Delmore Fast-Track

25/06/2025 – Auckland Council Response

Annexure 16:

Groundwater and Dewatering

Hester Hoogenboezem

Delmore Fast Track BUN60444768 / WAT60444827 - Groundwater Diversion and Dewatering

From: *Hester Hoogenboezem – Senior Specialist, Coastal and Water Allocation, Planning and Resource Consents Department, Auckland Council*

Date: 19 June 2025

Documents Reviewed:

- Report titled "Delmore Subdivision, Ōrewa, Preliminary Site Investigation (Ground Contamination)" prepared by Williamson Water & Land Advisory (WWLA), referenced WWLA1147, revision 3, dated 13 February 2025.
- Report titled "Geotechnical Report, Proposed Residential Development Russell Road and Upper Ōrewa Road, Wainui" prepared by Riley Consultants (Riley), Issue 1.0 Final, dated 14 February 2025.
- Report titled "Delmore Fast-track Application, Ecological Impact Assessment" prepared by Viridis Environmental Consultants, dated February 2025.
- Report titled "Delmore Fast Track Approval Application Assessment of Environmental Effects and Statutory Analysis" prepared by B&A Urban & Environmental, dated 17 February 2025.
- Development Drawings "Delmore, Site Plans" prepared by Terra Studio, revision A, not dated.
- Earthworks Plan "Delmore Stage 1, 53A, 53B & 55 Russell Rd, Ōrewa, Earthworks Cut/Fill Contours Overall" prepared by McKenzie & Co revision H, dated 5 February 2025.
- Earthworks Plan "Delmore Stages 2A&B, 130&132 Upper Ōrewa Road, Ōrewa, Earthworks Cut/Fill Contours Overall" prepared by McKenzie & Co revision H, dated 11 February 2025.
- Earthworks Plan "Delmore Stages 2C,D&E, 30&32 Upper Ōrewa Road, Ōrewa, Earthworks Cut/Fill Contours Overall" prepared by McKenzie & Co revision I, dated 4 February 2025.
- Rules Assessment "Rules Assessment, Delmore, 88, 130, 132 Upper Ōrewa Road and 53A, 53B and 55 Russell Road, Ōrewa" prepared by B&A Urban & Environmental, not dated.
- Report titled "Response to Council Groundwater Queries Delmore Residential Development" prepared by Riley Consultants, Issue 240065-I, dated 17 June 2025.

- Memorandum titled “Delmore Fast-track Application, Response to Auckland Council Terrestrial Ecology Queries” prepared by Viridis Environmental Consultants, dated 17 June 2025.

Reasons for consent (Groundwater Diversion and Dewatering)

Auckland Unitary Plan (Operative in Part) (AUP(OP))

Chapter E, Standard E7.6.1.10 and Standard E7.6.1.6 provide the permitted activity criteria under the AUP(OP) for the diversion of groundwater associated with any excavation, including a trench or tunnel and dewatering or groundwater level control associated with a groundwater diversion permitted under Standard E7.6.1.10.

The proposed works do not comply with E7.6.1.6 and E7.6.1.10 for the following reasons:

- The works involving take / dewatering may be for a period longer than 30 days and will not only occur during construction (E7.6.1.6 (2) and E7.6.1.6 (3)).
- Diversion of groundwater associated with the excavation does not comply with permitted standards (E7.6.1.10 2(a) and 2(b)), as the proposed excavation exceeds 1 ha in total area and is greater than 6 m depth below the natural ground level.
- The nearest relevant structure is a consented but unconstructed road located adjacent to the site within the Ara Hills Development. The distance to this proposed road is less than the depth of the planned excavation, which will extend below the natural groundwater level (E7.6.1.10 (5a)).

Accordingly, consent is required under AUP(OP) Chapter E Rule 7.4.1 (A20) and (A28) as a **Restricted Discretionary Activity**.

Potential additional reasons for consent not addressed in the reporting (Groundwater Diversion and Dewatering):

- E7.6.1.10.(6) The distance from the edge of any excavation that extends below natural groundwater level, must not be less than: 50m from the Wetland Management Areas Overlay and 10m from a lawful groundwater take.

Regulation 45C (4) **Restricted discretionary activities** of the National Environmental Standard for Freshwater 2020 (NES-F) regarding the proposed taking and diversion of water within a 100 m setback from a natural inland wetland, is based on whether:

a) the activity is for the purpose of constructing urban development; **and**

b) there is a hydrological connection between the taking, use, damming, or diversion and the wetland; **and**

c) the taking, use, damming, or diversion will change, or is likely to change, the water level range or hydrological function of the wetland.

