Beachlands South Fast-track

Auckland Council Specialist Memo

Annexure E:

Groundwater Diversion and Dewatering

Hester Hoogenboezem

19 October 2026

1.0 APPLICATION DESCRIPTION

Application and property details

Fast-Track project name:	Beachlands South
Fast-Track application number:	EPA reference: FTAA-2606-1256 Council reference: BUN60467962

2.0 Technical Specialist Memo – Groundwater Diversion and Dewatering

To:	Brooke Dales – Lead Planner Adonica Giborees – Principal Project Lead
From:	Hester Hoogenboezem – Senior Specialist – Coastal and Water Allocation Team
Qualifications & Relevant Experience:	I hold the qualification(s) of: Bachelor of Science in Environmental and Engineering Geology and a Bachelor of Science (Hons) In Engineering and Environmental Geology. I have 19 years of experience in geotechnical engineering and engineering geological assessments. I am a member of Engineering New Zealand. I have prepared expert evidence and technical assessments for resource consent applications and fast-track applications on numerous occasions.
Preparation in Accordance with the Code of Conduct:	I confirm that I have read the Environment Court Practice Note 2023 – Code of Conduct for Expert Witnesses (**Code**), and have complied with it in the preparation of this memorandum. I also agree to follow the Code when participating in any subsequent processes, such as expert conferencing, directed by the Panel. I confirm that the opinions I have expressed are within my area of expertise and are my own, except where I have stated that I am relying on the work or evidence of others, which I have specified.
Signature:	
Date:	19 October 2026

3.0 Executive Summary / Principal Issues

In summary, the proposed Beachlands South development comprises residential dwellings, a hotel and conference venue, commercial and community activities, protected ecological restoration areas, walking and cycling networks, community facilities, and provision for two future schools. The proposal also includes associated earthworks and supporting infrastructure, comprising transport facilities, roads, telecommunications, power, water supply, stormwater and wastewater networks, treatment and storage facilities, drainage systems, pipelines, pump stations, outfalls, and associated discharges.

The development requires extensive earthworks, with most proposed excavations less than 5 m deep. The deepest excavation is a proposed 9 m deep pond located in the northern part of the site. Several buildings also incorporate single-level basement car parking. The proposed works will require underfill drainage, while basement construction will involve excavation, retaining walls, and associated drainage infrastructure. These works have the potential to intercept and modify groundwater flow and will require groundwater diversion and dewatering during both construction and operation.

Principal groundwater diversion and dewatering issues identified are:

- The assessment is based on the regional groundwater level rather than the natural groundwater level, as required by the Auckland Unitary Plan (AUP).
- The application does not include plans showing the location and depth of proposed underfill and earthworks drainage.
- The locations of proposed retaining walls and associated drainage measures have not been provided.
- The application does not identify the location, depth, construction timing, or groundwater interaction of underground infrastructure, including roads, utilities, stormwater and wastewater networks, treatment and storage facilities, drainage systems, pipelines, pump stations, and outfalls.

Consequently, a comprehensive assessment against AUP Standard E7.6.1.10 (1 to 6), based on the natural groundwater levels (including perched groundwater conditions) and incorporating the proposed drainage, retaining walls, and infrastructure works, has not been provided.

4.0 Documents Reviewed

The following documents have been reviewed in preparing this memorandum:

- A report titled *"Beachlands South Fast Track Design Report",* prepared by Jasmax, revision C and dated 12 August 2026.
- A report titled *"Beachlands South – Fast-track Approval Substantive Application Assessment of Environmental Effects and Statutory Analysis",* prepared by Unio Environmental, dated 26 June 2026.
- A report titled *"Beachlands South – Rules Assessment",* prepared by Unio Environmental, dated 26 June 2026.

- A report titled *"Beachlands South Fast Track Application Landscape & Natural Character Effects Assessment",* prepared by Bron NZ Ltd, dated 20 August 2026.
- A report titled *"Beachlands South Fast-Track Application Geotechnical Report",* prepared by Tonkin and Taylor Ltd, version 2.2, dated 19 June 2026.
- A report titled *"Beachlands South Fast Track Infrastructure Report",* prepared by Harrison Grierson and dated 24 June 2026.
- A report titled *"Beachlands South Fast Track Ecological Impact Assessment",* prepared by Viridis Environmental Consultants, dated September 2026.

