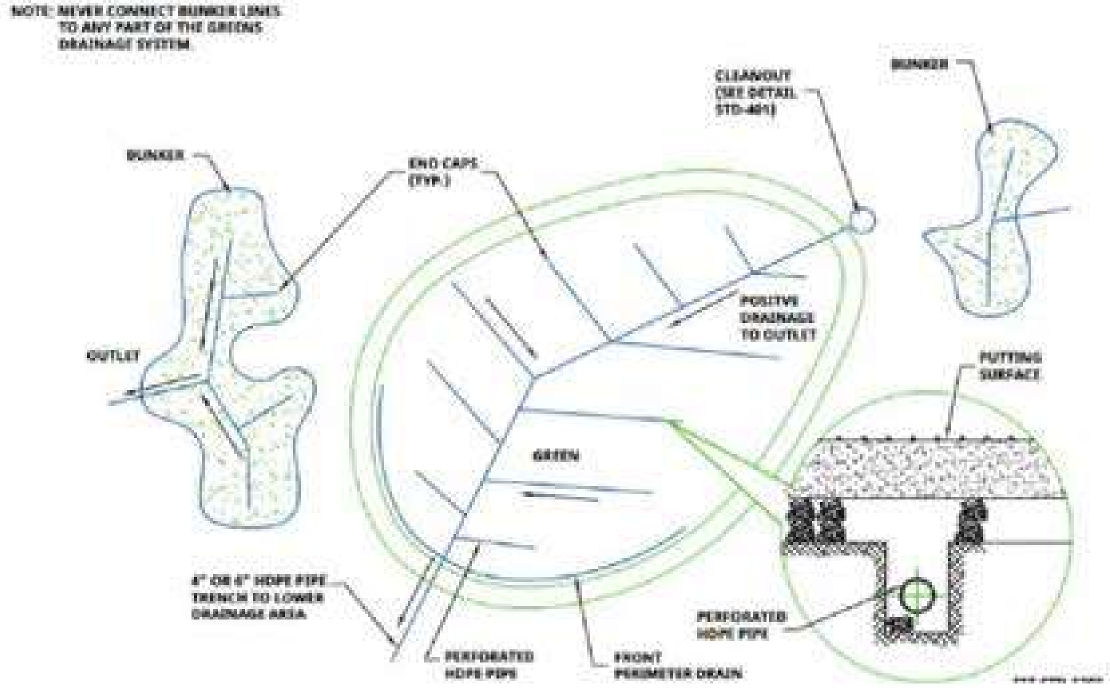
TGC Option R0 (24th April 2025)

TAKAPUNA GOLF CLUB
SAMPLE GREEN CONSTRUCTION DETAILS

The most preferred modern specifications for greens construction is either "USGA" or "California" and include either trenched perforated pipe or flat pipe in a herringbone pattern. California can be more cost effective without cost of trenching and the gravel layer.

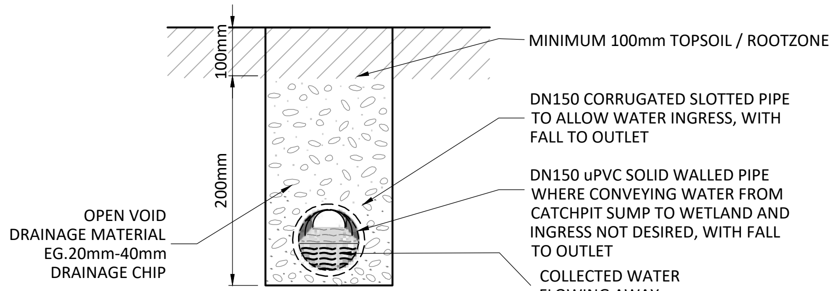
Sections below for flat pipe show AdvanEdge Pipe, in NZ we mostly use Megaflow.



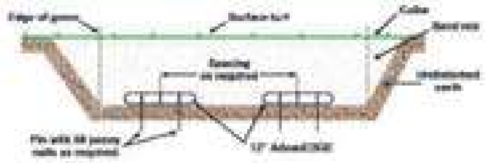


NOTES:

1. DETAILS PROVIDED BY KURA GOLF COURSE DESIGN, WITH PERMISSION.
2. DESIGN IS SUBJECT TO THE RESULTS OF THE FOLLOWING INVESTIGATIVE REPORTING TO BE COMPLETED BY HWFR OR OTHERS:
   - 2.1. GEOTECHNICAL REPORT
   - 2.2. GROUNDWATER REPORT
   - 2.3. CONTAMINATION REPORT
   - 2.4. ECOLOGY REPORT
   - 2.5. STORMWATER CATCHMENT FLOOD MODELLING REPORT
   - 2.6. WATERCARE WASTEWATER TRANSMISSION PIPE AND STRUCTURES INTEGRITY REPORT
   - 2.7. ELECTRICAL STUDY AND LINES REPORT



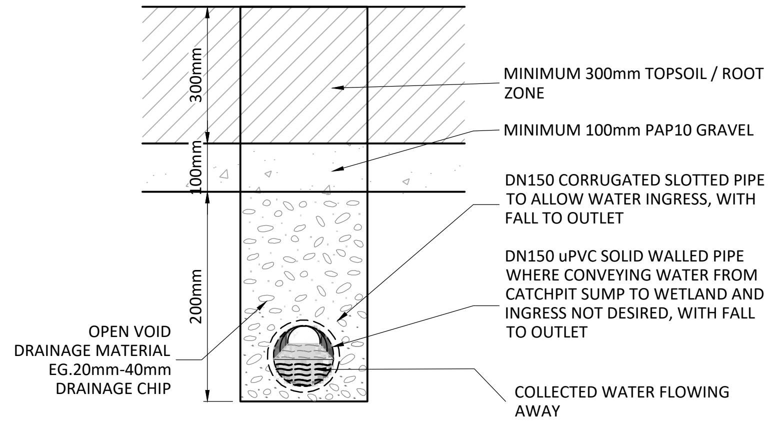
FAIRWAY SUBSOIL DRAINAGE SCHEMATIC



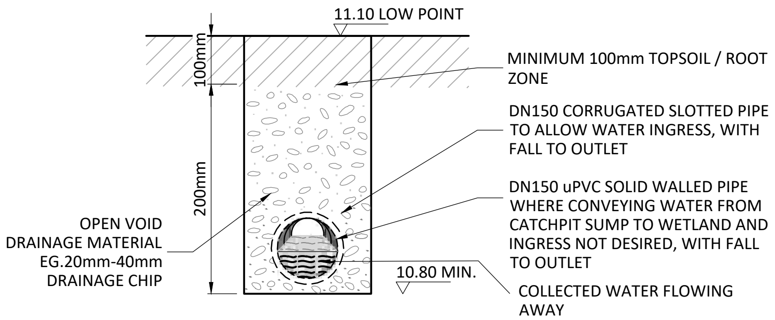
California Greens

California greens feature an all-sand root zone with no gravel layer. AdvanEDGE flat pipe is recommended for use with both types. California green specifications call for the flat pipe to be covered with a geotextile sock.

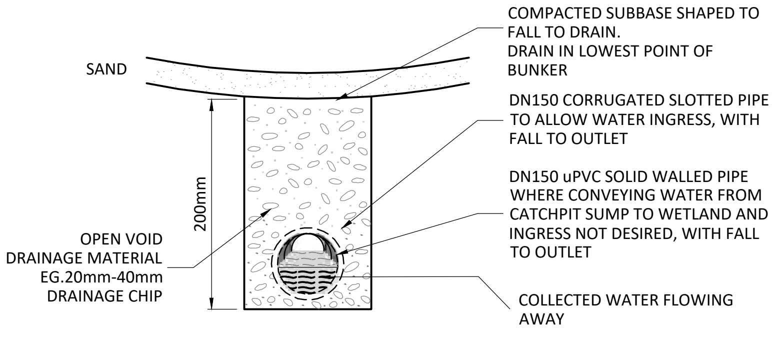
GREENS SUBSOIL DRAINAGE SCHEMATIC
OPTION 1 - FLAT MEGAFLOW, NO TRENCHING



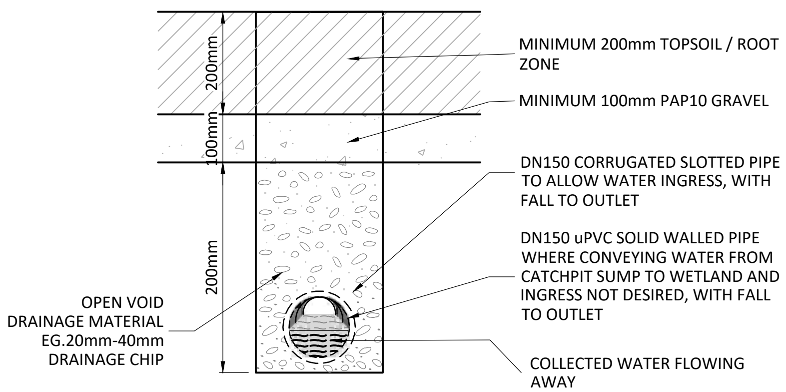
GREENS SUBSOIL DRAINAGE SCHEMATIC
OPTION 2 - TRENCHED PIPE



LOW AREA SUBSOIL DRAINAGE SCHEMATIC



BUNKER SUBSOIL DRAINAGE SCHEMATIC



TEE SUBSOIL DRAINAGE SCHEMATIC

CIVILPLAN CONSULTANTS
Level 12, 17 Albert Street, Auckland Central. Phone: 09 222 2445

PROJECT TITLE: TAKAPUNA GOLF COURSE
NORTHCOTE ROAD
TAKAPUNA

SHEET TITLE: TYPICAL GOLF HOLE DRAINAGE
OPTION 6

SCALE: (A1/A3) NOT TO SCALE
SCALE BAR N.T.S.

ISSUE STATUS: PRELIMINARY DRAFT

PROJECT NUMBER: HPCL1945 DRAWING NUMBER: SK07-5 REV: 1

REVISION DETAILS: PRELIMINARY DRAFT TO HWFR
REVISION DATE: 24 30 025

DRAWN: RJP CHECKED: RJP APPROVED: RJP

mps limited
29 Chamberlain Street
Grey Lynn,
Auckland 1021
www.mps.net.nz

12 June 2025

Head of Sustainable Partnerships
Healthy Waters & Flood Resilience
Auckland Council
135 Albert Street
Auckland 1010
[**by email**]

Attention: Tom Mansell

Takapuna Golf Course Flood Storage Submission

Dear Tom

On behalf of Takapuna Golf Course (TGC), please find enclosed our revised flood storage proposal (TGC-R1) and supporting technical material. This submission has been prepared in response to Council's ongoing engagement regarding the Wairau Blue-Green Network, including your recent correspondence of 6 June.

Purpose of the Project
TGC recognises that Auckland Council's Wairau Blue-Green Network aims to deliver significant flood attenuation benefits across the Wairau catchment, with a Stage 1 target of 550,000 m³ of flood storage. The Takapuna Golf Course site has been identified as a preferred location due to its size, proximity to Wairau Stream, and its status as publicly owned open space.

Significance of the Golf Course
TGC is a long-standing, highly valued public recreational facility that supports year-round access to golf, a driving range, and passive green space. Beyond its recreational role, the course contributes to local wellbeing, open space continuity, and urban green infrastructure. TGC staff also actively manage overland flow paths and site drainage to support stormwater and flood resilience. Historical debris and sediment issues have not been problematic to manage on-site.

The Revised TGC Proposal – A Balanced, Constructible Solution
The updated TGC-R1 concept delivers the same flood storage outcome as the Healthy Waters (HW) proposal — 550,000 m³ — with an equivalent 40 m inlet and assumed outlet configuration. Importantly, it does so while preserving recreational use of the site for golf, a valued community asset.

The proposal is the result of collaboration between civil contractors and designers, including input from golf course designers. It is an exercise in smart land shaping and integration, not opposition and demonstrates how flood infrastructure and community assets can coexist when they are considered together at the outset and not as an afterthought.

We consider that the cost to deliver the solution can be delivered within the $58M budget as we believe it achieves the same outcomes as the Healthy Waters' concept.

Golf Course Design
Final hole count is subject to refinement, largely due to outstanding information from Council — including Council's proposed terrain (DTM), groundwater levels, wetland design and drainage, and flood storage form. However, current layouts show potential to retain up to 18 holes and a driving range. We anticipate some potential summer-playable areas in seasonally inundated zones, with final hole alignment dependent on hydrological modelling and site-level validation.

While significant earthworks are required, the revised proposal is constructible and allows continued operation of the golf course and driving range, with only limited disruption over two construction seasons. TGC and its partners are ready to begin the next design phase immediately, pending confirmation of funding and scope alignment with Council.

Earthworks Methodology
TGC has engaged an experienced earthworks contractor with a proven track record in delivering large-scale bulk earthworks projects while retaining golf course functionality during construction. This contractor has previously worked on sites where golf operations were maintained in parallel with staged earthworks and has reviewed the current TGC concept to inform a high-level construction methodology.

TGC has received a conceptual earthworks methodology and has been advised that a carefully staged approach, beginning with excavation of the north-eastern dry basin and progressing to shaping of the north-western sector would allow flood control measures to be prioritised while enabling phased construction. This approach supports a progressive increase in flood storage capacity as the works advance.

Crucially, this sequencing would allow the golf course to remain partially operational throughout the construction period, with a minimum of nine holes playable at all times and uninterrupted access to the clubhouse. This ensures continuity of community use and minimises disruption to club operations.

The ability to implement the works in a way that respects both the flood storage objectives and the recreational function of the site reflects TGC's commitment to delivering a balanced solution that serves both infrastructure needs and community values.

Wetland Viability Considerations
Longstanding local knowledge, supported by TGC staff observations, raises concerns regarding the feasibility of the proposed permanent wetland under the HW concept. Drainage channels on site routinely dry out in summer, and the contributing catchment is relatively constrained. Without reliable inflows, the proposed wetland may underperform and pose new risks related to water quality, stagnation, and ecological health.

We believe a more modest wetland footprint would be appropriate and would also enable further refinement of the course layout and playable area.

In addition, we note that Council's current cost estimate allocates $10.7 million to design and consenting, representing over 18% of the total project cost. In our view, this is disproportionately high for a project of this type and scale. TGC believes it can deliver both the flood storage facility and a functioning golf course more efficiently, in a way that is cost-effective, outcome-driven, and beneficial to the community for generations to come.

Submission Materials
The following documents are included with this submission:

1. **3D Ground Model (NZVD1946)** – refer to digital DWG files provided by email with this letter.

   a. Note: Hole count remains indicative until Council's Digital Terrain Model (DTM), functional description, geotechnical and groundwater information is provided. Two-hole layout plans have been prepared showing 18 playable holes.

2. **Updated Site Plan and Cross Sections** – Refer plans to HPCL1945-SK08-1-Rev 1-SET.pdf provided by email with this letter. Note additional sections can be extracted by from the 3D model if required.

a. **Supporting Technical Information** – further material can be provided on request. However, given the high alignment between TGC-R1 and the HW proposal, we expect most requests will apply equally to both schemes.

Next Steps
TGC remains committed to progressing a viable and integrated flood storage solution that aligns with Council's objectives while retaining important community value. We welcome further technical discussion and engagement to:

- Clarify operational, hydrological, drainage and delivery assumptions
- Align on a shared DTM and ground model
- Meet with WSP and Council operations staff to refine feasibility, operational considerations and next-stage planning

TGC has assembled a team of experienced consultants and contractors who are actively engaged in the design process and ready to collaborate with Council on the next phase of development. We are also working with landscape and arboricultural experts, who are currently undertaking a tree survey with the aim of retaining as many existing trees as practicable.

In addition, TGC has access to a broader network of expertise, including a professional economist, health and wellbeing specialists, and individuals with deep knowledge of the social, recreational, and environmental benefits of golf course facilities. This expertise will support a well-rounded, evidence-based case for the value of retaining golf as part of an integrated flood mitigation solution. We expect ongoing engagement with Council and its advisors throughout the Benefit–Cost Ratio (BCR) assessment process to ensure the TGC proposal is fairly and accurately evaluated.

TGC would welcome the opportunity to discuss potential funding and delivery options including support to progress detailed TGC design work, a design–build delivery model, or alternative partnership arrangements.

Finally, we respectfully request written confirmation of an updated overall programme, including key dates and milestones — such as deliverables from Healthy Waters, reporting timelines to the Local Board and Council committees, and proposed dates for future feedback and collaboration sessions with TGC. In addition, we seek confirmation of the timeframe for the delivery and release of the outstanding technical information previously identified in our correspondence and summarised in Attachment A of this submission.

We note that several previously indicated dates for the provision of information — such as the release of the Healthy Waters digital terrain model (DTM) have now passed. Timely access to this material is essential to ensure meaningful engagement and continued progress.

Yours sincerely

Phil Jaggard
Director, MPS Limited

NOTES:

STAGE 1

1.1. FILL AREA IS IN THE SOUTHERN AREA, AND IS A COMMON SOLUTION, QUANTUM, PROGRAMMING AND COST TO THE HWFR SOLUTION. AS WITH THE HWFR SOLUTION IT IS SUBJECT TO GEOTECH INVESTIGATIONS AND CONFIRMATION FROM WATERCARE ON ACCEPTABILITY OF WORKS OVER TRANSMISSION WW LINE. THIS WORK IS TO BE PROGRESSED DURING PRELIMINARY DESIGN.