Other activities considered

Resource Consent LUC60444822 has been lodged to cover to the Land Use activities related to the proposed works. The effects of the land disturbance activity, except for settlement as a result of groundwater drawdown, will be covered by the land use consent and are not addressed further in this technical memo.

Overall Summary

The Applicant is seeking consent to take groundwater for dewatering purposes during earthworks for the construction of approximately 1 250 dwellings and in the long-term for ground dewatering after earthworks with associated drainage at the subject site for the proposed Delmore Development.

The proposal involves the subdivision of approximately 109 ha in six lots at 88, 130, and 132 Upper Ōrewa Road and 53A, 53B, and 55 Russell Road and construction of a residential development. The location of the site is shown in Figure 1. Subdivision of the site and construction are proposed in two stages (Stages 1 and 2), comprising six substages. Stage 1 comprises 53A, 53B and 55 Russell Road, and Stage 2 comprises properties 88, 130, and 132 Upper Ōrewa Road.

As part of site preparation works, earthworks comprising approximately 1 272 000 m^3 of cut and 953 000 m^3 fill is proposed. The earthworks plans indicate that cut and fill earthworks will take place over much of the site and a maximum excavation of up to 16 m depth.

It is understood that most excavations near the boundaries are proposed to be formed by batter slopes and some excavations will be supported by near boundary retaining walls

extending to a maximum height of approximately 3 m. It is understood that boundary retaining walls are still to be finalised and the retaining wall package is expected to be provided to the Council for review. I consider that geotechnical design inputs will be required for specific design of retaining walls and that further investigation may be required to enable specific designs to be completed.