5.0 Additional Reasons for Consent Not included in AEE / Incorrect Reasons for Consent

The AEE rules assessment by Unio Environmental, dated 26 June 2026, acknowledged consent is required for the works involving dewatering that will take longer than 30 days (E7.6.1.6 (2)), as shown below.

Standards E7.6	Compliance
E7.6.1.6. Dewatering or groundwater level control associated with a groundwater diversion permitted under Standard E7.6.1.10, all of the following must be met: (1) The water take must not be geothermal water; (2) The water take must not be for a period of more than 10 days where it occurs in peat soils, or 30 days in other types of soil or rock; and (3) The water take must only occur during construction.	(1) The proposed groundwater take is not geothermal water – **Complies**. (2) The dewatering associated with the groundwater diversion to enable construction of the concrete core caps is likely to take longer than 30 days – **Infringe**. Resource consent is sought for a **restricted discretionary activity**. (3) Will **Comply**.

The assessment also recognised that consent is required under Regulation 45C(4) of the National Environmental Standards for Freshwater (NESF), as the proposal involves the diversion of water within a 100 m setback of a natural inland wetland for the purpose of constructing urban development and is likely to change the water level range or hydrological function of the wetlands, which is a restricted discretionary activity.

I consider the following reasons for consent to be applicable:

AUP Standards E7.6.1.10 and E7.6.1.6 set out the permitted activity standards for groundwater diversion associated with excavations, including trenches and tunnels, and for dewatering or groundwater level control associated with such diversions.

The proposal has been assessed against these standards and is considered to not comply for the following reasons:

- Dewatering activities are anticipated to continue for more than 30 days, contrary to Standard E7.6.1.6(2).
- Dewatering and groundwater level control are likely to continue beyond completion of construction, as some excavations will permanently extend below natural groundwater levels, drained retaining walls are proposed, and other areas of earthworks may require permanent drainage, contrary to Standard E7.6.1.6(3).
- Insufficient information has been provided to determine compliance with Standard E7.6.1.10(5)(a), which requires that excavations intercepting groundwater are located a distance from neighbouring structures at least equal to the depth of the excavation.
- Compliance with Standard E7.6.1.10(6)(c) cannot be determined, as the location and extent of proposed drainage measures have not been provided. This standard requires any excavation extending below the natural groundwater level to be located at least 10 m from a lawful groundwater take.

When assessed against Regulation 45C (4) of the NES-Freshwater, the proposal involves the diversion of groundwater within 100 m of natural inland wetlands for the purpose of urban development and may alter the water level range and hydrological functioning of those wetlands.

Accordingly, consent is required under AUP Rule E7.4.1(A20), potentially Rule E7.4.1(A28), and Regulation 45C(4) of the NES-Freshwater as **Restricted Discretionary Activities**.

6.0 Specialist Assessment

S67 Response and Reasons for Consent

In response to a section 67 request, the Applicant stated that a groundwater diversion consent is not required, because the proposed underfill drains would only intercept isolated seepages, perched groundwater, and groundwater lenses located above the regional groundwater table.

I do not agree with this conclusion. The assessment of groundwater diversion and dewatering under the AUP is not limited to the regional groundwater table. The relevant assessment relates to the natural groundwater level, which includes perched groundwater, isolated seepages, and groundwater lenses. On

the basis of the information that has been provided, and applying the natural measured groundwater levels, I consider that consent is required for groundwater diversion and dewatering activities.

Diversion or dewatering of these groundwater resources has the potential to alter local groundwater conditions and may adversely affect neighbouring properties, structures, infrastructure, groundwater-dependent ecosystems, and the wider receiving environment. Accordingly, groundwater diversion and dewatering associated with the proposed earthworks, retaining walls, basements, and supporting infrastructure require assessment.

However, the applicant has not assessed the diversion or dewatering of the natural groundwater level, nor included corresponding consent conditions.

Groundwater Impact Assessment for Earthworks and Infrastructure

The Tonkin & Taylor report (Version 1.2, June 2026) acknowledges that perched groundwater may be encountered within the proposed excavations and that drainage measures may be required to manage seepage.

As noted above, perched groundwater forms part of the natural groundwater system and should therefore be included within the assessment of effects. Drainage measures associated with earthworks may alter groundwater conditions and potentially affect neighbouring properties and groundwater-dependent ecosystems.

The application does not identify the location, depth, extent, or discharge arrangements of proposed underfill drainage, nor does it adequately identify the location and construction details of the proposed infrastructure works, including roads, utilities, pipelines, pump stations, stormwater infrastructure, and wastewater infrastructure. Consequently, I am unable to fully assess the actual or potential groundwater diversion and dewatering settlement effects associated with these works or identify the third parties most at risk.