1.2. HOLES TO CONTINUE TO BE PLAYED IN STAGE 2 AREA IN THE ORDER AS FOLLOWS OR AS DETERMINED BY OTHERS: 10-18.

STAGE 2

1.1. STAGE 2 COMPLETES EARTHWORKS WITHIN STAGE 2 AREA.

1.2. HOLES TO CONTINUE TO BE PLAYED IN THE STAGE 1 AREA IN THE ORDER AS FOLLOWS OR AS DETERMINED BY OTHERS: 1-9.

KURA GOLF COURSE DESIGN

CIVILPLAN CONSULTANTS

Level 12, 17 Albert Street, Auckland Central. Phone: 09 222 2445

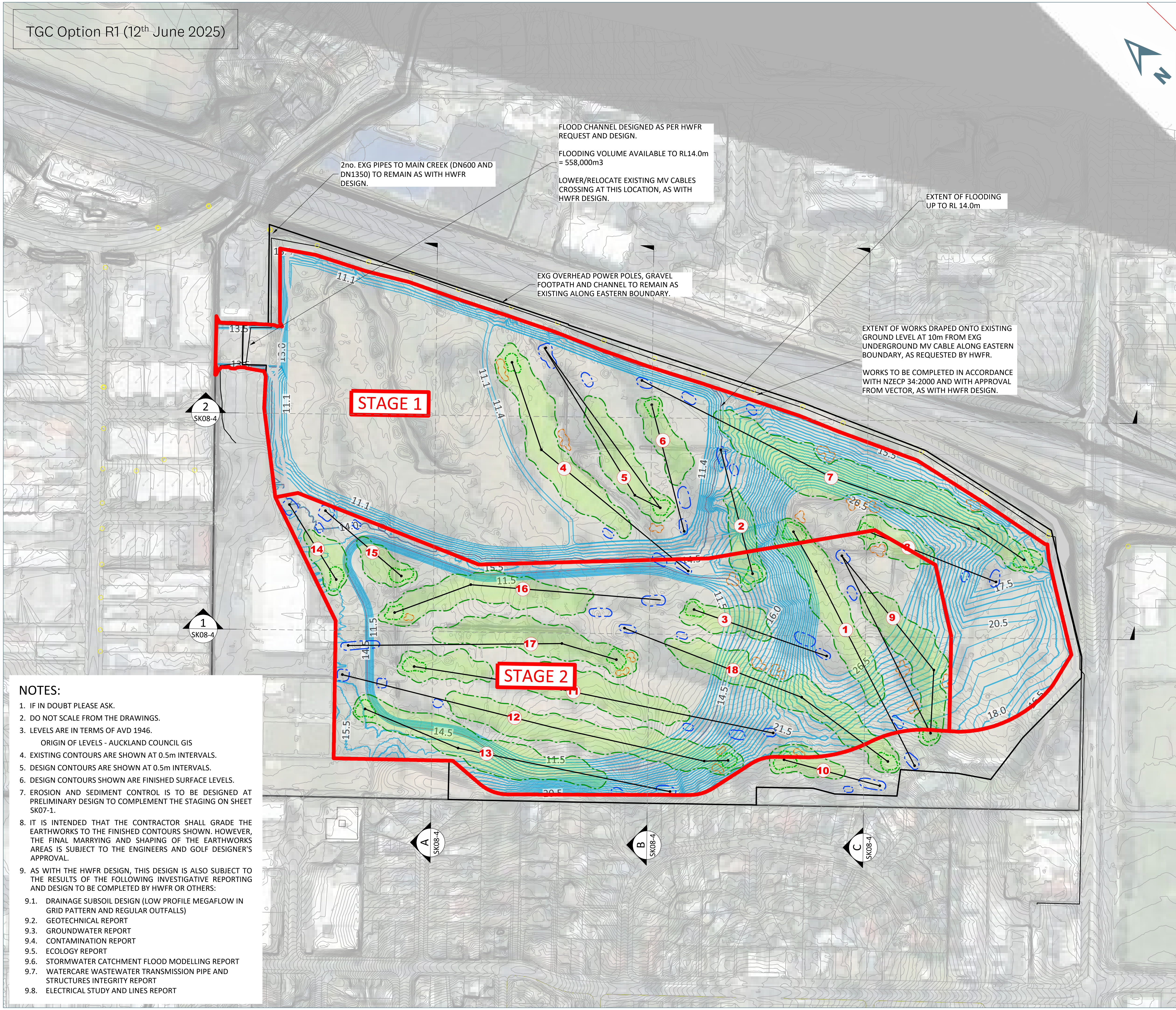
PROJECT TITLE:
TAKAPUNA GOLF COURSE
NORTHCOTE ROAD
TAKAPUNA

SHEET TITLE:
PROPOSED LAYOUT PLAN
OPTION 7

SCALE: (A1/A3)	1:2000 / 1:4000
SCALE BAR 1:4000@A3	0 40 80 120 160 200m
ISSUE STATUS:	PRELIMINARY DRAFT
PROJECT NUMBER:	HPCL1945
DRAWING NUMBER:	SK08-1
REV:	1
REVISION DETAILS:	PRELIMINARY DRAFT TO HWFR
REVISION DATE:	11 33 025
DRAWN:	RJP
CHECKED:	RJP
APPROVED:	RJP

Printed by: RYAN@11.06.25 // Filepath: S:\JOBS\HPCL1945 - TAKAPUNA GOLF CLUB\CIVILPLAN\CAD\1945-01-SK08-1-OPTION 7.DWG

TGC Option R1 (12th June 2025)



LEGEND

10.0 EXISTING CONTOUR
PROPOSED MINOR CONTOUR
10.0 PROPOSED MAJOR CONTOUR
EARTHWORK EXTENT
PROPOSED 14m RL CONTOUR

NOTES:

1. IF IN DOUBT PLEASE ASK.
2. DO NOT SCALE FROM THE DRAWINGS.
3. LEVELS ARE IN TERMS OF AVD 1946.
   ORIGIN OF LEVELS - AUCKLAND COUNCIL GIS
4. EXISTING CONTOURS ARE SHOWN AT 0.5m INTERVALS.
5. DESIGN CONTOURS ARE SHOWN AT 0.5m INTERVALS.
6. DESIGN CONTOURS SHOWN ARE FINISHED SURFACE LEVELS.
7. EROSION AND SEDIMENT CONTROL IS TO BE DESIGNED AT PRELIMINARY DESIGN TO COMPLEMENT THE STAGING ON SHEET SK07-1.
8. IT IS INTENDED THAT THE CONTRACTOR SHALL GRADE THE EARTHWORKS TO THE FINISHED CONTOURS SHOWN. HOWEVER, THE FINAL MARRYING AND SHAPING OF THE EARTHWORKS AREAS IS SUBJECT TO THE ENGINEERS AND GOLF DESIGNER'S APPROVAL.
9. AS WITH THE HWFR DESIGN, THIS DESIGN IS ALSO SUBJECT TO THE RESULTS OF THE FOLLOWING INVESTIGATIVE REPORTING AND DESIGN TO BE COMPLETED BY HWFR OR OTHERS:
   9.1. DRAINAGE SUBSOIL DESIGN (LOW PROFILE MEGAFLOW IN GRID PATTERN AND REGULAR OUTFALLS)
   9.2. GEOTECHNICAL REPORT
   9.3. GROUNDWATER REPORT
   9.4. CONTAMINATION REPORT
   9.5. ECOLOGY REPORT
   9.6. STORMWATER CATCHMENT FLOOD MODELLING REPORT
   9.7. WATERCARE WASTEWATER TRANSMISSION PIPE AND STRUCTURES INTEGRITY REPORT
   9.8. ELECTRICAL STUDY AND LINES REPORT

Kōrpiti Kōr KURA GOLF COURSE DESIGN

CIVILPLAN CONSULTANTS
Level 12, 17 Albert Street, Auckland Central. Phone: 09 222 2445

PROJECT TITLE:
TAKAPUNA GOLF COURSE
NORTHCOTE ROAD
TAKAPUNA

SHEET TITLE:
FINISHED CONTOUR PLAN
OPTION 7

SCALE: (A1/A3) 1:2000 / 1:4000
SCALE BAR 1:4000@A3 0 40 80 120 160 200m

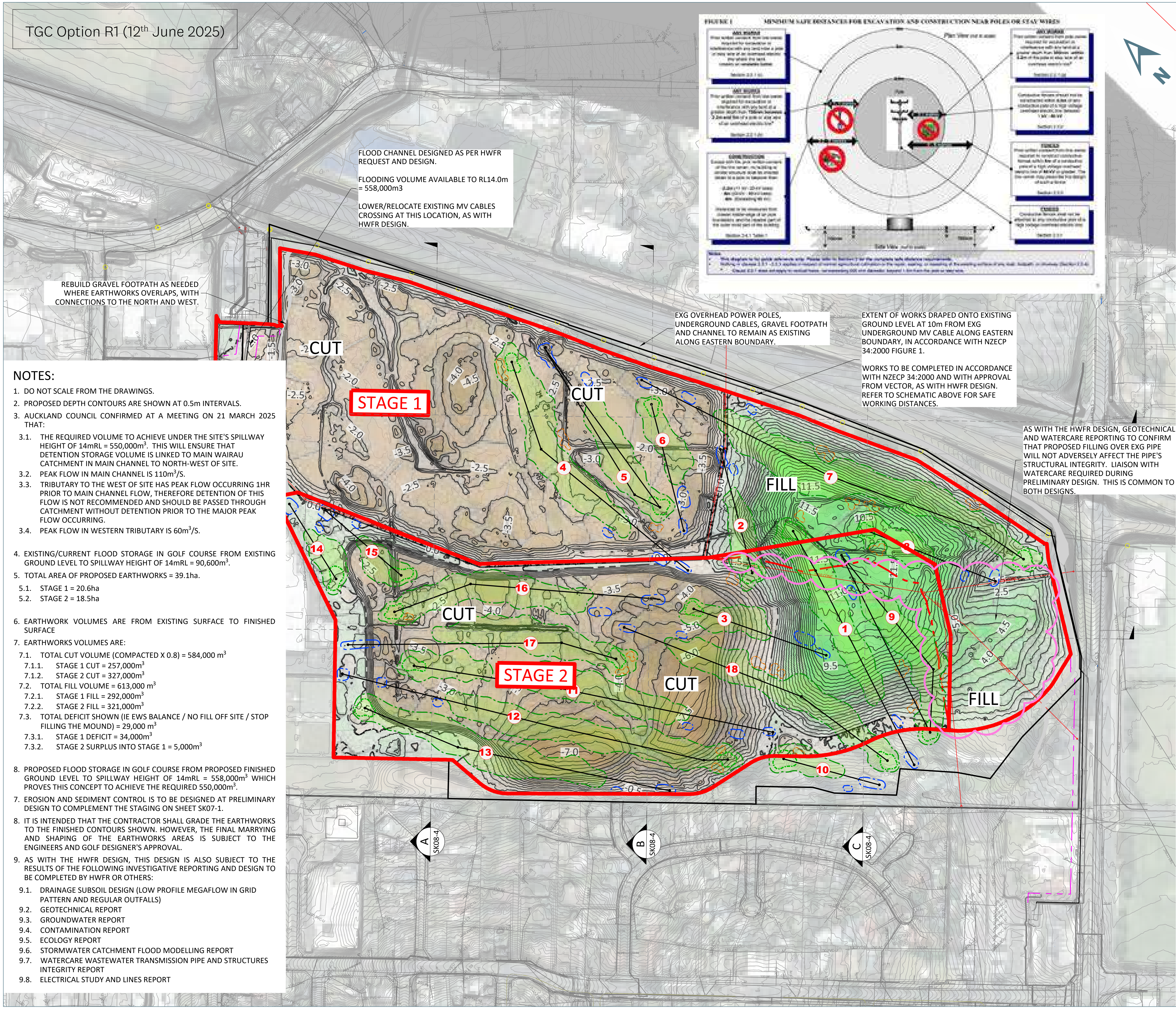
ISSUE STATUS: PRELIMINARY DRAFT

PROJECT NUMBER: HPCL1945 DRAWING NUMBER: SK08-2 REV: 1

REVISION DETAILS: PRELIMINARY DRAFT TO HWFR
REVISION DATE: 11 34 025

DRAWN: RJP CHECKED: RJP APPROVED: RJP

TGC Option R1 (12th June 2025)



LEGEND

-1.0	PROPOSED CUT ISOPACH
1.0	PROPOSED FILL ISOPACH
	EARTHWORKS ZERO CUT/FILL LINE
	EARTHWORK EXTENT
CUT	PROPOSED CUT
FILL	PROPOSED FILL
	EXG POWER O/H OR U/G ALIGNMENT CLOSEST TO EARTHWORKS
	10.0m OFFSET FROM EXG POWER

NOTES:

1. DO NOT SCALE FROM THE DRAWINGS.
2. PROPOSED DEPTH CONTOURS ARE SHOWN AT 0.5m INTERVALS.
3. AUCKLAND COUNCIL CONFIRMED AT A MEETING ON 21 MARCH 2025 THAT:
   - 3.1. THE REQUIRED VOLUME TO ACHIEVE UNDER THE SITE'S SPILLWAY HEIGHT OF 14mRL = 550,000m^3. THIS WILL ENSURE THAT DETENTION STORAGE VOLUME IS LINKED TO MAIN WAIRAU CATCHMENT IN MAIN CHANNEL TO NORTH-WEST OF SITE.
   - 3.2. PEAK FLOW IN MAIN CHANNEL IS 110m^3/S.
   - 3.3. TRIBUTARY TO THE WEST OF SITE HAS PEAK FLOW OCCURRING 1HR PRIOR TO MAIN CHANNEL FLOW, THEREFORE DETENTION OF THIS FLOW IS NOT RECOMMENDED AND SHOULD BE PASSED THROUGH CATCHMENT WITHOUT DETENTION PRIOR TO THE MAJOR PEAK FLOW OCCURRING.
   - 3.4. PEAK FLOW IN WESTERN TRIBUTARY IS 60m^3/S.
4. EXISTING/CURRENT FLOOD STORAGE IN GOLF COURSE FROM EXISTING GROUND LEVEL TO SPILLWAY HEIGHT OF 14mRL = 90,600m^3.
5. TOTAL AREA OF PROPOSED EARTHWORKS = 39.1ha.
   - 5.1. STAGE 1 = 20.6ha
   - 5.2. STAGE 2 = 18.5ha
6. EARTHWORK VOLUMES ARE FROM EXISTING SURFACE TO FINISHED SURFACE
7. EARTHWORKS VOLUMES ARE:
   - 7.1. TOTAL CUT VOLUME (COMPACTED X 0.8) = 584,000 m^3
     - 7.1.1. STAGE 1 CUT = 257,000m^3
     - 7.1.2. STAGE 2 CUT = 327,000m^3
   - 7.2. TOTAL FILL VOLUME = 613,000 m^3
     - 7.2.1. STAGE 1 FILL = 292,000m^3
     - 7.2.2. STAGE 2 FILL = 321,000m^3
   - 7.3. TOTAL DEFICIT SHOWN (IE EWS BALANCE / NO FILL OFF SITE / STOP FILLING THE MOUND) = 29,000 m^3
     - 7.3.1. STAGE 1 DEFICIT = 34,000m^3
     - 7.3.2. STAGE 2 SURPLUS INTO STAGE 1 = 5,000m^3
8. PROPOSED FLOOD STORAGE IN GOLF COURSE FROM PROPOSED FINISHED GROUND LEVEL TO SPILLWAY HEIGHT OF 14mRL = 558,000m^3 WHICH PROVES THIS CONCEPT TO ACHIEVE THE REQUIRED 550,000m^3.
7. EROSION AND SEDIMENT CONTROL IS TO BE DESIGNED AT PRELIMINARY DESIGN TO COMPLEMENT THE STAGING ON SHEET SK07-1.
8. IT IS INTENDED THAT THE CONTRACTOR SHALL GRADE THE EARTHWORKS TO THE FINISHED CONTOURS SHOWN. HOWEVER, THE FINAL MARRYING AND SHAPING OF THE EARTHWORKS AREAS IS SUBJECT TO THE ENGINEERS AND GOLF DESIGNER'S APPROVAL.
9. AS WITH THE HWFR DESIGN, THIS DESIGN IS ALSO SUBJECT TO THE RESULTS OF THE FOLLOWING INVESTIGATIVE REPORTING AND DESIGN TO BE COMPLETED BY HWFR OR OTHERS:
   - 9.1. DRAINAGE SUBSOIL DESIGN (LOW PROFILE MEGAFLOW IN GRID PATTERN AND REGULAR OUTFALLS)
   - 9.2. GEOTECHNICAL REPORT
   - 9.3. GROUNDWATER REPORT
   - 9.4. CONTAMINATION REPORT
   - 9.5. ECOLOGY REPORT
   - 9.6. STORMWATER CATCHMENT FLOOD MODELLING REPORT
   - 9.7. WATERCARE WASTEWATER TRANSMISSION PIPE AND STRUCTURES INTEGRITY REPORT
   - 9.8. ELECTRICAL STUDY AND LINES REPORT

Kaupapa Kura GOLF COURSE DESIGN

CIVILPLAN CONSULTANTS
Level 12, 17 Albert Street, Auckland Central. Phone: 09 222 2445

PROJECT TITLE: TAKAPUNA GOLF COURSE NORTHCOTE ROAD TAKAPUNA

SHEET TITLE: DEPTH CONTOURS OPTION 7

SCALE: (A1/A3) 1:2000 / 1:4000

SCALE BAR 1:4000@A3 0 40 80 120 160 200m

ISSUE STATUS: PRELIMINARY DRAFT

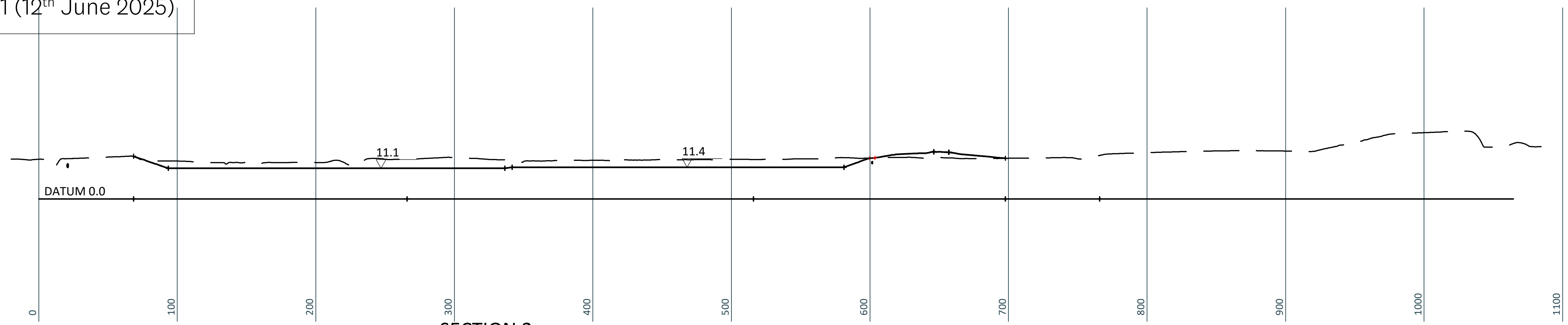
PROJECT NUMBER: HPCL1945 DRAWING NUMBER: SK08-3 REV: 1