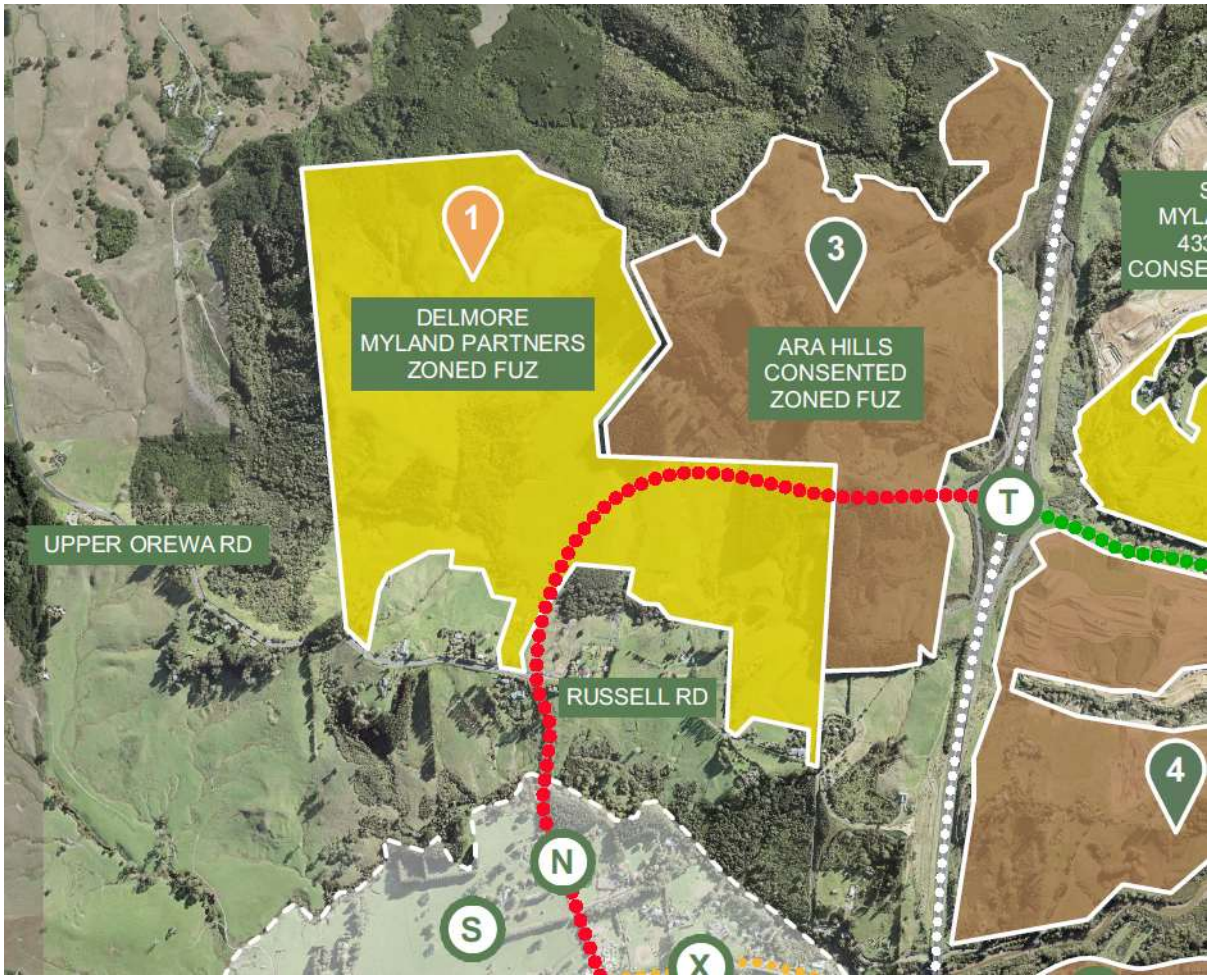

Figure 1: Site Plan

Groundwater was encountered in multiple investigation locations during the investigation completed in November and December 2024 and groundwater monitoring was undertaken in the locations of proposed deepest excavations to determine the groundwater equilibrium.

Potential Effects on neighbouring structures

Construction at the Ara Hills Development, to the north of proposed Stage 1 is underway at the time of writing this groundwater technical memo and a consented road is proposed at the northern boundary of the Delmore Stage 1 Development.

The minimum distance from the Stage 1 bulk excavation to the nearest structure is more than 20 m (greater than 9 m maximum depth of excavation adjacent to the site boundary). The nearest structure considered is an adjacent consented proposed road for Ara Hills Development. All other existing dwellings are located at least 40 m away from the boundary cuts.

A farm shed is adjacent to the southern boundary for Stage 2. This shed is approximately 6 m from the closest excavation and is in proximity to the maximum excavation along the southern boundary.

Elsewhere around the perimeter of Stage 2 the nearest structure considered is an adjacent consented road of the Ara Hills Development which is approximately 20 m form the edge of the cuts on the eastern boundary. There are no other existing structures located within 40 m of the boundary cuts.

There are some areas where it is proposed to form cut batters adjacent to the external boundary of the development and where groundwater is likely to be intercepted. These are primarily proposed along the northern and eastern boundaries of Stage 1 where cuts of up to approximately 9 m and 8 m respectively are proposed. There are also some smaller cuts of approximately 4 m to 5 m along the southern boundary of Stage 1. Within Stage 2 there are cuts of up to 14 m mid-way along the western boundary and 12 m in the northern end of the eastern boundary. Elsewhere, where there are boundary cuts on the eastern and southern boundaries, they are in the range of between 8 m and 9 m depth.

Groundwater measurements indicate that the proposed excavations could induce groundwater drawdown of up to 6 m in the vicinity of the northern boundary of Stage 1 and southern boundary of Stage 2. Riley assessed the magnitude of the associated settlement at the location of maximum groundwater drawdown. The extent of groundwater drawdown was assessed in accordance with the CIRIA C515 (Groundwater Control – Design and Practice) document. Calculations show that the maximum consolidation settlement of ~7 mm is anticipated along the northern boundary of Stage 1, with calculated settlements for the other locations considered being less than 5 mm at the site boundary apart from the southern boundary of Stage 2 where the maximum calculated settlement is ~6 mm.

Riley concluded that there are no existing structures within the zone of influence of the proposed groundwater drawdown and therefore the drawdown effect on neighbouring sites is expected to be negligible and that due to the limited extent of the groundwater drawdown,

there should be no adverse effect on the groundwater source, the neighbouring bore and lawful water take at Ara Hills.

Riley anticipates that there will be some localised groundwater drawdown that could extend a short distance beyond the site boundary but there are no existing structures within the zone of influence that are likely to be affected.

I consider that, at the time of writing this groundwater technical memo, that the proposal is not likely to cause adverse effect on the existing structures beyond the site boundary as a result of the proposed excavations. However, construction is underway at Ara Hills Development, and the effect of the proposed excavations on any new structures or services at neighbouring properties should be assessed prior to excavation.

I consider that mechanical settlement of the proposed retaining walls near the boundaries should be considered together with the groundwater drawdown settlement to determine the effects on the proposed road at Ara Hills Development, including any other proposed structures within the influence zone of the proposed excavation. I consider that consolidation settlement and mechanical settlement can be managed by a Groundwater Settlement Monitoring and Contingency Plan (GSMCP). I consider that the preparation of a draft GSMCP is required as a Condition of Consent of the Water Permit.