Excavations, Basements and Retaining Walls

The Tonkin & Taylor report states that the excavation, drainage requirements, and groundwater management measures for retaining walls will be determined through future detailed design. Similarly, the report acknowledges that several proposed buildings incorporate basement car parking and may require groundwater diversion, although the extent of any diversion has not yet been determined.

While I agree that many of the retained excavations appear to be located away from site boundaries, the full extent of groundwater diversion and dewatering associated with retaining walls, basements, and other retained structures has not been established. As a result, the application does not provide sufficient information to assess compliance with AUP Standard E7.6.1.10 or to undertake a comprehensive assessment against the matters of discretion in AUP E7.8 for Restricted Discretionary Activities. In addition, wall deflection and mechanical settlement have not been calculated for the proposed retaining structures.

I therefore consider that insufficient information has been provided to fully assess potential adverse effects from both groundwater diversion and dewatering (consolidation settlement) and from construction of the proposed retaining structures (mechanical settlement), on neighbouring properties and the environment.

Effects on Wetlands

Viridis concluded that the wetlands proposed to be reclaimed are generally of low ecological value and that adverse effects can be appropriately addressed through the proposed compensation measures. The assessment further concluded that the affected freshwater features are not irreplaceable and that the compensation site provides a feasible opportunity to achieve substantial freshwater gains.

The proposal was reviewed by Antoinette Bootsma, Senior Freshwater Specialist (Earth, Streams & Trees Team, Auckland Council), who confirmed that the values of the affected wetlands had been appropriately considered within the Biodiversity Compensation Model calculations and generally agreed that the aquatic compensation principles contained within Appendix 7 of the National Policy Statement for Freshwater Management had been demonstrated.

No additional information gaps relating to wetland effects were identified. Accordingly, I rely on Antoinette Bootsma's assessment regarding the actual and potential effects on wetlands.

7.0 Section 67 Information Gap

At the time of writing this Memo I have identified the following information gaps:

Information gap	Nature of deficiency	Decision-making impact	Risk / uncertainty created
1. *Reasons for consent not fully identified*	- *The assessment only considered the regional groundwater table and did not assess effects on the natural groundwater level, including perched groundwater. Consequently, a groundwater diversion and dewatering consent and associated conditions were not considered.*	*A complete assessment of effects has not been provided and appropriate consent pathways and conditions have not been identified.*	***High.*** *The omission may result in unassessed groundwater diversion and dewatering effects and inadequate consent conditions.*
2. *Earthworks/underfill drainage plan not provided*	- *The location, depth, extent and discharge of proposed underfill drainage have not been identified.*	*The extent of groundwater diversion and dewatering cannot be determined and the associated effects on the environment and neighbouring*	***Medium.*** *The potential effects of permanent drainage measures on groundwater conditions,*

		structures and Services cannot be accurately assessed.	*neighbouring properties, and the receiving environment remain uncertain.*
3. *A plan showing depth location of proposed infrastructure and confirmation of construction time.*	- *Plans showing the location, depth, construction methodology and duration of underground infrastructure works have not been provided*	*The extent and duration of potential groundwater diversion and dewatering associated with utility installation cannot be assessed.*	***Medium.*** *Potential groundwater effects associated with infrastructure construction and operation remain uncertain.*
4. *Retaining wall and associated drainage plans not provided*	- *The location of retaining walls and the extent of drainage proposed behind retaining walls have not been identified.*	*The potential groundwater diversion and dewatering effects associated with retained excavations cannot be fully assessed.*	***Low.*** *Most retaining walls appear to be located away from site boundaries and are likely to be outside the zone of influence of neighbouring properties.*
5. *Assessment of effects of these drainage and groundwater diversion activities not provided*	- *Detailed assessment of the effects of drainage, groundwater diversion and dewatering has been deferred to future design stages and consent conditions.*	*The actual and potential effects on the environment and neighbouring structures and Services cannot be adequately assessed, and appropriate monitoring, mitigation and management measures cannot be determined.*	***Medium.*** *Deferring assessment may result in unforeseen effects, additional information requirements, or delays during detailed design and construction.*
6. *Assessment of wetland effects based on incomplete groundwater information*	- *The assessment of effects on wetland hydrology was undertaken without a clearly defined extent of groundwater diversion and dewatering activities.*	*The full extent of potential effects on wetland water levels and hydrological functioning cannot be independently verified.* *I nonetheless understand the existing assessment*	***Low.*** *The wetland assessment adopted conservative assumptions, and Auckland Council's freshwater specialist did not identify any*

		included conservative parameters and assumptions.	*further information gaps. Accordingly, the residual level of uncertainty is considered low.*