REVISION DETAILS: PRELIMINARY DRAFT TO HWFR REVISION DATE: 11 35 025

DRAWN: RJP CHECKED: RJP APPROVED: RJP

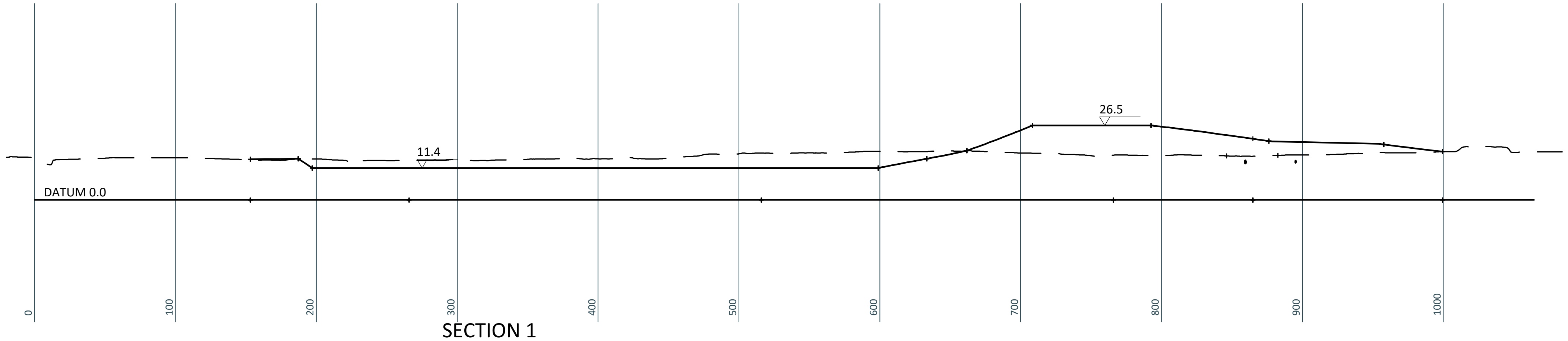
Printed by: RYAN@11.06.25 // Filepath: S:\JOBS\HPCL1945 - TAKAPUNA GOLF CLUB\CIVILPLAN\CAD\1945-01-SK08-1-OPTION 7.DWG

TGC Option R1 (12th June 2025)



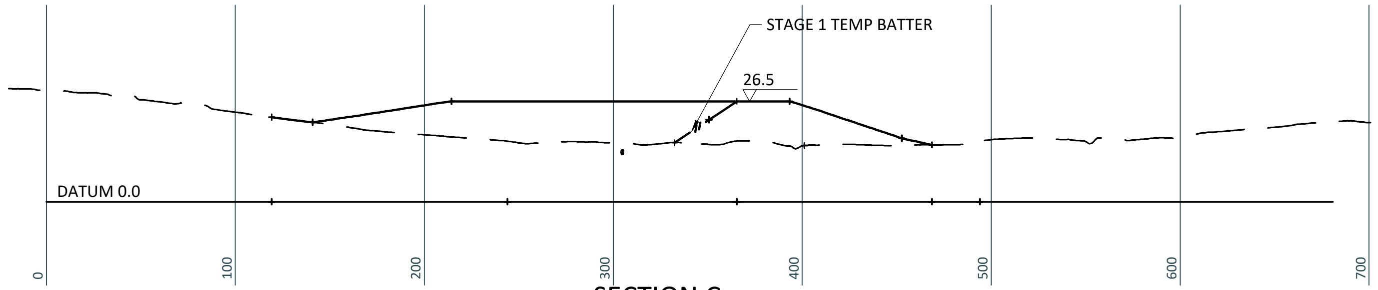
SECTION 2

SCALE: (A1/A3) 1:2000H 1:1000V / 1:4000H 1:2000V



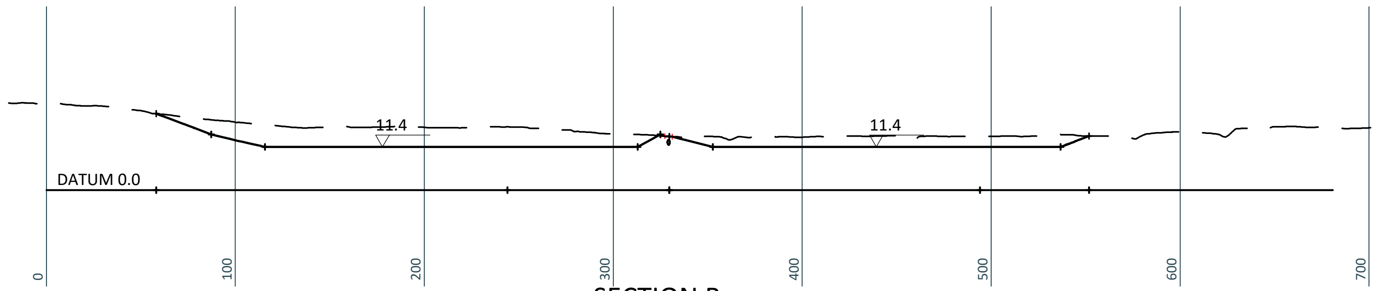
SECTION 1

SCALE: (A1/A3) 1:2000H 1:1000V / 1:4000H 1:2000V



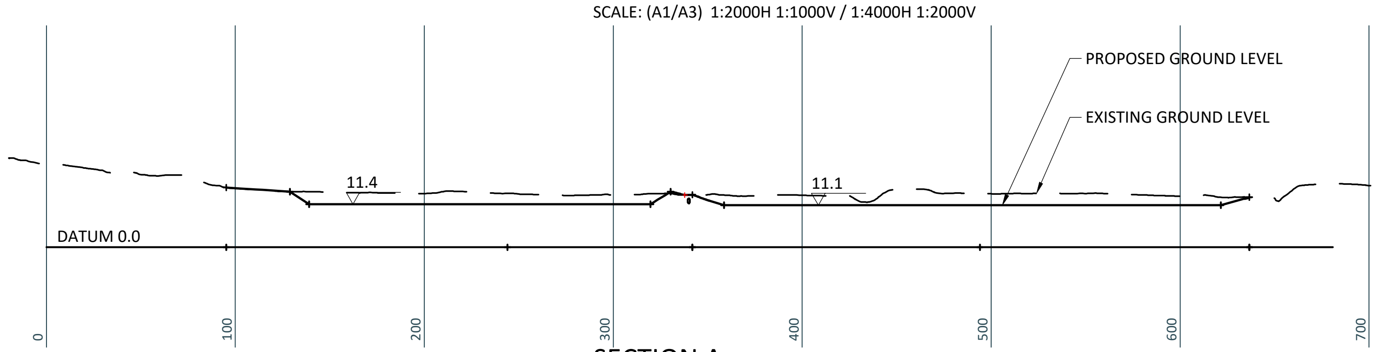
SECTION C

SCALE: (A1/A3) 1:2000H 1:1000V / 1:4000H 1:2000V



SECTION B

SCALE: (A1/A3) 1:2000H 1:1000V / 1:4000H 1:2000V



SECTION A

SCALE: (A1/A3) 1:2000H 1:1000V / 1:4000H 1:2000V

KURA
GOLF COURSE DESIGN

CIVILPLAN
CONSULTANTS

Level 12, 17 Albert Street, Auckland Central. Phone: 09 222 2445

PROJECT TITLE:
TAKAPUNA GOLF COURSE
NORTHCOTE ROAD
TAKAPUNA

SHEET TITLE:
SITE CROSS SECTIONS
OPTION 7

SCALE: (A1/A3) AS SHOWN
SCALE BAR N.T.S.

ISSUE STATUS: PRELIMINARY DRAFT

PROJECT NUMBER: HPCL1945 DRAWING NUMBER: SK08-3 REV: 1

REVISION DETAILS: PRELIMINARY DRAFT TO HWFR
REVISION DATE: 11 36 025

DRAWN: RJP CHECKED: RJP APPROVED: RJP

Printed by: RYAN@11.06.25 // Filepath: S:\JOBS\HPCL1945 - TAKAPUNA GOLF CLUB\CIVILPLAN\CAD\1945-01-SK08-1-OPTION 7.DWG

NOTES:

STAGE 1

1.1. FILL AREA IS IN THE SOUTHERN AREA, AND IS A COMMON SOLUTION, QUANTUM, PROGRAMMING AND COST TO THE HWFR SOLUTION. AS WITH THE HWFR SOLUTION IT IS SUBJECT TO GEOTECH INVESTIGATIONS AND CONFIRMATION FROM WATERCARE ON ACCEPTABILITY OF WORKS OVER TRANSMISSION WW LINE. THIS WORK IS TO BE PROGRESSED DURING PRELIMINARY DESIGN.

1.2. HOLES TO CONTINUE TO BE PLAYED IN STAGE 2 AREA IN THE ORDER AS FOLLOWS OR AS DETERMINED BY OTHERS: 10-18.

STAGE 2

1.1. STAGE 2 COMPLETES EARTHWORKS WITHIN STAGE 2 AREA.

1.2. HOLES TO CONTINUE TO BE PLAYED IN THE STAGE 1 AREA IN THE ORDER AS FOLLOWS OR AS DETERMINED BY OTHERS: 1-9.

Kura Golf Course Design

CIVILPLAN CONSULTANTS

Level 12, 17 Albert Street, Auckland Central. Phone: 09 222 2445

PROJECT TITLE:
TAKAPUNA GOLF COURSE
NORTHCOTE ROAD
TAKAPUNA

SHEET TITLE:
PROPOSED LAYOUT PLAN
OPTION 7A

SCALE: (A1/A3) 1:2000 / 1:4000

SCALE BAR 1:4000@A3 0 40 80 120 160 200m

ISSUE STATUS: PRELIMINARY DRAFT

PROJECT NUMBER: HPCL1945 DRAWING NUMBER: SK08-6 REV: 1

REVISION DETAILS: PRELIMINARY DRAFT TO HWFR

REVISION DATE: 11 37 025

DRAWN: RJP CHECKED: RJP APPROVED: RJP

Printed by: RYAN@11.06.25 // Filepath: S:\JOBS\HPCL1945 - TAKAPUNA GOLF CLUB\CIVILPLAN\CAD\1945-01-SK08-1-OPTION 7.DWG

mps limited
29 Chamberlain Street
Grey Lynn,
Auckland 1021
www.mps.net.nz

18 June 2025

Principal Project Manager | Blue Green Networks
Auckland Council
135 Albert Street
Auckland 1010
[**by email**]

Attention: Sara Zwart

Takapuna Golf Course Flood Storage Submission - Additional Information

Dear Sara

As noted, you have advised that the feasibility assessment of TGC proposal is **NOT** a collaboration process, and Healthy Waters (HW) design has been changing throughout this process. TGC considers that the process has made it difficult to prepare a proposal on a like-for-like basis, particularly without access to available information and a stable baseline for comparison. We attach a summary of the process from our perspective to this letter.

Furthermore, following on from today's meeting to discuss TGC's proposal, we are providing the following clarification on concept assumptions and observations regarding the feasibility process and comparison of options.

Overall, we consider the TGC and Healthy Waters (HW) proposals are comparable in all but a few minor aspects. As the design process has progressed, the two solutions have converged significantly. As requested at the meeting we can provide the following clarifications when assessing the TGC concept differences.

Wetland Area
The 11.1m RL storage area is outside any proposed golf holes and from a TGC perspective can be a fully wetted area of 66,883m^2 or a small wetted area of say 4,844m^2 (equivalent to approximately two times the area of the existing wetlands/ponds currently located on the site), or anything in between. The larger wetting area option will have higher costs but potentially greater ecological benefit. Please advise and apply whatever is most favourable (cost and benefit) to the feasibility assessment and TGC will undertake to incorporate that in the next design iteration.

Delivery Programme
The TGC construction programme allows for operational continuity throughout the works over two construction seasons. Our staging programme will overlap, and through smart and efficient planning, TGC would apply a flexible management approach to retaining a playable golf course throughout the project. TGC to date has developed an earthworks staging approach that enables nine holes to remain playable throughout construction following feedback from our experienced earthworks contractor. Further detail on potential earthworks staging can be found in the attached *Takapuna Golf Course Design - Construction Methodology and Wetland Area,* by CivilPlan dated 18 June 2025.

As noted, this is shorter than the construction programme identified in HW's Strategic Business Case, which shows the main works occurring over a three-year period (Year 3: $14.6M; Year 4: $16.2M; Year 5: $14.5M; Year 6: $1M), implying a longer period of disruption and site unavailability.

Integrated Design
We note that the end point of the two options are not directly comparable. HW concept has not been developed as an integrated design with the final land use clearly identified. Whereas the TGC proposal has been shaped around retaining a public recreational asset from the outset. When Council finalises how it will repurpose the balance land (non-wetted area) for either recreational or non-recreational purposes, this will impose additional costs related to engineering, earthworks, recontouring, drainage, compaction, and stabilisation — costs that do not apply to the TGC solution. Unlike the TGC proposal, there could conceivably be significant delays between completion of the flood storage works and re-purposing of the balance lands.

We remain committed to progressing a viable, cost-effective solution that supports both Council's flood mitigation goals and the community's long-term recreational use of the site.

We also respectfully request that this letter and attachments be forwarded to the feasibility team responsible for assessing both the TGC and Healthy Waters options.

Please confirm whether any further clarification is required.

Yours sincerely

Phil Jaggard
Director, MPS Limited

CIVILPLAN
CONSULTANTS

MEMO

To:	Healthy Waters Flood Resilience - Sara Zwart	Date:	18 June 2025
From:	Ryan Pitkethley	CivilPlan Project No:	1945
Subject:	Takapuna Golf Course Design - Construction Methodology and Wetland Area		

1. Construction Methodology – Option 1

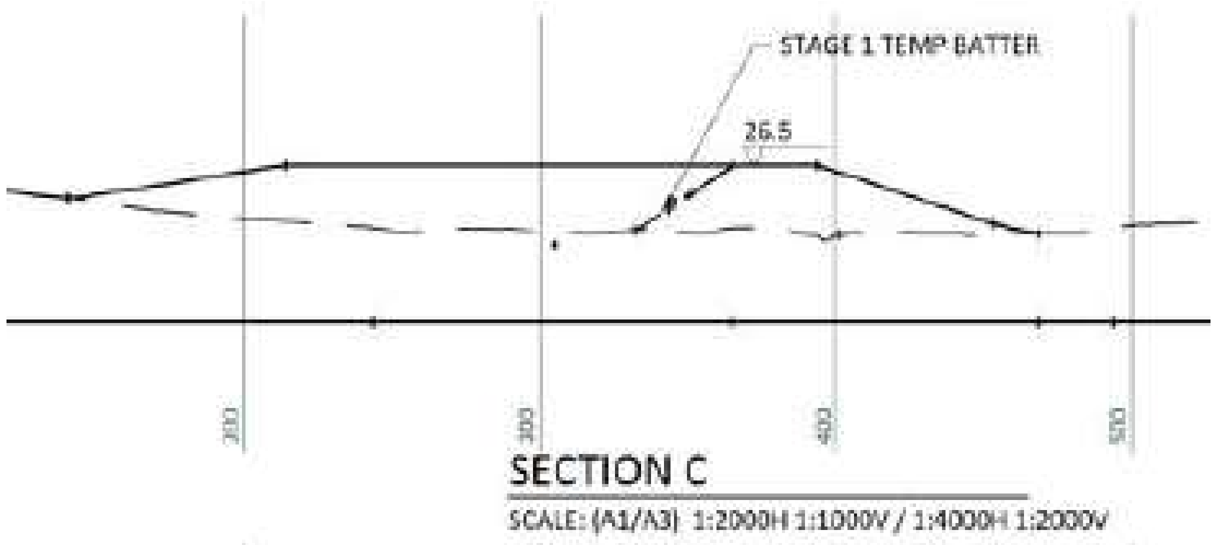
We provide a construction methodology to show how the golf course will continue to operate whilst construction is completed.

1.1. Volumes

Plan SK08-3 notes the indicative preliminary earthworks volumes for each stage. We note that this design is not final and should match the HWFR earthworks design when comparing costs.

5. TOTAL AREA OF PROPOSED EARTHWORKS = 39.1ha
  5.1. STAGE 1 = 20.6ha
  5.2. STAGE 2 = 18.5ha

6. EARTHWORK VOLUMES ARE FROM EXISTING SURFACE TO FINISHED SURFACE
7. EARTHWORKS VOLUMES ARE:
  7.1. TOTAL CUT VOLUME (COMPACTED X 0.8) = 584,000 m^3
    7.1.1. STAGE 1 CUT = 257,000m^3
    7.1.2. STAGE 2 CUT = 327,000m^3
  7.2. TOTAL FILL VOLUME = 613,000 m^3
    7.2.1. STAGE 1 FILL = 292,000m^3
    7.2.2. STAGE 2 FILL = 321,000m^3
  7.3. TOTAL DEFICIT SHOWN (IE EWS BALANCE / NO FILL OFF SITE / STOP FILLING THE MOUND) = 29,000 m^3
    7.3.1. STAGE 1 DEFICIT = 34,000m^3
    7.3.2. STAGE 2 SURPLUS INTO STAGE 1 = 5,000m^3



The red dashed line in plan and cross section C shows the temporary batter extent into stage 2 to complete the stage 1 fill.