I consider that provided that the take of groundwater (dewatering) and groundwater diversion activity is undertaken in the manner described in the application material and summarised above, and subject to the proposed conditions provided below, that the potential adverse effects of the activity on neighbouring buildings, structures and public services are considered likely to be less than minor, depending on mechanical settlement calculations.

I consider that the proposed dewatering and groundwater diversion could have potential adverse effects on the wetlands identified at the subject site, because significant dewatering is proposed at the subject site and groundwater diversion and dewatering was not assessed at the locations and within the influence zones of the identified wetlands. The reporting did not assess wetland losses resulting from groundwater diversion and dewatering. **The Application does not address this matter, which I consider to be a significant omission.**

I have reviewed the Conditions of Consent for the Water Permit and consider that they are appropriate, however, additional conditions are provided for clarity.

Recommended Additional Conditions

I have included the proposed conditions in a proposed full set of conditions below.

Ground Dewatering and Groundwater Diversion Consent Conditions

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

(a) 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) and diversion of groundwater associated with the Excavation for the Delmore Subdivision, 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 WAT60444827, including:

- Report titled “Geotechnical Report, Proposed Residential Development Russell Road and Upper Ōrewa Road, Wainui” prepared by Riley Consultants (Riley), Issue 1.0 Final, dated 14 February 2025.
- Report titled “Response to Council Groundwater Queries Delmore Residential Development” prepared by Riley Consultants (Riley), Issue 240065-I, dated 17 June 2025.

Duration of the consent

Condition 2: The take (dewatering) and groundwater diversion consent WAT60444827 must expire on 31 July 2060, 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 WAT60444827 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.

***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*

Design and Construction

Condition 2: The design and construction of the excavations must be undertaken in accordance with the recommendations and analysis contained in the following documents:

- Report titled “Geotechnical Report, Proposed Residential Development Russell Road and Upper Ōrewa Road, Wainui” prepared by Riley Consultants, Issue 1.0 Final, dated 14 February 2025.
- Report titled “Response to Council Groundwater Queries Delmore Residential Development” prepared by Riley Consultants, Issue 240065-I, dated 17 June 2025.

Excavation Limit

Condition 3: The Bulk Excavation must not extend 0.9 m below the depths identified in the following documents:

- Earthworks Plan “Delmore Stage 1, 53A, 53B & 55 Russell Rd, Ōrewa, Earthworks Cut/Fill Contours Overall” prepared by McKenzie & Co revision H, dated 5 February 2025.
- Earthworks Plan “Delmore Stages 2A&B, 130&132 Upper Ōrewa Road, Ōrewa, Earthworks Cut/Fill Contours Overall” prepared by McKenzie & Co revision H, dated 11 February 2025.
- Earthworks Plan “Delmore Stages 2C,D&E, 30&32 Upper Ōrewa Road, Ōrewa, Earthworks Cut/Fill Contours Overall” prepared by McKenzie & Co revision I, dated 4 February 2025.

Performance Standards

Damage Avoidance

Condition 4: All excavation, dewatering systems, retaining structures and works associated with the diversion or taking of groundwater, must be designed, constructed and maintained so as to avoid Damage to land, buildings, structures and Services on the site or adjacent properties, unless otherwise agreed in writing with the asset owner.

Alert and Alarm Levels

Condition 5: The activity must not cause any settlement or movement greater than the Alarm Level thresholds specified in Schedule A below. Alert and Alarm Levels are triggered when the following Alert and Alarm Trigger thresholds are exceeded:

Schedule A: Alarm and Alert Levels			
Movement		**Trigger Thresholds (+/-)**	
		Alarm	**Alert**
a)	Differential vertical settlement between any two Ground Surface Deformation Stations (the **Differential Ground Surface Settlement Alarm or Alert Level**):	TBC	TBC
b)	Total vertical settlement from the pre-excavation baseline level at any Ground Surface Deformation Station (the **Total Ground Surface Settlement Alarm or Alert Level**):	TBC mm	TBC mm
c)	Differential vertical settlement between any two adjacent Building Deformation Stations (the **Differential Building Settlement Alarm or Alert Level**)	TBC	TBC
d)	Total vertical settlement from the pre-excavation baseline level at any Building Deformation Station (the **Total Building Settlement Alarm or Alert Level**)	TBC mm	TBC mm
e)	Total lateral deflection from the pre-excavation baseline level at any retaining wall deflection station (the **Retaining Wall Deflection Alarm or Alert Level**):	TBC mm	TBC mm

Note: The locations of the proposed Monitoring Stations listed in Schedule A should be shown in the Groundwater and Settlement Monitoring and Contingency Plan (GSMCP).