Overall conclusion

While the information gaps relating to the location and extent of groundwater diversion and dewatering activities create uncertainty regarding the scale of effects and appropriate mitigation measures, the most significant deficiency is the failure to assess effects on the natural groundwater level, including perched groundwater, and to identify the associated groundwater diversion and dewatering consent requirements. This limits the ability to undertake a complete assessment against AUP Standards E7.6.1.6 and E7.6.1.10 and the matters of discretion in AUP E7.8.

8.0 Recommendation

I recommend that the Applicant identify the location, extent, and design of all proposed earthworks, including infrastructure excavations, earthworks drainage, underfill drainage, and retaining wall drainage, and undertake an assessment of the associated groundwater diversion and dewatering effects against AUP Standards E7.6.1.10 (1 to 6) and the relevant matters of discretion under AUP E7.8 for **Restricted Discretionary Activities.**

Based on the information currently available, I am unable to support the application, as insufficient information has been provided to enable a complete assessment of the actual and potential effects associated with groundwater diversion and dewatering.

Should consent nevertheless be granted, I recommend that the conditions set out in Section 9.0 of this memorandum are imposed. These conditions will ensure that groundwater diversion and dewatering effects are appropriately assessed, managed, monitored, and mitigated, and that any actual or potential effects on the environment, neighbouring properties, structures, infrastructure, and groundwater-dependent ecosystems are appropriately avoided, remedied, or mitigated such that the resulting effects are less than minor.

9.0 Proposed Conditions

Proposed Consent Conditions – WAT Groundwater Diversion and Dewatering

Definitions

Words in the ground dewatering (take) and groundwater diversion consent conditions have specific meanings as outlined in the table below.

Alarm Level	*Specific levels at which actions are required as described in the relevant conditions.*
Alert Level	*Specific levels at which actions are required as described in the relevant conditions.*
Bulk Excavation	*Includes all excavation that affects groundwater excluding minor enabling works and piling less than 1.5 m in diameter.*
Commencement of Excavation	*Means commencement of Bulk Excavation or excavation to create perimeter walls.*
Completion of Construction	*Means when the Code Compliance Certificate (CCC) is issued by Auckland Council*
Completion of Excavation	*Means the stage when all Bulk Excavation has been completed and all foundation/footing excavations within 10 meters of the perimeter retaining wall have been completed.*
Condition Survey	*Means an external visual inspection or a detailed condition survey (as defined in the relevant conditions).*
Damage	*Includes Aesthetic, Serviceability, Stability, but does not include Negligible Damage. Damage as described in the table below.*
External visual inspection	*A condition survey undertaken for the purpose of detecting any new external Damage or deterioration of existing external Damage. Includes as a minimum a visual inspection of the exterior and a dated photographic record of all observable exterior Damage.*
GSMCP	*Means Groundwater and Settlement Monitoring and Contingency Plan*

Monitoring Station	*Means any monitoring instrument including a ground or building deformation station, inclinometer, groundwater monitoring bore, retaining wall deflection station, or other monitoring device required by this consent.*
RL	*Means Reduced Level.*
Seasonal Low Groundwater Level	*Means the annual lowest groundwater level – which typically occurs in summer.*
Services	*Include fibre optic cables, sanitary drainage, stormwater drainage, gas and water mains, power and telephone installations and infrastructure, road infrastructure assets such as footpaths, kerbs, catch-pits, pavements and street furniture.*
SQEP	*Means Suitably Qualified Engineering Professional*
SQBS	*Means Suitably Qualified Building Surveyor*

Category of Damage	**Normal Degree of Severity**	**Description of Typical Damage** *(Building Damage Classification after Burland (1995), and Mair et al (1996))*	**General Category** *(after Burland – 1995)*
0	Negligible	Hairline cracks.	**Aesthetic Damage**
1	Very Slight	Fine cracks easily treated during normal redecoration. Perhaps isolated slight fracture in building. Cracks in exterior visible upon close inspection. Typical crack widths up to 1 mm.	
2	Slight	Cracks easily filled. Redecoration probably required. Several slight fractures inside building. Exterior cracks visible, some repainting may be required for weather-tightness. Doors and windows may stick slightly. Typically, crack widths up to 5 mm.	
3	Moderate	Cracks may require cutting out and patching. Recurrent cracks can be masked by suitable linings. Brick pointing and possible replacement of a small amount of exterior brickwork may be required. Doors and windows sticking. Utility services may be interrupted. Weather tightness often impaired. Typical crack widths are 5 mm to 15 mm or several greater than 3 mm.	**Serviceability Damage**