1.2. Earthmoving Capacity Per Season

TGC are working with a well known and reputable Auckland based contractor who has been in business for more than 30 years. They have the capability of moving up to 1.1 million cubic metres per season. A recent development they completed in difficult peat soils moved 750,000m3 in a season.

To demonstrate golf course experience, they have been involved in a 500 lot residential subdivision at Peninsula Golf Course at Red Beach which moved 600,000m3. They also built the new Wainui golf club for the club to move to.

The risk of unknown ground conditions is common to both designs. If there is basalt rock found in the cuts this will however delay the project, and the program may not be achievable for either design.

However with the information on hand, it is therefore concluded that it is very reasonable to assume that the approximately 300,000m3 of cut to fill earthworks can be completed in each stage, ie within 2 earthworks seasons, and the golf course can continue to operate in some form throughout the periods.

1.3. Phase 1 – North-Eastern Dry Basin and Initial Filling

1.3.1. Objectives:

- Excavate a dry basin in the lowest, north-eastern corner of the site.
- Commence sediment control measures aligned with Auckland Council's GD05 standards.
- Strip topsoil, use excavated spoil to fill two designated areas: the driving range (up to 4.5 metres TBC) and the southern mound (up to 11 metres TBC).

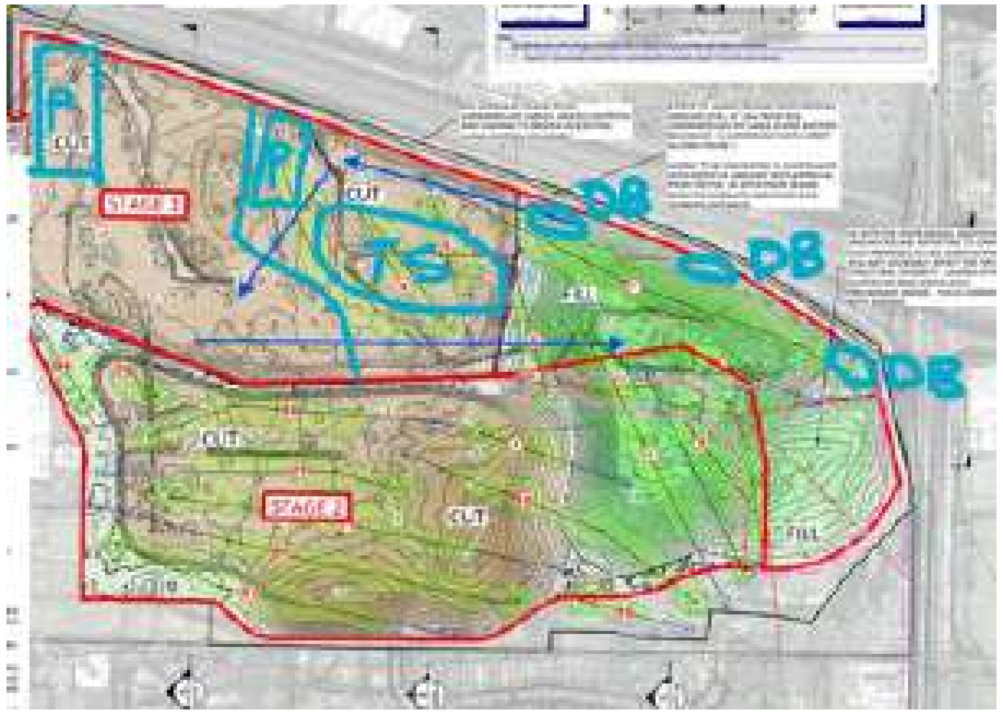
1.3.2. Description:

Phase 1 begins in the lowest-lying area of the site, allowing immediate control of stormwater inflow from surrounding urban areas. This phase includes large-scale clearing of trees, fairways, and existing golf features. Ecologists and arborists will supervise tree removal to retain or reuse viable specimens where possible. Excavation of the dry basin will be sequenced to prioritise water management benefits and facilitate compliance with erosion and sediment controls from the outset.

The driving range will be closed temporarily (approximately 6 months, 3 months earthworks, 3 months grass strike) to allow for safe and efficient fill placement. Once fill in the southern mound area is underway, the driving range will be reshaped, resurfaced, and reopened. Sediment controls such as silt fences, decanting earth bunds, and sediment ponds will be installed prior to any earthworks, and continuously maintained.

1.3.3. Indicative site movements and sequencing

Stage 1a – indicative site movements as blue arrows, topsoil (TS) erosion and sediment controls (P, DB) in teal



Stage 1b – indicative site movements as blue arrows, topsoil (TS) erosion and sediment controls (P, DB) in teal. Stabilised areas in green.

1.4. Phase 2 – North-West Area and Final Shaping

1.4.1. Objectives:

- Relocate temporary golf activities to this area upon Phase 1 completion.
- Commence sediment control measures aligned with Auckland Council's GD05 standards.
- Strip topsoil, complete bulk earthworks across the north-western portion of the site.
- Finalise cut and fill operations, including shaping.

1.4.2. Description:

Upon completion of Phase 1, the focus will shift to the north-western area. This phase includes large-scale clearing of trees, fairways, and existing golf features. Ecologists and arborists will supervise tree removal to retain or reuse viable specimens where possible. Sediment controls will be expanded to include new contributing catchments. Final basin contouring and stormwater flow paths will be integrated into the earthworks, ensuring that the site captures and redirects runoff away from sensitive boundaries.

1.4.3. Indicative site movements and sequencing

Stage 2a – indicative site movements as blue arrows, topsoil (TS) erosion and sediment controls (P) in teal. Stabilised areas in green.

Stage 2b – indicative site movements as blue arrows, topsoil (TS) erosion and sediment controls (P) in teal. Stabilised areas in green.

1.5. Haul Road Construction and Access Planning

The contractor will establish a network of haul roads to facilitate efficient movement of machinery and materials throughout the site. These roads will:

- Be constructed using site-won material where quality and quantity allow.
- Incorporate hardfill where required to ensure year-round operability.
- Be strategically located to avoid sensitive golf operations and reduce haul distances.
- Include adequate turning radii, drainage culverts, and safety signage.

All haul roads will be decommissioned or integrated into final landforms once earthworks are complete.

1.6. Sediment and Erosion Control (GD05 Compliance)

All sediment and erosion control measures will adhere to Auckland Council's Technical Publication GD05. Key controls include:

- Decanting Earth Bunds: Constructed early in Phase 1 to manage stormwater in initial catchment areas.
- Sediment Ponds: Sized according to catchment runoff volume; designed with baffles and decanting structures.
- Silt Fences: Installed along perimeter boundaries and downslope of all active earthworks.
- Diversion Channels: Direct clean runoff away from disturbed areas.
- Entry/Exit Stabilisation Zones: Minimise tracking of sediment onto public roads.

These measures will be monitored, adapted, and maintained for the full duration of works.

1.7. Safety and Delineation

The contractor prioritises safety across all operations. Site boundaries and work zones will be clearly defined using:

- Water-filled barriers and temporary fencing.
- Colour-coded signage and delineators.
- Dedicated pedestrian paths where public access intersects with construction.
- Daily toolbox meetings and safety briefings.
- Traffic management plans to separate construction and golf activities.

Emergency response plans, hazard registers, and incident protocols will be maintained onsite.

1.8. Vegetation and Course Feature Removal

All existing course features and vegetation in construction zones will be cleared.

Large and historically significant trees will be assessed by an arborist. Where feasible, mature trees will be:

- Protected and retained.
- Transplanted or relocated.
- Reused as landscape or structural features post-construction.

An ecologist will advise on habitat preservation and relocation of fauna if discovered during clearing operations.

18 June 2025
Takapuna Golf Course Design - Construction Methodology and Wetland Area

1.9. Community Engagement and Programme Efficiency

The contractor recognises that the community expects timely delivery and minimal disruption.

To meet these expectations:

- A streamlined programme will be developed to shorten earthworks duration.
- The use of site-won basalt will reduce haulage and environmental impact.
- Haul roads will extend the construction season into wetter months.
- Phased works ensure continuous golf operations and clubroom access.

Regular communication with Takapuna Golf Club, Auckland Council, and nearby property owners will ensure transparency and responsiveness to concerns.

2. Construction Methodology – Option 2

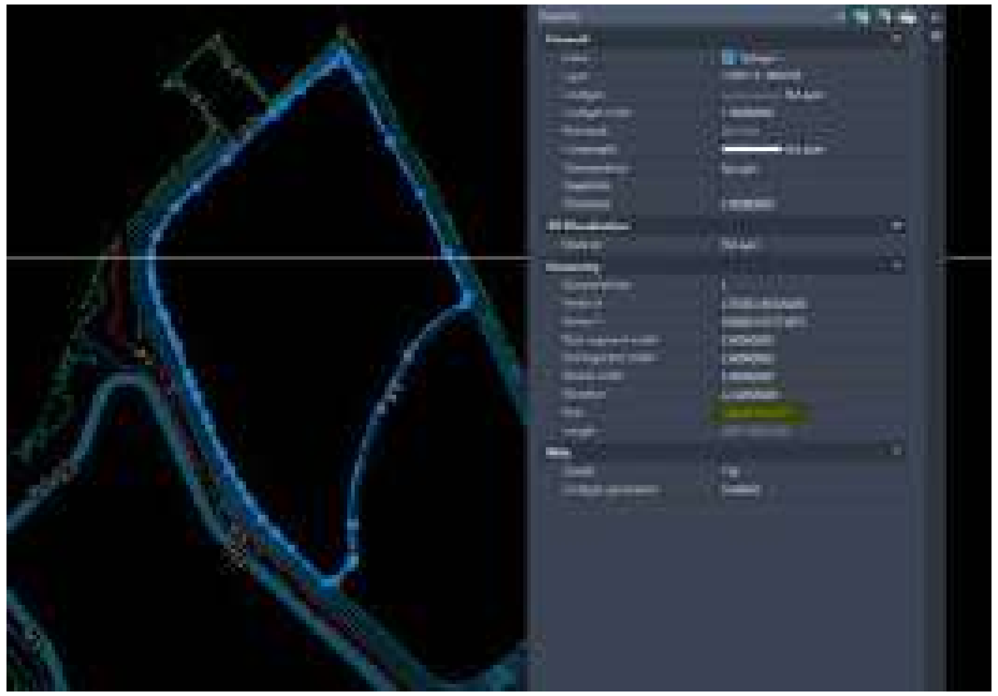
In the instance where program is delayed due to bad weather or unforeseen ground conditions the Takapuna Golf Course tenants are flexible about how many golf holes stay open at any one time. They have noted that a 6-hole golf course is also manageable for a temporary amount of time.

The above design and methodology is also flexible so as to move stage boundaries to proactively respond to any situations avoiding any programme delays.

18 June 2025
Takapuna Golf Course Design - Construction Methodology and Wetland Area

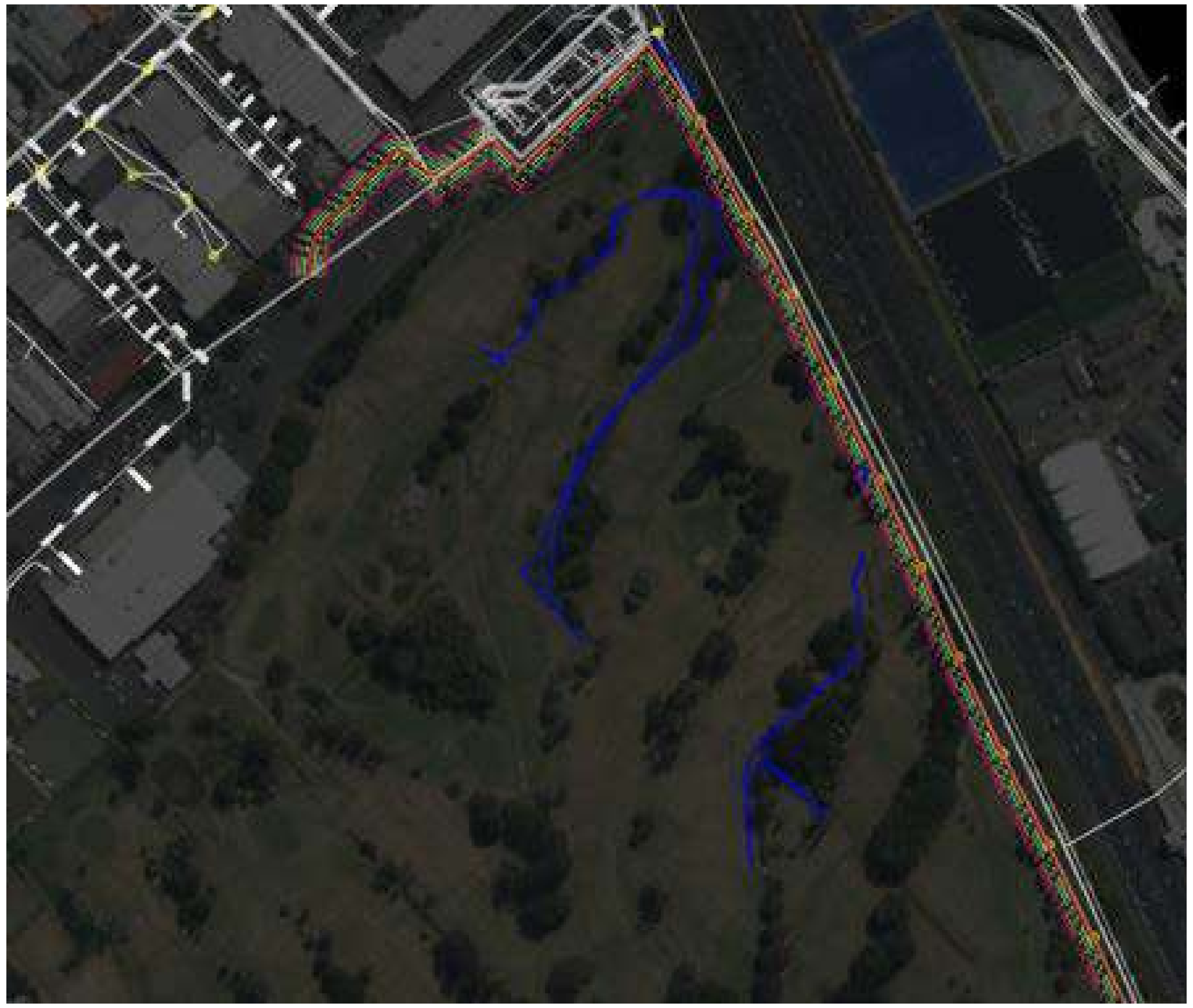
3. Wetland Area Assumption

Finished contour plan SK08-2 shows the lowest area of the site being an area of 66,883m2 at the 11.1mRL contour (shown below). This may be wetland to offset any stream loss from the works (yet to be determined), however is not required for flood mitigation or water treatment.



To assess what the estimated minimum wetland area may need to be, a best guess to allow for a minimum area of twice the existing ponding on site. We estimate the existing ponding area to be 2,422m2 (the area shown below in the NE corner of the site defined by survey completed 30 May 2025), therefore twice this is 4,844m2. By this logic the wetland shown is potentially 13 times larger than required. This is all dependant on the outcome of the ecological reporting.

For the purposes of the comparison, the TGC design should be comparable to the HWFR design. Therefore, apply whatever is most favourable (cost and benefit) to the feasibility assessment given the minimum and maximum wetted area available, including consideration of planting/mowing requirements. TGC will undertake to incorporate that in the next design iteration.



The area that isn't wetland can be grassed with planting at a density similar to the existing golf course situation.

S:\Jobs\HPCL1945 - Takapuna Golf Club\civilplan\reports\20250618-memo-TGC construction method and wetland area final.docx

Appendix C - Clarifications and Comparative Notes from TGC ‘Engagement Summary’

Clarifications and Comparative notes from TGC 'Engagement Summary' (provided 18th June):

On 18 June TGC provided a document titled "Engagement Summary", sections of which contain further clarifications of the TGC Proposal. Appendix C sets out those parts of the "Engagement Summary", together with comparative notes where relevant.

TGC clarifications in response to HWFR requests for clarification

TGC provided notes in response to requests for clarification by HWFR (numbered 1 to 10 below) set out in the agenda for the meeting between HWFR and TGC on 18 June. Where the TGC comments have been superseded in the final HWFR proposal (which was being developed in parallel to the TGC option) this is noted in red text.

(black = TGC commentary, red = HWFR clarifications)

The most recent requests made of TGC are as follows (taken from the agenda for this meeting of 18 June), to which responses are made to each following:

1. Are you proposing any Wastewater pipe bridges to connect the storage cells?

a. Our design will follow HWFRs as a common design feature, so is irrelevant for the purposes of concept selection. TGC has been of the opinion that HWFR has been unclear on the design assumption in relation to the build over requirements as different comments have been made by the HW team. Assume to be the same as HW.

2. Are you proposing any new stormwater pipes or culverts, or retaining any of the existing pipes?

a. Our design will follow HWFRs as a common design feature, so is irrelevant for the purposes of concept selection.

3. Can you clarify how a minimum of 9 holes will remain open at all times, given that Stage 1 contains only 4 complete holes and 2 partial holes, noting the requirement for laydown areas and fill. Providing the construction methodology you've referred to will help clarify this.

a. It is our understanding that golf is not being considered as part of the HW feasibility evaluation process as per your email dated 13 June 2025 and the following statement: "*and we can not include assessment of golf (or other recreation) benefits as these are yet to be confirmed, we do not anticipate the BCR being material to the decision regarding project feasibility*" Note this understanding is incorrect. The technical feasibility of golf operations is critical to the feasibility assessment of TGC's proposal. The statement above refers to the assessment of golf **benefits** in relation to the Benefit Cost Ratio. This distinction was clarified to TGC in the workshop on the 18th of June.

b. The TGC construction programme allows for operational continuity throughout the works over two construction seasons.

c. Our staging programme will overlap, and through smart and efficient planning, TGC would apply a flexible management approach to retaining a playable golf course throughout the project. TGC to date has developed an earthworks staging approach that enables nine holes to remain playable throughout construction following feedback from our experienced earthworks contractor. Further detail on potential earthworks staging can be found in the attached Takapuna Golf Course Design - Construction Methodology and Wetland Area, by CivilPlan dated 18 June 2025.

d. As noted at the 18 June meeting, this is shorter than the construction programme identified in HW's Strategic Business Case, which shows the main works occurring over a three-year period (Year 3: $14.6M; Year 4: $16.2M; Year 5: $14.5M; Year 6: $1M), implying a longer period of disruption and site unavailability. The HW Strategic Business Case referred to was an early conservative programme from the indicative business case. This is subject to refinement following concept design progression and optimisation, the current HWFR option is estimated to take 2 earthworks seasons.