4	Severe	Extensive repair involving removal and replacement of walls especially over door and windows required. Window and door frames distorted. Floor slopes noticeably. Walls lean or bulge noticeably. Some loss of bearing in beams. Utility services disrupted. Typical crack widths are 15 mm to 25 mm but also depend on the number of cracks.	
5	Very Severe	Major repair required involving partial or complete reconstruction. Beams lose bearing, walls lean badly and require shoring. Windows broken by distortion. Danger of instability. Typical crack widths are greater than 25 mm but depend on the number of cracks.	**Stability Damage**

Table 1: Building Damage Classification

Note: In the table above the column headed "Description of Typical Damage" applies to masonry buildings only and the column headed "General Category" applies to all buildings.

Standard Conditions

Activity in accordance with plans

Condition 1: The take (dewatering) of groundwater associated with the earthworks and installation of drainage must be carried out in accordance with the plans and all information submitted with the application, detailed below, and all referenced by the council as consent number WATXXX, including:

- A report titled *"Beachlands South Fast Track Design Report",* prepared by Jasmax, revision C, dated 12 August 2026.
- A report titled *"Beachlands South – Fast-track Approval Substantive Application Assessment of Environmental Effects and Statutory Analysis",* prepared by Unio Environmental, dated 26 June 2026.
- A report titled *"Beachlands South Fast-Track Application Geotechnical Report",* prepared by Tonkin and Taylor Ltd, version 2.2, dated 19 June 2026.
- A report titled *"Beachlands South Fast Track Infrastructure Report",* prepared by Harrison Grierson, dated 24 June 2026.
- Detailed retaining wall and drainage plans.

Duration of the consent

Condition 2: The take (dewatering) of groundwater consent WATXXX must expire 35 years from the commencement of the consent, unless it has lapsed, been surrendered or been cancelled at an earlier date pursuant to the RMA.

Provide for a review under section 128

Condition 3: Under section 128 of the RMA, the conditions of this consent WATXXX may be reviewed by the Manager Resource Consents at the Consent Holder's cost:

Within six (6) months after Completion of Construction Phase Dewatering and subsequently at intervals of not less than five (5) years thereafter, in order:

- To deal with any adverse effects on the environment which may arise or potentially arise from the exercise of this consent and which it is appropriate to deal with at a later stage.

- To vary the monitoring and reporting requirements, and performance standards, in order to take account of information, including the results of previous monitoring and changed environmental knowledge on:

1) ground conditions
2) aquifer parameters
3) groundwater levels; and
4) ground surface movement.

Ground Dewatering (Take) and Groundwater Diversion Conditions

Notice of Commencement of Excavation

Condition 1: The Council must be advised in writing at least ten (10) working days prior to the date of the Commencement of Excavation.

Provision of an Assessment of Settlement Effects

Condition 2: Twenty (20) working days before the Commencement of Excavation, the Applicant must provide an Assessment of Settlement Effects of the proposal on the environment, adjacent buildings, structures and public services, to the satisfaction of the Council. The assessment must include the following:

a) The identification of critical cross-sections for assessment – deepest excavations, any drainage measures, proximity to adjacent buildings/structures and services and shallowest groundwater levels must all be considered.

b) An assessment of the groundwater drawdown due to the excavation and drainage measures to include consolidation settlement profiles, at the critical cross-sections from the edge of the proposed excavation extending beneath neighbouring buildings/structures (including driveways) and services.

c) The preparation of profiles, at the critical cross-sections, showing the total (combined) settlement (i.e., the consolidation settlement due to groundwater drawdown plus the mechanical settlement due to retaining wall deflection) beneath the neighbouring buildings/structures (including driveways) and services. The profiles must be annotated with the calculated maximum differential settlement (slope gradient) across neighbouring buildings/structures (including driveways) and services.

d) An assessment of the tolerance/sensitivity of the neighbouring buildings to the predicted differential settlement that could result from the dewatering and retaining wall deflections, with respect to their age, construction and foundation types, from the structural design engineer for the project. A Stage 1 Assessment - Burland Classification of Damage for the neighbouring buildings/structures must also be undertaken. If the Stage 1 assessment indicates *"Slight Damage or greater",* then a Stage 2 assessment must be completed.

e) The identification of potentially affected public services/utilities and the assessment of the combined effect of groundwater drawdown and retaining wall deflection on these services.