4. Please provide more detail on how the fill for Stage 1 will be contained in the Stage 1 area, given there will need to be a temporary batter for the fill or retaining of the fill. Do you propose retaining the fill for Stage 1?

a. Batters as shown on the plans and cross section. Not relevant to concept selection with flood mitigation being the priority.

5. Will the driving range be closed for Stage 1 works?

a. Not relevant to concept selection with flood mitigation being the priority.

b. Yes, refer staging memo for more detail.

6. For the sake of the feasibility assessment, shall we assume that the wetland area that you refer to is the area at 11.1m RL? Do you have any further details on it?

a. Yes but it does not need standing water over the entire area as per HWFR design, so would be cheaper and easier to maintain than HWFRs design. Refer below and to letter 18 June 2025 for more detail on TGC proposal.

7. Can you please provide an annotated plan showing anticipated extent / location of wetland area.

a. Sizing of wetland will occur upon receipt of hydrological and groundwater reports and models, including an ecological assessment of any existing wetlands and loss of ecological areas. Waiting on this further information from HW, including consent assessment report. Our design will follow HWFRs as a common design feature.

b. The 11.1m RL storage area is outside any proposed golf holes and from a TGC perspective can be a fully wetted area of 66,883m^2 or a small wetted area of say 4,844m^2 (equivalent to approximately two times the area of the existing wetlands/ponds currently located on the site), or anything in between. The larger wetting area option will have higher costs but potentially greater ecological benefit.

c. Please advise and apply whatever is most favourable (cost and benefit) to the feasibility assessment and TGC will undertake to incorporate that in the next design iteration. Note for the sake of the technical assessment HWFR have assumed the larger wetland area (66,883m^2) and a permanent pool (4,822m^2) given the advice to follow HWFR as a common feature (noting the HWFR wetland is 111,000m^2) and apply the most favourable option.

8. What shall we assume with regards to planting, maintenance paths, footbridges, walkways or cycleways

a. Our design will follow HWFRs as a common design feature, so is irrelevant for the purposes of concept selection.

b. Overall planting area can be assumed to be the same as existing, just the location differs.

9. What holes are you referring to that would be the summer playable areas?

a. Holes 4, 5 and 6, but these could be replaced by holes at the driving range or through reconfiguration of the hole layout, use of more par 3's. There are too many options in relation to final hole layout that can be considered at this stage that is beyond the extent of the concept approval process.

10. Are you proposing any groundwater drains or subbase material (e.g. sand for greens)?

a. Our design will follow HWFRs as a common design feature, so is irrelevant for the purposes of concept selection.

b. Any sand material required will be repurposed from the existing greens.

Section of "Engagement Summary" headed "Preferred Option Assessment"

In the absence of a HWFR provided brief and objectives to allow for effective, timely and realizable concept comparisons, we suggest that a true unbiased assessment requires **analysing cost differences between designs**. To simplify the process, the following (not exhaustive) list identifies common and different elements that need to be considered when choosing the preferred design.

Commonalities = cost neutral, therefore, are irrelevant to provide details on for concept selection

1. Both designs achieve the required storage with the same inletting and outletting configurations. Both designs achieve the required storage, however there is a lack of information of the TGC design to confirm it does with the required golf contouring, and with the concerns and risks that have been identified (that may affect the storage capacity). The inletting and outletting configurations are assumed to be the same.

2. Both designs need to manage the existing utilities (ie vector cables) relocations and/or offsets from existing and future infrastructure. Both manage the existing vector cables the same through the agreed 10m setback. TGC's design will require extension of the existing stormwater pipes/outfalls in the reserve. For TGC's design, the wastewater trunk main will need significant protection (if the design is indeed acceptable by Watercare) from a maintenance, structural and settlement perspective.

3. Both designs require more than 1.5m – 2m filling over the WSL trunk WW lines therefore require the same upgrades. The fill height was a stated constraint which the HWFR design has accommodated and worked around. Significant filling above the WW pipes will likely require additional expense (e.g. pipe lining, bridging, and/or removal of fill) or significant rework of the TGC design to address. There is concern that the extent of fill that TGC propose over the pipes will not be acceptable by Watercare, as it could have significant maintenance and renewal implications.

4. Both designs require the same storage cell connectivity and therefore same culverts and pipeline bridging of the Watercare ww trunk mains. TGC have instructed to assume the same as HW scheme, however, note that HWFR have accounted for this in their earthwork volumes and fill location, whereas TGC have not. This is estimated to result in up to 5,000m^3 of additional cut and fill.

5. Both designs require the same foot bridges, culverts, and pathways. Agree, however note TGC claim this as a cost difference below.

6. Both designs need to deal with the same geotechnical, ground water, contamination, ecological existing conditions, Given current information available, HWFR have demonstrated how their earthworks will respond to the anticipated conditions and how any risks will be managed, TGC have not provided evidence of the same considerations (noting e.g. of intermittent stream). Ground levels in the TGC design for the dry detention areas are 200-500mm lower than the HWFR design which may be problematic from a groundwater drainage perspective (and maintenance).

7. Both designs have dry basins in the same locations meaning that subsoil drainage designs, water table levels, and designs for hydraulic gradients and lengths to free outlets are the same There are some slight differences in storage areas and ground level differences (200-500mm) in the dry basins which will impact cost and feasibility of golf activities. Frequency of inundation could also be an issue.

8. Both designs need to have the same construction cost contingencies applied

Differences = cost differences, ie what needs to be focussed on

HW need to work with TGC on what the differences are so we can determine:

1. Earthworks

1. Earthworks volumes are different due to the design.

a. The HWFR design requires at least an additional 500mm of excavation below the outlet level of 11.1m to create a wetland with standing water. Over the area of approximately 70,000m2 this generates an additional 35,000m3 of fill material or $350,000 (assuming this area is simply clay and not basalt which would add a significant additional cost to the project). TGC have allowed for a permanent pool of 4,844m^2 (twice the existing ponding area). The earthworks associated with this hasn't been allowed for (assumed 2,422m^3 at 0.5m deep). The 500mm deep excavation for the permanent pool for the HWFR design is circa 15,000m^3 not 35,000m^3 as claimed. This has been allowed for in the earthwork quantities and cost. The TGC design has 730,000m^3 of cut (different to what is stated on their plans due to the bulking factor), 120,000m^3 more than the HWFR design. The TGC design has assumed a bulking factor of 0.8, which has not been substantiated. To achieve this, it will likely result in significant costs relating to drying and compaction of the material.

2. HWFR has a wetland with associated features (ie more planting, more excavation potentially into rock, wetland standing water treatment, boardwalk features). Cost TBA. TGC have instructed us to also allow for a wetland of 66,000m^2 (which is 61% of the HWFR wetland footprint) and to also allow for the same walkway / pathway features. Excavation of basalt is not anticipated.

3. TGC has a golf course with associated features (ie greens, fairways,). Cost TBA.

a. Fairways are assumed to be similar to grassed areas of HW solution. Note the holes (especially greens) will require additional contouring (and raising from proposed ground levels) which hasn't been factored into. Any additional drainage, sub-base material etc because of golf activities will be priced separately.

b. Existing greens and sand will be repurposed where practical. Both schemes can re-use material once the recreation outcomes are known. However, this approach could complicate construction and incur additional costs.

c. TGC has expressed interest in participating in a Public-Private Partnership (PPP) model. The project team is actively preparing construction cost estimates and project management timelines related to works on the golf course site. TGC believes this approach can deliver both the required stormwater functionality **and golf course reinstatement within the project's budget and timeframe.** This model is expected to enable faster, more efficient delivery, with improved health and safety outcomes through a more joined-up and integrated construction approach. The proposal also aims to preserve as many existing trees as possible, as well as utilising the natural resources within the land including turf and soil life, in line with the core objective of retaining the Takapuna Golf Course as a vital public recreational asset. TGC will take a sustainability approach to the management of resources on site and re-purpose of material where practicable. Note that this would be subject to a commercial agreement between the Kaipātiki Local Board and TGC. The Kaipātiki Local Board are legally required to engage with community and seek wider guidance from the Sports and Rec, and Parks and Community Facilities teams to inform future land use. If HWFR wait to have this in place, it will result in a significant project delay.

Cost estimate to be undertaken by Alta. Retainment of trees will be similar between the schemes. Further to this – costings indicate provision of golf would incur a significant additional cost and we do not have approval to spend Government funding on golf course reinstatement. There are likely programme and cost implications due to the complexities of maintaining golf operations throughout construction (as noted in constructability memo).

4. Maintenance

a. HWFR will need to maintain the wetland with the HWFR design. They will not get income from the wetland area. This is positive for the TGC design to be selected. Note that TGC have instructed us to include a 66,000m^2 (at 11.1m RL) wetland in their option (61% of the HWFR wetland size). Maintenance approaches will be similar – with the only difference being the scale of wetland.

b. HWFR will not need to maintain the land with the TGC design (currently costing TGC $425k pa), and Council will also get income from the tenant for the entire land holdings (currently $310k pa). This is positive for the TGC design to be selected. Note that this will also apply to any tenanted recreation land on the future HWFR scheme (following future commercial negotiations)

Additional differences noted by HWFR:

1. Filling over WW pipe – as noted above, HW design has avoided going over the accepted 1.5-2m additional fill
2. Assumption around compaction, whilst they are saying 0.8 compaction factor there is no evidence of this as a valid assumption, and it was never agreed as an acceptable assumption with HWFR. If bulking/compaction factor should be 1, then the height of the fill/hill in the TGC option is estimated to be increased by another 5 to 10m.
3. There are two stormwater outfalls discharging to fill zones that are greater than 10m in height in the TGC design, whereas they have been accommodated in the HW design. They pipes/outfalls will need extending.
4. Overland flows from Northcote Road have not been adequately considered in the TGC design, raising flood levels by up to 300mm on Northcote Road. Flow paths have been modelled in the HWFR design, through the landform. If they are accommodated in the TGC option there will be cut and fill (and cost) implications.
5. The extent of groundwater drainage in the TGC design will be more extensive, if it is indeed feasible to drain the areas at 11.4m RL, given the lower ground levels.

Appendix D - Feasibility Assessment and Engagement Timeline

Feasibility Assessment and Engagement Timeline

Please see below for a summary of engagement between HWFR and the Takapuna golf course and the agreed feasibility assessment process:

1. 24th February: Initial meeting with Takapuna Golf Course to indicate that concept design work was being undertaken to consider stormwater detention in the park, with early indication of potential scale and impact outlined (noting that future stormwater works had previously been indicated as part of tenancy and Local Park Management Plan discussions in 2024).
2. 8th March: Engagement event undertaken at Takapuna Golf Course to update the tenant and golfing community on the flood mitigation works. Feedback from this engagement was included in the business case.
3. 21st March: Meeting with TGC to outline key design parameters. This included the 550,000m3 storage to 14mRL, peak flow rates and a request from TGC for HWFR to provide the HWFR draft flood model.
4. 12th March and 27 March: Requested information released to TGC
5. 3rd April: TGC present alternate option (TGC R0) at the TRIC committee and resolution is passed for HWFR to undertake a technical feasibility assessment.
6. 7th April: Flood model and ground model provided including clarification around assumptions and uncertainties associated. WSP noted ongoing design resolution required for fill and earthwork approach.
7. 10th April: 8 step feasibility assessment process agreed with TGC (via email) including confirmation of primary project parameters. Further clarifications requested by TGC on flood model.
8. 11th April: email sent with requested clarification on flood modelling, hydrology and hydraulics.

Agreed feasibility review process (as approved by TGC in email dated 10th April):

1. Week beginning 14th April: TGC presentation on alternate design, WSP / Healthy Waters Flood Resilience (HWFR) to provide early feedback and areas for further clarification
2. By 22nd April: TGC to provide updated scheme following feedback, and response to any queries
3. 22nd April – 5th May: WSP to undertake preliminary technical review of proposed TGC design including costing (by Alta) and flood modelling
4. Week beginning 5th May: Workshop between TGC/WSP/HWFR to discuss TGC project feasibility including flood detention volume/benefits, project costs, constructability. HWFR to outline accepted Auckland Council benefit-cost ratio (BCR) methodology.
5. By 12th May: TGC to provide final proposal following feasibility testing / feedback and any required revisions
6. By 26th May: WSP / HWFR to complete and provide updated BCRs and summary of risk and constraints for proposed designs including TGC alternate design (as captured in the Draft Concept Design Report).
7. Week beginning 2nd June: Any final queries / clarifications / concerns / omissions to be addressed
8. 13th June: Concept design report updated / finalised setting out HWFR's preferred option to progress to preliminary and detailed design, with a copy provided to TGC.

Final feasibility review process (including additional engagement and extension to timeframes):

1. 15th April: TGC presentation on alternate design, WSP / Healthy Waters Flood Resilience (HWFR) to provided early feedback, assumptions around cost and flood benefits, and areas for further clarification.
2. 24th April: TGC provided updated scheme following feedback, and response to any queries.
3. 24th April – 7th May: WSP undertook preliminary technical review of proposed TGC design including costing (by Alta) and flood modelling
4. 7th May: Workshop between TGC/WSP/HWFR to discuss TGC project feasibility including flood detention volume/benefits, project costs, constructability. HWFR informed TGC that the proposed TGC R0 option was significantly over budget and had both significant constructability and maintenance risks.

   HWFR indicated intent to externally source benefit-cost ratio (BCR) work to ensure a fair and robust process. Noted this would cause a delay in finalising methodology.
5. 9th May – additional clarification meeting held between project engineers on request of TGC.
6. 12th May – extension requested by TGC to allow them to revise their proposal. Granted by HWFR.
7. 27th May: Additional phone call with TGC to share agreed assumption regarding acceptable fill over Watercare pipes (up to 2m total cover) following meeting with Watercare.
8. 30th May (agreed deadline): Letter received from TGC indicating a revised proposal was being prepared and requesting further information. HWFR granted an extension to 12th June to provide information on the revised scheme and noted that requested information was either already provided, unavailable, or not critical to the design development and would be subject to Local Government Official Information Act.

   BCR procurement was paused due to lack of final TGC proposal information and need to revise scope due to convergence of HWFR and TGC options.
9. 12th June: TGC provided final proposal drawing set and cover letter.
10. 12th June to 27th June: WSP, HWFR and technical experts completed technical feasibility review.
11. 18th June: Workshop held between technical reviewers and TGC and any final queries / clarifications / concerns / omissions were addressed. Noted that significant new material was provided by TGC at this stage.
12. 19th June: External economist briefed to provide updated BCR.
13. 4th July: Concept design report updated / finalised setting out HWFR's intent to progress to developed and detailed design based on the converged options, with a copy provided to TGC subsequently.

    Noted that the economist (Martin Jenkins Ltd.) was provided an extension to 31 July to provided final Cost Benefit Analysis reporting due to compressed timeframes. High-level guidance provided in this report notes that the BCR is anticipated to be the same for both options and is not material in agreeing a way forward for developed design.

Appendix E - Feasibility Review Memorandums

Auckland Council
Te Kaunihera o Tāmaki Makaurau

Memo

4th July 2025

To: Healthy Waters Flood Resilience – Blue-Green Network Team

cc:

From: Ross Roberts (Auckland Council Chief Engineer) and Nick Brown (HWFR Head of Intelligence)

Subject: AF Thomas Park Concept Options Technical Assessment

Background

The Transport, Resilience and Infrastructure Committee (TRIC) moved a resolution in April 2025 requesting that Healthy Waters and Flood Resilience (HWFR) undertake a technical assessment of Takapuna Golf Club's (TGC) proposal and its feasibility. Two key areas of the technical assessment include achievement of the required flooding benefits (and any associated stormwater considerations) and an assessment of the geotechnical and groundwater considerations and risks associated with the proposed landform.

These aspects and identified considerations and risks are outlined in the following assessment and include the HWFR's concept option design as a comparison. Conclusions from the assessment are outlined for both schemes.

Information Received

The technical review is based on the following information:

- HWFR's Concept Design Option Rev 0.0 dated 12 June 2025.
- TGC's alternative option (TGC-R1) dated 12 June 2025 including covering letter and associated sketches.
- Clarification meeting of the HWFR design on stormwater matters (e.g. hydrology, hydraulics and spillway) on 18 June 2025
- Clarification meeting of TGC's submission held on 18 June 2025 and subsequent additional information on assumptions, wetland and construction methodology provided on 18 June 2025.
- Wairau Creek Geotechnical Desktop Study dated 14 March 2025 by WSP
- Contaminated land desktop study (PSI) dated 14 April 2025 by WSP
- Publicly available geotechnical information in the New Zealand Geotechnical Database (NZGD)

It is assumed that all levels for both proposals are as Auckland Vertical Datum (AVD1946)

Technical Reviews

Stormwater

General

The attenuation scheme at AF Thomas Park is to achieve 550,000m^3 of storage up to 14m RL (AVD1946), to primarily reduce residential flooding downstream adjacent to the Wairau Creek.

A spillway to safely convey the flood flows into the reserve is proposed to be located immediately south-west of the Wairau substation. The proposed spillway is approximately 40m wide at 13.5m RL. This spillway is common to both concepts.

The governing hydraulic outlet of the reserve is based on the existing culvert, located at the northern corner of the park, at 11.1m RL. This sets the minimum ground levels that can provide active storage and the minimum level that groundwater drains can be designed to connect to.

Considerations

The following stormwater considerations have been identified with both schemes.