Advice Note: *For the purpose of compliance with conditions of consent, "the Council" refers to the council monitoring inspector unless otherwise specified. To identify your allocated officer please email monitoring@aucklandcouncil.govt.nz.*

Provision of Groundwater and Settlement Monitoring and Contingency Plan

Condition 3: If the Assessment of Settlement Effects required in **Condition 2** determines that a calculated total settlement is greater than 7 mm at a neighbouring property, a Groundwater Settlement Monitoring & Contingency Plan (GSMCP) must be provided to the Council within twenty (20) working days before the Commencement of Excavation. The GSMCP must include (but not be limited to):

a) A monitoring plan showing the locations and types of all Monitoring Stations, including building settlement marks on the neighbouring buildings/structures, ground settlement marks, retaining wall deflection marks and inclinometers (as required).

b) Alert and alarm trigger levels and monitoring frequency for total and differential settlement of the ground surface, buildings and retaining walls;

c) Pre-and-post dewatering detailed condition surveys for existing walls;

d) Settlement monitoring and the identification of neighbouring buildings/structures that require pre-and-post dewatering detailed condition surveys, together with those public services (if any), which require pre-and -post dewatering CCTV condition survey, together with a description of the proposed construction methodology/sequence and contingency options.

If it is considered that a GSMCP is not required, then a full justification for this must be provided to the Council within twenty (20) working days before the Commencement of Excavation.

Construction Methodology

Condition 4: The consent holder must provide a detailed construction methodology written or endorsed by a Chartered Geotechnical Engineer or Chartered Engineering Geologist detailing how the contractor must undertake the proposed earthworks.

The construction methodology must be provided at least ten (10) working days prior to the Commencement of Excavation for approval, and must include excavation time frames, temporary propping/weatherproofing and/or sequencing of works. This is required to ensure stability is maintained throughout the civil works stage of the development. No Bulk Excavation is permitted onsite prior to written confirmation that the construction methodology has been reviewed and approved by the Council.

Condition 5: All construction, dewatering, monitoring and contingency actions must be carried out in accordance with the approved GSMCP and the Construction Methodology required under **Conditions 3 and 4**, respectively. Bulk Excavation (that may affect groundwater levels) or other dewatering activities must not commence until the GSMCP is certified in writing by the council.

Extent of Bulk Earthworks

Condition 6: The design and construction of the earthworks, drainage and retaining walls must be undertaken in accordance with the specifications contained in the documents titled:

- A report titled *"Beachlands South Fast-Track Application Geotechnical Report",* prepared by Tonkin and Taylor Ltd, version 2.2, dated 19 June 2026.
- A report titled *"Beachlands South Fast Track Infrastructure Report",* prepared by Harrison Grierson and dated 24 June 2026.
- Detailed retaining wall and drainage plans.

Excavation Limit

Condition 7: The Bulk Excavation must not extend beyond the extent shown in the report titled *"Beachlands South Fast Track Infrastructure Report",* prepared by Harrison Grierson, and dated 24 June 2026.

PERFORMANCE STANDARDS

Damage Avoidance

Condition 8: All excavation, dewatering systems, retaining structures, basements and works associated with the diversion or taking of groundwater, must be designed, constructed and maintained so as to avoid Damage to buildings, structures and Services on the site or adjacent properties, outside that considered as part of the application process, unless otherwise agreed in writing with the asset owner.

Alert Level Actions

Condition 9: In the event of any Alert Level being exceeded the Consent Holder must:

a) Notify the Council within 24 hours of the alert level exceedance being detected.
b) Re-measure all Monitoring Stations to confirm the extent of apparent movement.
c) Ensure the data is reviewed, and advice provided by a Suitably Qualified Engineering Professional (SQEP) on the need for mitigation measures or other actions necessary to avoid further deformation. Where mitigation measures or other actions are recommended those measures must be implemented.
d) Submit a written report, prepared by the SQEP responsible for overviewing the monitoring, to the Council within five working days of Alert Level exceedance. The report must provide an analysis of all monitoring data relating to the exceedance, actions taken to date to address the issue, recommendations for additional monitoring (i.e., the need for increased frequency or repeat condition survey(s) of building or structures) and recommendations for future remedial actions necessary to prevent Alarm Levels being exceeded.
e) Measure and record all Monitoring Stations every two days until such time the written report referred to above has been submitted to the Council.

Alarm Level Actions

Condition 10: In the event of any Alarm Level being exceeded at any ground or building Monitoring Station the Consent Holder must:

a) Immediately halt construction activity, including excavation or any other works that may result in increased deformation, unless halting the activity is considered by a SQEP to likely be more harmful (in terms of effects on the environment) than continuing to carry out the activity.
b) Notify the Council within 24 hours of the Alarm Level exceedance being detected and provide details of the measurements taken.
c) Undertake a condition survey (this could comprise either a detailed condition survey or an external visual inspection at the discretion of the SQEP responsible for overviewing the monitoring) by a SQEP or suitably qualified building surveyor (SQBS) of any building or structure located adjacent to any Monitoring Station where the Alarm Level has been exceeded.
d) Take advice from the author of the GSMCP on actions required to avoid, remedy, or mitigate adverse effects on ground, buildings or structures that may occur as a result of the exceedance.
e) Not resume construction activities (or any associated activities), halted in accordance with paragraph (a) above, until any mitigation measures (recommended in accordance with paragraphs (d) above) have been implemented to the satisfaction of a SQEP.
f) Submit a written report, prepared by the SQEP responsible for overviewing the monitoring, to the satisfaction of the Council, on the results of the condition survey(s), the mitigation measures implemented and any remedial works and/or agreements with affected parties within five (5) working days of recommencement of works.
g) Re-measure all Monitoring Stations to confirm the extent of apparent movement.

Pre-Excavation Building and Structure Survey

Condition 11: No more than six (6) months prior to the Commencement of Excavation, a detailed condition survey of existing buildings and structures, as specified in the GSMCP required under **Condition 3**, must be undertaken by a SQEP or SQBS, and a written report must be prepared and reviewed by the SQEP responsible for overviewing the monitoring. The report must be submitted for approval by the Council.

The detailed condition survey must include:

a) Confirmation of the installation of building deformation stations as required in the GSMCP.
b) A description of the type of foundations.
c) A description of existing levels of Damage considered to be of an aesthetic or superficial nature.
d) A description of existing levels of Damage considered to affect the serviceability of the building, where visually apparent without recourse to intrusive or destructive investigation.
e) An assessment as to whether existing Damage may or may not be associated with actual structural Damage and an assessment of the susceptibility of buildings/structures to further movement and Damage.
f) Photographic evidence of existing observable Damage.

This condition does not apply where written evidence is provided to the Council that the owner of a property has confirmed they do not require a detailed condition survey.

Pre-Dewatering Services Condition Survey

Condition 12: Prior to the Commencement of Excavation, a CCTV condition survey of potentially affected stormwater and wastewater services must be undertaken in consultation with the relevant service provider.

This condition does not apply to any service where written evidence is provided to the Council that the owner of that service has confirmed they do not require a condition survey.

External Visual Inspections during Construction Phase Dewatering

Condition 13: External visual inspections of the surrounding ground and the neighbouring buildings and structures identified in the GSMP required under **Condition 3**, must be undertaken for the purpose of detecting any new external Damage or deterioration of existing external Damage. Inspections must be carried out weekly from the Commencement to Completion of Construction Phase Dewatering. A photographic record must be kept, including time and date, of each inspection and all observations made during the inspection, and must be of a quality that is fit for purpose.

The results of the external visual inspections and an assessment of the results must be reviewed by the SQEP responsible for overviewing the monitoring and included in a two monthly monitoring report, submitted to the Council at a two monthly interval, for the relevant monitoring period.

This condition does not apply to any land, building or structure where written evidence is provided to the Council confirming that the owner of the land, building or structure does not require visual inspections to be carried out.

Completion of Construction Phase Dewatering - Services Condition Surveys

Condition 14: Between six and twelve months after Completion of Construction Phase Dewatering, a detailed condition survey of all previously surveyed stormwater and wastewater Services must be undertaken by a SQEP, and a written report must be prepared. The report must be reviewed by the SQEP responsible for overviewing the monitoring and then submitted to the Council, within one month of completion of the survey.

The condition survey report must make specific comment on those matters identified in the pre-dewatering condition survey. It must also identify any new Damage that has occurred since the pre-dewatering condition survey was undertaken and provide an assessment of the likely cause of any such Damage.