Consideration	HWFR's design	TGC's design
Storage	Meets the 550,000m^3 requirement	Currently meets the 550,000m^3 storage requirement but there is a lack of information about any additional contouring required for the golf course which may impact storage volumes.
Hydraulic performance	Aligns with the flood benefits outlined in the business case.	Aligns with the flood benefits outlined in the business case with the addition of wastewater pipe bridges (not shown in the plans but later clarified).
Frequency of inundation – Wetland	The wetland for both schemes will have a permanent pool and will be frequently inundated (once or twice a month) from flows backing up from the main Wairau Creek.	
Frequency of inundation – Dry detention areas	The dry detention areas are predicted to be inundated a few times a year.	The dry detention areas are predicted to be inundated many times a year (anticipated to be twice as frequent as the HWFR scheme due to the lower ground levels). The ground level of holes 3, 4, 5, 6, 11, 12, 13, 15, 16, 17 and 18 are at 11.4m RL and are 200-500mm lower than the HWFR design. As a reference, the level of 11.4m RL is approximately 700mm above base flows at the main Wairau Creek.
Dry detention drainage	Ground levels are between 11.6-11.9m RL. This allows 500-800mm of fall to the culvert's invert level of 11.1m RL (hydraulic outlet). These ground levels should sufficiently allow for any drainage required and recreational activities to occur in these areas.	Ground levels, where the 11 golf holes are proposed (holes 3, 4, 5, 6, 11, 12, 13, 15, 16, 17 and 18) are at 11.4m RL. This allows 300mm of fall to the culvert's invert level of 11.1m RL (hydraulic outlet). The ground at these levels will be difficult to drain and will likely be waterlogged for a large portion of the year (in addition to being frequently inundated).

Spillway	Assumed a 40m wide weir/channel at 13.5m RL.	
Overland flow paths	Adequately accounts for overland flow paths in their landform.	Has not adequately accounted for the overland flow entering from Northcote Road, raising flood levels on Northcote by up to 300mm. This would be a consenting issue. Accommodating the flow paths will affect earthworks and needs to be factored into the cost estimate.
Stormwater pipes	Retains the existing stormwater pipes, with minor extensions if required.	Although not shown on the plans, TGC have clarified that they will retain all existing stormwater infrastructure. Two of the stormwater outfalls discharge underneath a proposed 10m of fill, within a relatively steep slope. The pipes will need to be extended and drainage channels formed to cater for the flow. Erosion protection will be required where water is discharging to slopes. This needs to be factored into the cost estimate.
Connection between cells	Has adequate connection provided between cells to ensure all storage is being used effectively (through wastewater pipe bridges).	No wastewater pipe bridges provided in proposal. TGC has provided a clarification to assume the same as HWFR design. This would create an additional up to 5,000m^3 of cut and fill not currently allowed for in the earthworks design which needs to be factored into the cost estimate.

Conclusions

The following can be concluded from this technical assessment:

- Both concepts provide the storage requirements and therefore similar flooding benefits.
- Both are considered feasible from a stormwater perspective.
- Both designs are similar in their approach in terms of the main areas of flood storage and fill in the park, with the TGC proposal converging with the HWFR design.
- The wetland areas for both schemes will be frequently inundated, many times a year.
- The TGC design is predicted to have frequent inundation of the land on which 11 holes are located, likely impacting on feasibility of golf/recreation in these areas.
- The TGC proposal presents some additional unresolved issues and risks. While these may be addressed through design modifications, doing so is likely to result in additional time and cost implications.

Earthworks and Geotechnical

Site geological description

This geological summary has been predominately based on the WSP Geotechnical Desktop Study (14 March 2025), historical investigations recorded in New Zealand Geotechnical Database (NZGD) recorded in and around the vicinity of the park, and geological information available on Auckland Council GIS such as geological maps and aerial photographs.

Extracts from two key maps are shown below, with the site outlined in yellow.

Industrial series geological map (1:25,000) from 1966 a2 = Tauranga Group alluvium c = Peat t = Volcanic tuff (eastern portion of site)	IGNS Map 2 sheet R11 (1:50,000) from 1993 Peat (brown) is shown in the same approximate location Recent Tauranga Alluvium (yellow) is shown in the centre and the eastern portion of the site (instead of volcanic tuff) Older Tauranga Group alluvium (light red) is shown along the south west boundary of the site.

The geological maps are different at this site. This may represent increasing knowledge (for example, gained during the construction of the northern motorway). However, it is important to note that the earlier maps were drawn at a higher resolution, so may include some details missing from the later maps.

In general, the older industrial series map appears to align better with the available borehole data on the New Zealand Geotechnical Database and is, geomorphologically, more rational. As anticipated for low-lying areas, much of the site is shown as being underlain by alluvial deposits, with volcanic tuff in the south and east towards the Pupuke volcano.

Both maps show peat in the northern part of the site. This was likely deposited after the Pupuke eruption deposits blocked the natural flow paths in the area, which would have created a small lake or swamp. Pupuke is one of the oldest volcanoes in Auckland (about 250,000 years). It started as a thin shield volcano which caused a series of overlapping basaltic lava flows, which was followed by a more explosive stage which threw out tuff and ash.

Tuff over basalt was encountered in pits for the northern busway, so these materials may occur beneath the eastern margin of the park. Tuff was also found in borehole 68106 and 68107 in the centre of the southern half of the park.

Both deposits (alluvium and tuff) are likely to be variable across the site in depth and composition, and may be interbedded in areas. Adjacent boreholes suggest that the alluvial material is likely to be quite compressible (it includes peat, loose sands etc) and 10-15 m thickness. In general, the more compressible material appears to be present in the northern part of the site, with slightly less compressible tuff in the south. However, the tuff overlies alluvial deposits which may compress a little.

Basalt was identified in boreholes (e.g. 124753) at the Wairua Road substation (immediately north of the site, adjacent to the motorway) at shallow depth of 3 m. This would be about 11.5 mRL. This is above the maximum proposed excavation depth, so there is some potential for this to be encountered when excavating in the north east corner of the site. This basalt has alluvium below it. One positive aspect of this finding is that the basalt should protect the substation from settlement effects.

Beneath these more recent deposits, Waitemata Group rocks are present. The depth to rock is likely to vary a little across the site. In general, the soil/rock boundary is likely to be a gentle transition (rather than an abrupt boundary) because the surface materials will have weathered to silty clay. Borehole information suggests that a depth of 10-20 m to relatively unweathered rock is likely, so this material will be below any activities that could feasibly occur as part of this project and are unlikely to influence the outcome.

Geological maps generally omit fill (except where particularly thick), as is the case at this site. The potential presence (and thickness) of fill could be of significance to the project, particularly if contaminated or poorly compacted.

The WSP Geotechnical Desktop Study notes fill across parts of the site ("*The upper soil profile of across the golf course consists of FILL that generally becomes thicker to the south.*"), However, my review of the borehole logs was unable to confirm any significant thicknesses on the course itself. The WSP description appears to be based on the car park to the north of the site, and one borehole (69433) which is shown in the centre of the course. Borehole 69433 reports nearly 9 m of fill. This seems very unlikely, and a comment on the log about casing to prevent road cave in suggests that it has been inaccurately mapped and should have been shown in the busway about 250 m to the east. This should be disregarded.

Given the long-standing use of the site as a golf course, it is highly likely that landscaping over the years has been undertaken which would have resulted in some material being moved on site and placed as fill. It is not clear whether this fill would have been imported or redistributed within the site. The earliest photos in Retrolens are from 1940 and they are very similar to the 1959 images, so some filling, if it occurred, could pre-date 1940.

Option comparison and technical commentary

The following geotechnical considerations have been identified with the two options.

Earthwork volumes and bulking factor

The two designs have taken different approaches to presenting and calculating earthworks volumes:

HWFR's design	TGC's design (from SK08-3 notes)
One stage: 610,000 m^3 of cut 610,000 m^3 of fill	Two stages: 257,000 + 327,000 = 584,000 m^3 cut 292,000 + 321,000 = 613,000 m^3 fill

The quantities provided in Note 7 of SK08-3, and reproduced above, appear to include a 0.8 factor on the cut volumes (and presumably fill, although not explicitly stated). Cut volumes can't be factored in this way; the volume is fixed. Fill volumes can be factored if it is likely that the placed fill can be compacted to a higher density than existed in its natural condition before excavation. A bulking factor of 0.8 assumes the volume of excavated material will be reduced by 20% through compaction. It is a significant assumption that is considered unlikely to be valid. If the 20% reduction in volume could be achieved, it will require stringent quality control of the drying and fill compaction and will have programme and cost implications. Drying these materials is likely to be slow and would require a lot of working space. The HWFR design does not appear to include a bulking factor, so fill placement should be more easily achieved.

If a factor of 0.8 has been applied by TGC to their design in both the cut and fill portions, the volumes would instead be:

HWFR's design	TGC's design (my inference)
One stage: 610,000 m^3 of cut 610,000 m^3 of fill	Two stages: 321,250 + 408,750 = 730,000 m^3 cut 365,000 + 401,250 = 766,250 m^3 fill

Alternatively, if the bulking factor had been applied to only the cut, and not the fill, the volumes would instead be:

HWFR's design	TGC's design (my inference)
One stage: 610,000 m^3 of cut 610,000 m^3 of fill	Two stages: 321,250 + 408,750 = 730,000 m^3 cut 292,000 + 321,000 = 613,000 m^3 fill

I requested that WSP assess the 3D ground models provided for each scheme to identify which of the above scenarios aligned with the model provided, and they responded with the following information:

	Earthworks Comparison - TGC and HWFR design						
Design	**Stage**	**Total Cut (m^3)**	**Total Fill once placed (m^3)**	**Cut volume with bulking (m^3)**	**Excess (m^3)**	**Excess Cut/Fill**	**Bulking / compaction factor**
TGC	1	322,000	333,000	322,000	11,000	FILL	1.0
TGC	2	410,100	280,200	410,100	129,900	CUT	1.0
TGC	Total	732,100	613,200	732,100	118,900	CUT	1.0
TGC	1	322,000	333,000	257,600	75,400	FILL	0.8
TGC	2	410,100	280,200	328,080	47,880	CUT	0.8
TGC	Total	732,100	613,200	585,680	27,520	FILL	0.8
HWFR	N/A	610,000	610,000	610,000	0	N/A	1.0

Notes:

- *The earthworks quantities are outlined with and without the TGC assumed 0.8 compaction factor to understand any impacts.*
- *The 732,000m^3 of cut (and other numbers) differ from what is stated in SK-08-3 from TGC. That is because even if some kind of compaction factor is valid, the earthwork quantities that need to be moved around the reserve can't include this (from a cost perspective).*
- *The temporary bund (for TGC Stage 1) is estimated to be 42,000m^3 of volume (1:3 gradient). This has been included in the Stage 1 quantities and not included in the Stage 2 quantities.*
- *TGC earthwork quantities include some provision for the spillway earthworks (HWFR does not) – this is estimated in the order of 1,000m^3 and can be dealt with in the cost estimate.*

This suggests that the cut and fill volumes that I have inferred above in my final table match the 3D model provided by TGC, and that the note on the TGC drawing is incorrect. These discrepancies need to be clarified as the additional volumes would likely add significant cost to the project. There appears to be an additional ~117,000 m^3 of fill that has not been accounted for in the TGC design unless the bulking factor of 0.8 is correct (which I think is unlikely) and can be achieved without additional costs associated with drying and handling.

In addition, it appears that TGC has not accounted for the excavation required for the wetland permanent pool, wastewater pipe bridges or contouring associated with golf holes. These would further increase the cut and fill volumes and therefore cost. The HWFR design has also not accounted for future contouring associated with golf holes; whether this counts as a major difference between the proposals depends on the end use of the site. The missing volumes from the permanent pool and wastewater pipe bridges will need to be considered in the costs.

Slope stability

The slopes proposed in each design appear achievable and do not suggest cause for concern. Further investigations and design will be needed to confirm the stability of the slopes, but it isn't a significant difference between designs.

Fill over wastewater pipe and induced settlement

The two designs differ significantly in the amount of fill they place above the wastewater pipe. The HWFR design generally avoids filling above the pipe; the TGC design does not. This partially explains how the TGC design can place more fill in the southern part of the site.

Based on a rough assumption of 7 m of compressible material (see geology section above), with a stiffness of 12 MPa the settlement can be roughly calculated based on one dimensional consolidation

HWFR's design	TGC's design (my inference)
Fill up to 2.2 m over the trunk main	Fill up to 11.5 m over WW pipe.
Predicted to be approximately 50mm of settlement and 1:500 of differential settlement. According to Rankin (1988), the damage severity is slight based on the differential settlement.	Predicted to be approximately 250 mm of settlement and 1:100 of differential settlement. According to Rankin (1988), the damage severity is moderate based on the differential settlement.

The comments in the table above refer to potential damage classifications usually applied to buildings. I believe it is reasonable to apply these to the wastewater pipes in this case as they are concrete and in relatively poor condition.

Watercare have indicated that they would require the applicant to demonstrate through a structural assessment that the pipe would be undamaged; in my opinion a structural assessment would not be able to demonstrate this for the TGC design, but would for the HWFR design.

In addition, the placement of 11.5 m of fill over the pipe in the TGC design will likely be contested by Watercare due to complications for maintenance and renewal of the pipeline. Structural lining and/or bridging of the pipe will likely be required.

Contamination

Some contamination of material is expected due to pesticide use. It is expected that the vast majority of the material will be able to remain onsite. Given the very longstanding use of the site as a golf course (over 90 years), it is unlikely that other contaminated materials are present in significant volumes. There is no material difference between the proposals.

Liquefaction and lateral spread

The clays and tuff that underlie this site are unlikely to be susceptible to liquefaction, although cyclic softening and lateral spread is a possibility. This factor does not materially differ between the proposals.

Conclusions

The following can be concluded from this technical assessment:

- The total volumes for the TGC design is approximately 730,000m^3, significantly more than the reported values outlined in Sketch SK08-3. This will have a material impact on cost and programme.
- The bulking factor assumption of 0.8 (20% of the material volume is lost due to compaction) for the TGC design is considered unlikely to be valid and could have a major impact on the landform and costs. WSP's assessment of the 3D model provided by TGC suggests that an extra approximately 117,000 m^3 will need to be carted and disposed of offsite or will need to be added to the fill height of the hill, adding potentially another 5 to 10 m.
- Excessive filling over the wastewater pipe poses a risk to the wastewater infrastructure that serves a significant catchment in the region. Failure of the pipe could be detrimental for the people and the environment. Additional costs will be required for any significant level of filling, perhaps by installing a bridging structure. This would be expensive. In addition, the level of filling proposed by the TGC design is unlikely to be acceptable to Watercare from a maintenance and renewal perspective.
- No contouring of the existing site for golf greens, tees or fairways of the TGC design has been provided. This will result in additional earthworks and may have an impact on the available storage for flood protection and cut and fill slopes.

Groundwater

Site description

Land use, topography and nearby surface water

The Takapuna Golf Course is mainly grassed and has lines of trees in between the fairways, tees and greens. The current site has a gradual fall from about 25 m RL in the southwest to 12 m RL in the northeast, with localised highs of about 15 m RL and lows to 12 m RL.

A pond in the northeast of the site has a water level of about 11.9 m RL, as does the drain that runs along the northeastern perimeter of the golf course at the northern corner of the site. In addition, there are several open land drains visible on aerial photography in the northeast and north of the site. The Wairau Creek is estimated to have a base water level of about 10.7 m RL at the closest point, about 40 m to the north of site.

Groundwater levels and soil conditions

The golf course is generally underlain with sandy and silty clays which would be expected to have low hydraulic conductivity. The hydraulic conductivity governs the groundwater flow and thus the amount of groundwater mounding that occurs in response to rainfall recharge. No site-specific data on hydraulic conductivity of these materials is available. Based on literature, the hydraulic conductivity of the encountered sediments at the golf course can vary but are generally between 0.002 and 0.2 m/day (2E-08 m/s to 2E-06 m/s; see Table 1 below). A value of 0.01 m/day would appear to be the most likely for this site.

Limited groundwater level information is available from the bore logs. Groundwater levels appear to be about 2.5 m below ground level (m bgl) in the southwestern and southern part of the site, and about 1 m bgl at the northeastern and northern end of the site. The groundwater level is at the surface at several ponds and open land drains in the northeastern and northern parts of the site. Groundwater at the Wairua Road substation (immediately north of the site) appears to be slightly higher than in the ponds.

Considering the low permeability of the anticipated soils, outlined in Table 1, groundwater levels are likely to mound notably in between drainage features.

Geological unit	Permeability (m/s) assumed isotropic where not otherwise noted		
	Assessed minimum	Assessed mean	Assessed maximum
Basalt	$1x10^{-6}$	$1x10^{-4}$	$1x10^{-3}$
Tuff	$1x10^{-7}$	$1x10^{-5}$	$1x10^{-3}$
Estuarine Sediments	$1x10^{-9}$	$2x10^{-7}$	$1x10^{-6}$
Tauranga Group Alluvium /Upper Puketoka Formation	$2x10^{-8}$	$2x10^{-7}$	$2x10^{-6}$
Lower Puketoka Formation	$2x10^{-7}$	$2x10^{-6}$	$2x10^{-5}$
Kaawa Sands	$1x10^{-7}$	$1x10^{-6}$	$1x10^{-4}$
Weathered ECBF	$2x10^{-8}$	$2x10^{-7}$	$2x10^{-6}$
ECBF	$K_h = 2x10^{-8}$ $K_v/K_h = 0.1$	$K_h = 2x10^{-7}$ $K_v/K_h = 0.1$	$K_h = 2x10^{-6}$ $K_v/K_h = 0.1$
Fractured ECBF	NA	$5x10^{-4}$	NA

Table 1: Summary of hydraulic conductivities per geological unit (T+T, 2012[1])

Considerations

The following groundwater considerations have been identified with the two options.

Efficiency of land drains

The ability for the site to be effectively used as a golf course is expected to be a function of whether land drains can realistically maintain a surface that isn't saturated. Both designs will require groundwater drains for dry detention areas for sports or recreation to maintain a useable surface that isn't saturated in normal conditions. The culvert outlet at 11.1m RL will control the downstream elevation of these drains, and the upstream elevation will be controlled by the design ground level.