This condition does not apply to any Services where written evidence is provided to Council confirming that the owner of that building, structure, or Service does not require a condition survey to be undertaken.

Additional Surveys

Condition 15: Additional condition surveys of any building, structure, or Service must be undertaken, if requested by the Council, for the purpose of investigating any Damage potentially caused by ground movement resulting from Construction Phase Dewatering or retaining wall deflection. A written report of the results of the survey must be prepared and/or reviewed by the SQEP responsible for overviewing the monitoring. The report must be submitted to the Council.

The requirement for any such additional condition survey will cease six (6) months after the Completion of Construction Phase Dewatering, unless ground settlement or building deformation monitoring indicates movement is still occurring at a level that may result in Damage to buildings, structures, or Services. In such circumstances, the period where additional condition surveys may be required will be extended until monitoring shows that movement has stabilised and the risk of Damage to buildings, structures and Services as a result of the dewatering is no longer present.

Access to Third Party Property

Condition 16: Where any monitoring, inspection or condition survey in this consent requires access to property/ies owned by a third party, and access is declined or subject to what the Consent Holder considers to be unreasonable terms, or a reasonable attempt has been made to contact the property owner and occupiers (where required) to carry out monitoring, inspections

or surveys, and agreement has not been obtained, an alternative monitoring option must be developed by a SQEP and a report submitted to Council. The report must describe how the monitoring will provide sufficient early detection of deformation to enable measures to be implemented to prevent Damage to buildings, structures or Services. Written approval from the Council must be obtained before an alternative monitoring option is implemented.

Contingency Actions

Condition 17: If the Consent Holder becomes aware of any Damage to buildings, structures or Services potentially caused wholly, or in part, by the exercise of this consent, the Consent Holder must:

a) Notify the Council and the asset owner within two (2) working days of the Consent Holder becoming aware of the Damage.
b) Provide a report prepared by a SQEP (engaged by the Consent Holder at their cost) that describes the Damage; identifies the cause of the Damage; identifies methods to remedy and/or mitigate the Damage that has been caused; identifies the potential for further Damage to occur and describes actions that will be taken to avoid further Damage.
c) Provide a copy of the report prepared under (b) above, to the Council and the asset owner within ten (10) working days of notification under (a) above.

Advice Note: *It is anticipated the Consent Holder will seek the permission of the damaged asset to access the property and asset to enable the inspection/investigation. It is understood that if access is denied the report will be of limited extent.*

Building, Structure, and Services Surveys and Inspections

Condition 18: A copy of all pre-excavation building, structure condition surveys, and Service condition surveys and photographic records of external visual inspections required by this consent must be submitted to the council with the GSMCP. All other condition surveys and photographic records required by this consent must be provided to the council upon request.

Reporting of Monitoring Data

Condition 19: At two (2) monthly intervals, a report containing all monitoring data required by conditions of this consent must be submitted to the Council. This report must include a construction progress timeline, the monitoring data (including the results of condition surveys) recorded in that period, and a comparison of that data with previously recorded data and with the Alert and Alarm Levels for each Monitoring Station.

Condition 20: Upon Completion of Construction, one electronic data file (excel workbook) containing digital data for all groundwater monitoring bores must be provided to the Council. Data should include the monitoring bore name, type, location (NZTM easting / northing and elevation), screened depth for groundwater monitoring bores, absolute and relative readings (and their units of measure) and the date / time of each reading. The worksheets should contain data values only (no formulas, circular references or links to other sheets).

Notice of Completion

Condition 21: The Council must be advised in writing within ten (10) working days of when excavation and Construction Phase Dewatering has been completed.

Advice Note: *The Consent Holder is advised that the discharge of pumped groundwater to a stormwater system or waterbody will need to comply with any other regulations, bylaws or discharge rules that may apply.*

Condition 22: Certification from suitably qualified Chartered Geotechnical Engineer or Chartered Engineering Geologist must be provided to the Council, confirming that the works have been completed in accordance with the approved construction methodology as required by Condition 3, within ten (10) working days following completion. Written certification must be in the form of a geotechnical completion report, or any other form acceptable to the Council.

Groundwater Maintenance Program

Condition 23: At the Completion of Construction Phase Dewatering, the council must be provided with a maintenance program for any permanent groundwater drainage system used to manage groundwater levels.

Advice Note: *The consent holder is advised that the discharge of pumped groundwater to a stormwater system or waterbody will need to comply with any other regulations, bylaws or discharge rules that may apply.*