HWFR's design	TGC's design
Dry detention areas at 11.6-11.9m RL.	Dry detention areas at 11.4m RL.

In my opinion the HWFR design should allow sufficient fall to for light recreation activity. If the drains are 100 mm deep at the upstream end, and have a 100 mm diameter, they should have a fall of 700 mm. I have some concern as to whether the ground levels in the TGC design allow for sufficient depth (for the groundwater drains) and fall to the culvert outlet as the proposed ground level is only 300 mm above the culvert outlet, meaning that using the same assumptions the fall would be only 100 mm over a distance of several hundred metres. Drains at such a shallow fall are unlikely to be fully effective and will be challenging to maintain.

Because the TGC drains will have to be shallower (driven by the outfall level), more will be needed. Calculations undertaken in accordance with Ritzema[2] by WSP suggest that to maintain groundwater generally below the surface in 'normal' conditions the TGC design would require approximately 40% more groundwater drains. The HWFR design would need drains every 19 m,

[1] https://promising-sparkle-d7f0c0cfc9.media.strapiapp.com/groundwater_settlement_report_041abaddc0.pdf

[2] Ritzema, H.P., 1994, Drainage Principles and Applications, ILRI Publication 16, 2nd Edition, ISBN 90 70754 3 39

while the TGC would need drains every 12 m (Figure 2). It is important to note that this assumes the drains are equally effective between designs. However, the shallow fall of the TGC drains means these might be less effective, meaning that even more will be needed.

It should be noted this assessment is, by necessity, a simplification. At the upstream end of each proposal it is likely that increased density of drains will be needed as they will be shallower in these areas.

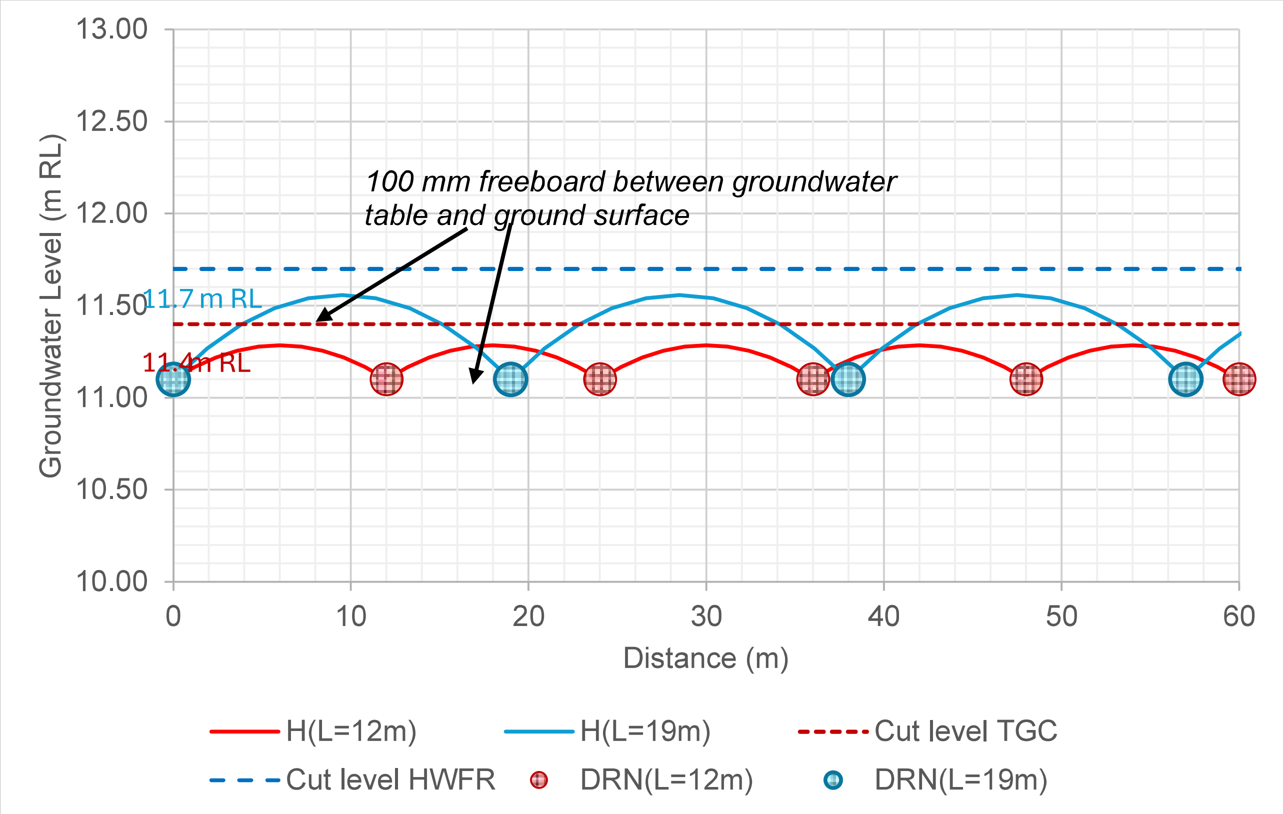


Figure 2: Output of mounding between drains calculation (by WSP)

Groundwater drawdown / settlement

The net groundwater drawdown is predicted to be up to 3 m locally and up to 2 m beyond the site. The settlement calculation in the geotechnical section considers the local drawdown. The settlement beyond the site is anticipated to be no more than 10 mm. This is not likely to differ significantly between the proposals.

Wetland – groundwater recharge

The designs differ in wetland area. However, it is anticipated that groundwater will recharge the wetland in a similar manner in both proposals.

HWFR's design	TGC's design
Design includes a 11ha wetland area at 11.1m RL, with a 3.15ha permanent pool at 10.6m RL (0.5m deep).	Design includes a 6.6ha wetland area at 11.1m RL, with a 0.48ha permanent pool at 10.6m RL (0.5m deep).

Conclusions

- The site is characterised by a very shallow groundwater table and low permeability soils. The site is partially drained by existing land drains and wetlands/ponds to the northeast and north of the site.
- Permanent drainage of groundwater will be required beneath the proposed cut areas to avoid permanent water ponding on the surface. Subsoil drains can be used to control groundwater which would mitigate water ponding at the surface and allow for the areas to be used for various recreational purposes.

- Groundwater control under gravity (i.e., without pumping) is possible but limited by the drainage level of about 11.1 m RL at the northern outlet of the site to Wairau Creek. This limits the level to which areas can be cut for any groundwater drainage systems to work sufficiently, in particular for this site which is subject to notable groundwater mounding due to the low permeability of the soil materials. An extensive network of subsoil drains will be required to control groundwater levels at the site. Because subsoil drains can clog over time and require maintenance, it would be preferrable to have a design that reduces the amount of required drainage.
- I have some concerns that the TGC design will be costly and may not achieve a dry surface under normal conditions.

Nick Brown
Nick Brown (Jul 4, 2025 11:28 GMT+12)

Nick Brown
Head of Intelligence – HWFR

Ross Roberts
Ross Roberts (Jul 4, 2025 11:31 GMT+12)

Ross Roberts
Chief Engineer – Auckland Council

Auckland Council
Te Kaunihera o Tāmaki Makaurau

Memo

1 July 2025

To: HWFR – Blue Green Network Team

cc:

From: Chris Stumbles and Keith Snow

Subject: AF Thomas Park Concept Options Construction Review

After our meeting with the Takapuna Golf Club on the 18th June our construction concerns were largely eliminated by the declaration that they could effectively alter their design to suit the designs that HW comes up with and the golfing requirements would be modified to suit.

This statement was somewhat different to how we interpreted the documentation submitted as we thought it was intended to be undertaken in two distinct stages.

Our concerns for both proposals now remain the same with only a few risk items that need to be considered. More on these later.

In no particular order the risks for both schemes identified are (this is not exhaustive):

1. Protection and crossing points of the Watercare Wastewater mains will need to be identified and strengthened during construction.
2. Level of fill and compaction of fill over the Watercare Wastewater mains and what remedial actions (lining or bridging) may be required to protect the mains. Note that bridging and depth of fill over the WW mains will have a negative impact on the ability of Watercare to upgrade or renew these mains
3. Drying of the excavated material will require large areas to be open at a time to allow the works to proceed efficiently.
4. Soft saturated materials make moving of construction machinery slower and less efficient.
5. With the site being so flat it will make surface drainage difficult, and ponding of water could severely hamper progress. It maybe that the lower sections of work will need to be done with diggers and dumpers rather than scrappers to allow works to proceed efficiently. This will only be determined when more geotechnical data becomes available.

The Takapuna Golf Club proposal has an element of continuing operation of a golf course within an operating construction site and has the following additional risks to the Council:

1. Access routes will need to be well defined.
2. Excavation and drying sites will need to take into consideration areas set aside for golfing activities.
3. Completing areas as you proceed will become a greater requirement and a loss of flexibility in the work areas could constrain construction activities.
4. Compaction factors appear optimistic and will depend in part on the ability to dry the materials to or near optimum quality.
5. The constraints and sequencing issues associated with construction being carried out while a golf course remains in some form will necessarily add time to the overall duration of the works. There is considerable variability in productivity associated with working in soils that are likely to be damp to saturated and it will be tight to complete the works in two summer seasons. It will be a requirement for some areas of the works to be grassed and established to allow course relocation to occur when opening new areas. It is our opinion that the restrictions of having a public golf course in operation will add another season to the works.
6. The safety of construction staff working close to an operating golf course needs to be considered and will necessarily have an influence on the progress of the works at times.

While some of the above may be able to be managed, there will be an impact that will have an effect of driving the construction to take into account the operations in some form. The costs and/or delays that this will cause cannot be quantified at this stage, and while it is easy to say it will be managed it is necessarily more complicated than a clear site.

Purely from a construction perspective we believe that contractors will view the potential conflicts/restraints as a risk element and price it accordingly. Most contractors would prefer the site to be clear of ongoing operations. The cost risk will sit with the Council.
It is our recommendation that it is planned for the site to be cleared of other activities and when the final form and layout of the site is finalised it can be revisited to determine which activities, if any, can be accommodated with the construction rather than the other way around.

Keith Snow

Chris Stumbles
Head of Design and Delivery

Keith Snow
Technical Advisor - Construction

Memo

27 June 2025

To: Healthy Waters Flood Resilience – Blue-green Network Team

cc:

From: Frank Tian (Manager Northern Operations)

Subject: AF Thomas Park Maintenance and Operations Concept Options Review

The northern operations team reviewed the proposed concept designs from both Healthy Waters and the Takapuna Golf Club. Some of our questions were clarified during our meetings with Healthy Water's design team on the 9th of June and the Takapuna Golf Club team on the 18th of June.

The northern operation team supports the idea of creating a detention facility within the AF Thomas Park to reduce flooding risks to surrounding and downstream properties, and it appears that the AF Thomas Park is the only available space for providing a large detention facility.

We understand that the two options have converged significantly, and both include a wetland and a large dry attenuation basin. Hence, the maintenance activities are similar, including the assumption of shared maintenance responsibilities and costs between HWFR (for stormwater aspects), and future tenant / Parks and Community Facilities (for open space / recreation assets).

Generally speaking, from an operations perspective, our preferred approach is to maximise the dry detention for stormwater attenuation, similar to what council built at Sunnynook or Greenslade, due to the following considerations associated with the wetland:

1) infection of invasive weeds (Alligator weeds were found upstream, Parrot Feather weeds were also found in North Shore),
2) debris from the large contribution catchment,
3) silt build up and removal,
4) aquatic weed control
5) stagnant and possibly smelly water issue during dry and hot summers

We note that the above-mentioned concerns are typical concerns for any proposed wetland, particularly large-scale wetlands. However, we understand that construction of a wetland is unavoidable due to high groundwater levels in this area. A permanent wetland with a large surrounding area as detention basin is the best way to achieve the desired purposes: providing required detention volume and improving local ecological value and amenity.

1. **Healthy Water design**:

The northern operations team will work with the design team at later design stages to address the above-mentioned concerns. Furthermore, following the decision making regarding future recreation use of the dry detention areas, some sub-soil drains may have to be considered, resulting in additional maintenance activities.

2. **Takapuna Golf Club design (TGC Design R1):**

We noticed that the TGC design (TGC R1) proposed to have 10 Greenways within the required detention areas (three in Stage 1 area and seven in Stage 2 area). We also noticed that the proposed ground levels for the dry detention areas will be at RL11.4 m. This is 0.2 - 0.5 m lower than the proposed dry detention areas from Healthy Waters' design. The proposed lower dry detention areas increase the risk of having mal-functioning sub-soil drains resulting in (a) boggy ground; and (b) difficulties for future maintenance and renewal.

Signed:

Tian Fengming

Frank Tian
Manager Operations North

A F Thomas Park Options – Technical Assessment Consent-ability

Date:	3 July 2025
Project name:	Blue-green Network Wairau
Project no:	IZ072701.224
Attention:	Blue Green Network Team
Company:	Healthy Waters and Flood Resilience
Prepared by:	Therese Wilson (Jacobs - Associate Environmental Planner)
Reviewed by:	Roger McDonald (Jacobs – Technical Lead, Planning), Clarke McKinney (HWFR Manager Resource Management) and Connor Whitely (HWFR Ecologist and Manager Wai ora Partnerships)

Carlaw Park
12-16 Nicholls Lane, Parnell
Auckland 1010
PO Box 9806, Newmarket
Auckland 1149
New Zealand
T +64 9 928 5500
www.jacobs.com

1. Introduction

Auckland Council Healthy Waters and Flood Resilience (Healthy Waters) have been requested to undertake a technical assessment of Takapuna Golf's proposal for the future of AF Thomas Park and ensure the feasibility and cost benefit ratio of the proposal are included as part of the delivery business case to the Transport Resilience and Infrastructure Committee in 2025. As part of the technical assessment, Jacobs New Zealand Limited have been engaged to provide consent-ability assessment for the two proposed concept designs for the future of A F Thomas Park, located at R21 Northcote Road, Wairau Valley. Connor Whitely (Manager Wai Ora Partnerships Urban) is an ecologist and has provided high-level ecological comments which have been incorporated into this assessment.

- The Takapuna Golf Course (TGC) Proposal, as described in the letter titled *'Takapuna Golf Course Flood Storage Submission'* and associated drawings, dated 12 June 2025. Additional information was provided in the letter titled *'Takapuna Golf Course Flood Storage Submission – Additional Information'* and associated memo titled *'Takapuna Golf Course Design – Construction Methodology and Wetland Area'*, both documents dated 18 June 2025.
- WSP Limited Proposal, as described in the document titled *'Wairau Blue-green Network A F Thomas Park Concept Design Option, Rev 0.0, For Discussion'*, dated 12 June 2025.

The scope provided by Healthy Waters is to prepare a memorandum outlining the following:

- Summary of high-level benefits
- Summary of high-level risks (including any programme impacts)
- Summary of high-level issues and constraints
- Conclusion re: concept level feasibility

The consent-ability assessment should be read in conjunction with the memos provided by iwi project partners. It is noted that in lieu of a memo, an email has been received by Ngāti Paoa in support of the letter provided by Te Kawarau ā Maki. As the concept proposals involve works to water bodies, the concept proposals need to take into account the relationship of Māori and their culture and traditions with their ancestral land, water, sites, wāhi tapu, valued flora and fauna, and other taonga. This is consistent with

Section 6 (Matters of national importance) of the RMA[1]. Further, Section 8 of the RMA also states that *"in achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development of natural and physical resources, shall take into account the principles of the Treaty of Waitangi (Te Tiriti o Waitangi)."*

2. Consent-ability assessment

The consent-ability assessment covers the following key elements:

- Whether the proposal is consistent with the underlying land use zoning.
- Potential effects on the environment.
- Consistency with the objectives and policies in the statutory framework (Resource Management Act 1991, National Policy Statements, National Environmental Standards and Auckland Unitary Plan Operative in Part (AUP(OP)).

The consent-ability assessment is not a planning assessment nor a comprehensive assessment of effects on the environment.

The following key matters that inform consent-ability apply to both proposals, where there are differences between the proposals this is stated below. Overall, the TGC and WSP proposals are comparable in all but a few minor aspects. As the concept design process has progressed, the two solutions have converged significantly.

- The concept designs propose a mixture of dry detention and wet detention (constructed wetland) with a total flood storage of ~550,000m^3. Given the scale of the earthworks to provide for approx. ~550,000m^3 of flood storage, the potential effects from earthworks, construction noise and vibration and traffic on neighbours, business and road users are likely to be similar. Visual, landscape and amenity effects are likely to be similar. Although the flood storage is the same in the concept proposals, the TGC design has not adequately considered overland flows from Northcote Road which raises flood levels by up to 300mm on Northcote Road. The WSP design has modelled the overland flows, and this is allowed for in the design through the landform.
- Resource consents will likely be required for earthworks, vegetation removal, groundwater diversion, disturbance of contaminated land. Streamworks consents (are to be confirmed) during preliminary design.
- There are a number of identified hydrological features on the site that may meet the definition of permanent or intermittent streams under the Auckland Unitary Plan (AUP(OP).
- The concept designs do not change the existing land use (i.e., it will remain open space) and is consistent with the underlying zone – Open Space Sport and Active Recreation Zone.
- The concept designs are consistent and generally achieves the freshwater objectives and policies in the AUP, NPS-FM[2] and NES-F[3] as both designs include constructed wetlands. However, the WSP design retains the existing watercourse through the middle of the site, which may provide consenting advantages, in line with current direction around aquatic compensation. The Takapuna Golf Course (TGC) design has not retained the existing watercourse, it may be considered during preliminary design and upon receipt of ecological assessment for the site, however, how this will interact with an 18 hole golf

[1] Resource Management Act 1991
[2] National Policy Statement for Freshwater Management
[3] National Environmental Standard for Freshwater

course is unknown and may result in tension between the golf course and aquatic compensation requirements (or offsetting if compensation is not possible on-site).

- The TGC design presents a dry detention basin that is 400mm lower than the WSP design. Given the unknown levels of the water table, there is a potential risk that this lower basin may inadvertently evolve into a wetland ecosystem, which may further compromise future operations and maintenance. The WSP design may mitigate this risk as their dry detention basin is at a higher elevation. However, given the uncertainty and unknown levels of the water table this risk may equally apply to both concept designs dependent on the final elevations and should be considered further during preliminary design.
- A F Thomas Park also supports fragmented but potentially ecologically important terrestrial habitats (including lizards, potential bat roosting habitat and bird nesting). It is not clear in both concept proposals how potential effects on terrestrial ecology will be managed. Both designs propose a wetland which will provide some terrestrial ecology benefit however the exact quantum of gain for each fauna will vary between the proposals when also considering quantum of vegetation re-planting (WSP design proposes larger extent of replanting).
- The excavation design for both proposals has been setback from buildings to reduce the risk of settlement from groundwater drawdown and the WSP concept design notes that the risk of settlement on the wastewater pipes will be assessed and mitigated as required. Therefore, the risk of settlement on adjacent buildings and assets has been appropriately considered. The TGC design has not stated any consideration of the risk of settlement on assets however, TGC note that further information is required on groundwater levels. It is therefore considered that the groundwater settlement matters will likely be further refined during preliminary design.
- The ecological matters raised by the ecologist regarding nutrient and chemical inputs (e.g., fertilisers and herbicides) to maintain standard golf course quality, would apply to both proposals if golf is the preferred future land use. Any consents that may be required for discharge will need to be applied for in both the current and future scenario where the discharge does not comply with the permitted activity standards of the AUP(OP) and this matter is not considered to be a consent-ability matter.

3. Conclusion

On balance, given guidance from the TGC where there is an optimal solution to design towards the WSP proposal, the proposals are reasonably similar and the two proposals have converged significantly, resulting in two proposals that have a comparable scale and similar potential effects on the environment.

The sketches provided by TGC differ to the supporting information and need to be read in conjunction to understand the potential effects on the environment. Whereas the WSP proposal provides a greater level of resolution and understanding in the sketches provided.

The main differences in the proposals are in relation to potential effects on the environment which includes flood effects on Northcote Road, freshwater ecology, terrestrial ecology and groundwater settlement on assets. These matters can be managed through careful consideration during preliminary design.

Signed:

Therese Wilson

Therese Wilson – Associate Environmental Planner (Jacobs)

Level 3
Henderson Civic Building
1 Smythe Road
Auckland 0612
PO Box 104198
Lincoln North, Henderson
www.tekawerau.iwi.nz
tiaki@tekawerau.iwi.nz

25 June 2025

Healthy Waters Flood Resilience
Auckland Council

RE: AF Thomas Park Flood Detention Options

Tēna koe

I write on behalf of Te Kawerau ā Maki in relation to options to develop flood retention at AF Thomas Park as part of the wider Wairau Blue-Green project. We have reviewed at a high-level sets of designs and documentation from both Council's Healthy Waters team (Council option) and an alternative design from the Takapuna Golf Course (TGC option).

Te Kawerau Position

Our rights and interests in the Wairau catchment and our cultural values and outcomes sought in relation to the AF Thomas Park project and the wider Wairau Blue-Green Network are set out in this memo.

We believe the kaupapa should be held by a whakatauki:

WAIHŌ MĀ TE WAI E RERE KI TŌNA TAUNGA

Roughly translated this refers to the memory of water and that eventually it will find its path home again. It also captures the importance of reconnecting the natural systems of the catchment as a means of healing both land and community.

We believe the kaupapa should be framed by four guiding values:

- Rangatiratanga – embodying partnership, identity, and outcomes for our people
- Kaitiakitanga – embodying protection and restoration of the mauri of the land
- Manaakitanga – embodying lifting the mana and wellbeing of the community
- Tauritetanga – embodying cooperating for a solution that balances both world views

We seek the following key outcomes:

1. Te Kawerau ā Maki are project partners meaning we make decisions together
2. The mauri and wairua of Wairau is healed meaning the manga, wetlands, and awa are restored with meaningful urban setbacks, revegetation, and clean flowing waters running their natural course
3. That the waters are rejuvenated such that they can be used for ceremony, swimming, and can sustain kākihi and other key tohu mauri o te awa
4. That the revegetation creates habitat that supports an abundance of manu as key tohu mauri o te whenua
5. That the restoration of Wairau keeps people and property safe from the risk of flooding and climate change
6. That the restoration of Wairau creates high amenity for the community
7. That the project is delivered in such a way that it fits within a programme that captures the scope of the issue and its solution in a full and holistic manner, being both strategic and long-term via a 100-year Wairau Plan
8. That the business case for the current project references the Wairau Plan and incorporates our values into it including through calculating biodiversity services, carbon

Level 3
Henderson Civic Building
1 Smythe Road
Auckland 0612
PO Box 104198
Lincoln North, Henderson
www.tekawerau.iwi.nz
tiaki@tekawerau.iwi.nz

sequestration, risk to life, financial liability (insurance or future buy-outs), health outcomes, and amenity against the future-state

9. That opportunities for iwi place-naming, identity, and activation are identified
10. That procurement opportunities for iwi members to participate in the works are identified

Appraisal of Options

The following is a high-level appraisal of the two options provided to us for comment. We note that our appraisal does not constitute a formal cultural impact analysis of the options due to time and resource constraints. Our appraisal is therefore provided here in good faith, the documentation provided, and based upon a Te Kawerau cultural lens, reflective of the wider outcomes we have identified.

ISSUE	COUNCIL OPTION	TGC OPTION	COMMENT
Storage Capacity	550,000m3	550,000m3	No preference
Earthworks	Cut-Fill Neutrality 610,000m3 total earthworks	Stage 1 Imported Fill 34,000m3 Stage 2 Exported Fill 5,000m3 730,000m3 total earthworks	Council option preferred as has less bulk earthworks
Flood Risk Reduction to People	Reduces the exposure to 'high danger flood risk' for 19 dwellings, 5 commercial buildings and reduces flood risk for 200 other homes and 10ha of residential properties as well as road flooding to Nile Road, Waterloo and Alma Road.	Reduces the exposure to 'high danger flood risk' for 19 dwellings, 5 commercial buildings and reduces flood risk for 200 other homes and 10ha of residential properties as well as road flooding to Nile Road, Waterloo and Alma Road.	No preference
Flood Risk Reduction to Infrastructure	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, and Alma Road Watercare wastewater pump station	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, and Alma Road Watercare wastewater pump station	Noted that safeguarding wastewater infrastructure during flood events is culturally significant
Mauri / Environmental Performance	Restored and diverse 14.9ha wetland of regional significance, 70,000m2 permanent pool, given only 0.5%, establishment of ecological reserve, net increase in trees, and potential to improve water quality, treating road runoff from surrounding areas.	6.6ha wetland, and 4,844m2 permanent pool.	Council option preferred as there is a large delta between the options in terms of wetland size and quality and thus ecological and water quality
Amenity	Improved pedestrian and cycling accessibility, provides 30.7ha area available for additional recreation activities/urban parkland including likely potential for a reduced 9-hole golf-course	18-hole golf course and inclusion of walking and cycling network	Council option preferred based on available info. It is unclear what the TGC recreation and amenity offering is for the wider (non-golfing) community in terms of accessibility and connectivity.

Based on the high-level appraisal we conclude a preference for the Council Option. The TGC Option, based on available information, does not outperform the Council Option on any of the key issues above and has a greater level of risk as noted in the feasibility assessments.

It appears that the TGC option also prioritizes maintaining golfing provision over reducing immediate flood risk and wider environmental outcomes, which is not supported through our stated key outcomes.
It is important to note that in any option, or variation of any option, that we seek that our values and outcomes identified in this memo are realised and that further work is required.

Level 3
Henderson Civic Building
1 Smythe Road
Auckland 0612
PO Box 104198
Lincoln North, Henderson
www.tekawerau.iwi.nz
tiaki@tekawerau.iwi.nz

Ngā Mihi,

Edward Ashby
CEO
Te Kawerau Iwi Tiaki Trust

Email reveived from Tipa Compain of Ngāti Paoa (02/07/2025) in support of this statement from Te Kawerau ā Maki.

Level 3
Henderson Civic Building
1 Smythe Road
Auckland 0612
PO Box 104198
Lincoln North, Henderson
www.tekawerau.iwi.nz
tiaki@tekawerau.iwi.nz

Council Option

TGC Option

Appendix F - Cost Estimate

Memorandum

To	Healthy Waters Flood Resilience – Blue-Green Networks Team
From	Tom Barlow
Date	3 July 2025
Reference	J000814
Subject	Wairau Blue-Green Network - AF Thomas Park Concept Design Cost Estimates

In Brief

Healthy Waters Flood Resilience (HWFR) has engaged Alta to prepare developed design budget estimates for the proposed AF Thomas Park flood mitigation project in Takapuna, Auckland.

Two design options have been developed at this stage, with comparative cost estimates developed to assist with option selection. This memorandum summarises the outcome of the cost estimates and key assumptions.

These estimates include flood resilience works and reinstatement costs as detailed in the associated business case. They do not include any allowance for implementation of any future recreational outcomes as these are subject to further decision making. Some indicative recreational costs have been provided for context.

The comparative project business case estimates are as follows:

Option	Project Base Estimate	Project Expected Estimate (P50)	95th Percentile Project Estimate
ACHW Concept Design	$ 42.51 m	$ 55.26 m	$ 74.39 m
TGC Alternative Design	$ 49.13 m	$ 63.87 m	$ 85.98 m

Project Description

The Auckland Anniversary rainfall event in early 2023 caused significant flooding throughout the Wairau catchment. The proposed works at AF Thomas Park form part of Stage 1 of the flood mitigation response to significantly reduce flood risk to the community, improve resilience to future storm events, and provide greenway and open spaces.

Two concept design options have been developed for comparison at this stage;

- HWFR have engaged WSP to develop a concept design.
- Takapuna Golf Course (TGC) have developed an alternative concept design with the intention to retain an 18-hole golf course as the end land use.

This memorandum outlines the values of the cost estimates, the information provided, the estimate process, and the main assumptions made in developing the estimates. Attached to this memorandum are the estimate summaries – refer to Appendix A.

Cost Estimates

A summarised breakdown of the construction cost estimates for both options is provided below:

Blue Green Networks - Wairau Catchment - AF Thomas Park Cost Estimates		ACHW Concept Design		TGC Alternative Design	
Item	Description	Amount		Amount	
1	On-site overheads (P&G)	$	3,160,000	$	4,460,000
2	Temporary Works	$	1,514,000	$	2,073,500
3	General	$	3,273,875	$	5,161,213
4	Site Clearance and Demolition	$	995,000	$	995,000
5	Earthworks	$	10,561,490	$	12,103,490
6	Drainage	$	440,000	$	969,600
7	Structures	$	140,250	$	140,250
8	Reinstatement	$	8,817,230	$	8,759,282
	Sub total including on site overheads	$	28,901,045	$	34,662,335
	Allowance for off site overheads	$	4,335,156.8	$	5,199,350.3
	Total Base Construction Estimate	$	33,236,202	$	39,861,685
	Indirect Client-Side Costs	$	9,272,000	$	9,272,000
	Total Base Cost	$	42,508,202	$	49,133,685
	Contingency	$	12,752,461	$	14,740,106
	P50 Expected Estimate	$	55,260,662	$	63,873,791
	Funding Risk	$	19,128,691	$	22,110,158
	95th Percentile Estimate	$	74,389,353	$	85,983,949

The estimates are based on the designs and supporting information provided by HWFR and Takapuna Golf Club (TGC).

Information Provided

The following information was provided to inform the development of the cost estimates:

- A F Thomas Park Concept Design Option – Rev 0.0 – 12 June 2025
- TGC final submission to HWFR dated 12th June 2025, and associated additional supporting information provided on 18th June 2025.
- Technical feasibility reviews to validate design assumptions.

Key Differences

The two design philosophies are fundamentally similar, applying a cut to fill bulk earthworks approach to achieving the required flood storage volume.

The overall difference between the P50 estimate for both options is $8.6m. Key differences between the two options are outlined in the table below.

Cost Element	Difference in P50 cost	Commentary
Time related costs	$3.2m	The TGC option is proposed to be undertaken in two stages to maintain an operational golf course throughout the construction period. This results in an increased programme duration and increases in cost to the following elements; • Indirect time related construction costs • Erosion and sediment control and associated dewatering requirements • Ongoing site maintenance

Watercare wastewater transmission pipeline	$2.6m	The TGC design contours indicate placement of significant overburden fill over the Watercare pipeline, and additional cost has been included to allow for structural lining or bridging of the pipe. The HWFR design minimises the fill placed over the pipe avoiding the risk of excessive surcharge and the need for potential mitigation measures.
Earthworks volumes	$2.3m	The TGC option has an additional ~20% of cut / fill volume compared to the HWFR option. This results in an associated increase in earthmoving costs.
Drainage elements	$0.8m	The TGC fill extents require extension of several existing stormwater pipelines and raising of several existing wastewater manholes, resulting in a higher overall drainage cost.

One additional potential cost difference occurs due to the TGC cut/fill earthworks design having assumed a compaction factor of 0.8. No compaction factor has been applied within the estimate to either design scenario at this stage due to uncertainty and risk associated with the properties of the in-situ material.

The estimated cost for the TGC option assumes that the additional fill generated by removal of this compaction assumption can still be retained on site as a cut/fill balance.

If the current design landform must be retained to enable the golf course layout to function, the indicative additional P50 cost for carting excess spoil to waste would be in the order of $10.3m.

Additional recreational outcomes options

The estimates have been developed as an indication of the base flood resilience works costs. They do not include any allowance for implementation of any future recreational outcomes as these are subject to further decision making. Some indicative high level P50 costs for various recreational outcomes have been provided below for context.

The final land use has not yet been determined for this project. The figures below provide an initial estimate of the P50 costs associated with including additional recreational outcomes in this scheme:

- Approximately $7m for addition of approximately 8 sports fields.
- Approximately $10m for addition of a 9-hole golf course and driving range.
- Approximately $17m for addition of an 18-hole golf course and driving range. Note that there has been no feasibility review of incorporating a full 18-hole golf course into the finished contours of the current earthwork designs.

Estimate Assumptions

The following assumptions have been used in the preparation of the cost estimate and should be used to inform any future decision making.

The estimate base date is July 2025, and no allowance for escalation has been included in the base estimate or contingency.

PROFESSIONAL SERVICES COSTS

Estimated costs for professional services have been developed by HWFR. These have been advised as $9,272,000 of base cost for inclusion within the business case estimate summary.

These costs include design fees, consenting, survey & investigations, quantity surveying, legal fees, comms and engagement, and internal HWFR personnel costs.

CONSTRUCTION COSTS

Construction costs have been developed by Alta utilising a combination of first principles and benchmarking against similar projects.

The schedule of prices and quantities have been developed based on the designs provided by HWFR and TGC and using the quantities validated by the technical memorandums.

The overall cost is sensitive to several key rates and assumed productivities in particular due to the large portion of cost attributed to the bulk earthworks operation.

No allowance has been included for any property acquisition or demolition.

The cost estimate has been developed using the following key assumptions:

- Existing services
  - Substation power cables - A benchmarked allowance has been included for lowering or nearby relocation of the power cables adjacent to the substation at the basin inlet. Additional detail and confidence in this item will be developed through upcoming further design phases and coordination with Vector.
  - Watercare wastewater transmission line – an allowance has been included for construction and diversion into three new pipe bridges to replace the sections of pipeline which require undermining for the new proposed ground contours. Additional detail and confidence in this item will be developed through upcoming further design phases and coordination with Watercare.
- Earthworks
  - The in-situ material is assumed to be rippable by a 20t+ excavator. No allowance has been included for hard rock, since there is currently no evidence suggesting rock is present at the site.
  - An allowance for disposal of 500m³ of medium-level contaminated material has been included at this stage. This will be further informed by future ground investigations during later design phases.
  - The TGC cut/fill earthworks design has assumed a compaction factor of 0.8. No compaction factor has been applied within the estimate to either design scenario at this stage due to uncertainty and risk associated with the properties of the in-situ material.

    The estimated cost for the TGC option assumes that the additional fill generated by removal of this compaction assumption can still be retained on site as a cut/fill balance.

    If the current design landform must be retained to enable the golf course layout to function, the indicative additional P50 cost for carting excess spoil to waste would be in the order of $10.3m.
- Reinstatement
  - Vegetation reinstatement is assumed as a mixture of plants from 1.5L seedlings up to 60L specimen trees. No allowance has been included for relocation of existing trees or importing any larger specimen trees to site. All existing trees have been assumed to be removed during initial site clearance.
  - Reinstated areas have assumed reuse of the existing topsoil recovered from site. No allowance has been included for importing additional topsoil.

PRELIMINARY AND GENERAL

- Time-related On-site overheads have been developed from first principles based on the anticipated supervision and overhead equipment costs for each option. These range between 11% to 13% of the direct construction costs. This aligns with benchmarked market expectations for a project of this scale and type.
- Off-site overheads have been applied as 15% of the physical works cost in line with market expectations for a project of this scale.

CONTINGENCY AND RISK

- A contingency of 30% has been applied to the base estimate to derive the expected estimate (P50) based on the current status of design certainty, risk of design change, and variability in the work method.
- P95 funding risk has been calculated as 1.5 times the contingency in line with the HWFR cost estimation manual.

Please contact the undersigned if you have any queries concerning the estimate or the assumptions presented in this memorandum.

Yours sincerely,

Tom Barlow
Alta Consulting Ltd

Reviewed by: Rory Bishop

S 7(2)(h) Commercial Activities, S 7(2)(i) Negotiations

REDACTED

WITHHELD AS ABOVE

S 7(2)(h) Commercial Activities, S 7(2)(i) Negotiations

REDACTED

WITHHELD AS ABOVE

Appendix G - Cost Benefit Analysis (Pending: Due 31 July 2025)

Auckland Council
Te Kaunihera o Tāmaki Makaurau