These levels may be amended subject to approval by the Council, after the receipt of pre-dewatering condition survey, if supported by recommendations from a suitably qualified engineering professional (SQEP), but only to the extent that avoidance of Damage to building, structures and Services can still be achieved.

There are conditions below that must be complied with when the Alert and Alarm Level triggers are exceeded. These include actions that must be taken immediately including seeking the advice of a SQEP.

Alert Level Actions

Condition 6: In the event of any Alert Level being exceeded the Consent Holder must:

a) Notify the Council within twenty-four (24) hours.

b) Re-measure all Monitoring Stations within fifty (50) meters of the affected monitoring location(s) to confirm the extent of apparent movement.

c) Ensure the data is reviewed, and advice provided, by a 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 (5) working days of Alert Level exceedance. The report must provide an analysis of all monitoring data (including wall deflection) 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 within fifty (50) meters of the location of any Alert Level exceedance every two (2) days until such time that the written report referred to above has been submitted to the Council.

Alarm Level Actions

Condition 7: In the event of any Alarm Level being exceeded at any ground deformation pin, retaining wall deflection pin, or inclinometer, the Consent Holder must:

a) Immediately halt construction activity, including excavation, dewatering, or any other works that may result in increased deformation, unless halting the activity is considered by a SQEP to be likely to be more harmful (in terms of effects on the environment) than continuing to carry out the activity.

b) Notify the Council within twenty-four (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 Alert Level exceedance report (if there was one) 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 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 re-commencement of works.

Groundwater and Settlement Monitoring and Contingency Plan (GSMCP)

Condition 8: At least ten (10) working days prior to the Commencement of Excavation, a GSMCP prepared by a SQEP, must be submitted to the Council for written approval. Any later proposed amendment of the GSMCP must also be submitted to the Council for written approval.

The overall objective of the GSMCP must be to set out the practices and procedures to be adopted to ensure compliance with the consent conditions and must include, at a minimum, the following information:

(a) A monitoring location plan, showing the location and type of all Monitoring Stations including groundwater monitoring bores, ground, building, inclinometer and retaining wall deformation pins.

(b) Final completed schedule B (as per the conditions below) for detailed condition surveys, and monitoring of ground surface, building and retaining wall (including any proposed changes to the monitoring frequency) as required by conditions below.

(c) All monitoring data, the identification of Services susceptible to Damage and all building/Service condition surveys undertaken to date and required by conditions below.

(d) A bar chart or a schedule, showing the timing and frequency of condition surveys, visual inspections and all other monitoring required by this consent, and a sample report template for the required two (2) monthly monitoring.

(e) All Alert and Alarm Level Triggers (including reasons if changes to such are proposed, for example as a result of recommendations in the building condition surveys or data obtained from pre-dewatering monitoring).

(f) Details of the contingency actions to be implemented if Alert or Alarm Levels are exceeded.

Condition 9: All construction, dewatering, monitoring and contingency actions must be carried out in accordance with the approved GSMCP. No Bulk Excavation (that may affect groundwater levels) or other dewatering activities must commence until the GSMCP is approved in writing by the Council.

Pre- Excavation Services Condition Survey

Condition 10: Prior to the Commencement of Excavation, a photographic condition survey (recording evidence of existing observable Damage) of any structures within the influence zone of the proposed excavation, must be undertaken by a SQEP and a written report must be prepared and reviewed by the SQEP responsible for overviewing the monitoring.

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

Condition 11: Prior to the Commencement of Excavation, a condition survey of the potentially affected stormwater 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 Dewatering

Condition 12: External visual inspections of the surrounding ground and neighbouring structures within the influence zone of any excavation must be undertaken for the purpose of detecting any new external Damage or deterioration of existing external Damage. Inspections must be carried out weekly during Active Excavation, and then monthly until Completion of 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.

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 Dewatering - Building, Structure and Services Condition Surveys

Condition 13: Between six and twelve months after Completion of Construction Phase Dewatering, a detailed condition survey of all previously surveyed stormwater 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 Council, within one month of completion of the survey.

The condition survey report must make specific comment on those matters identified in the pre-Excavation 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 14: Additional condition surveys of any building, structure, or Service within the area defined by the extent of groundwater drawdown or ground movement, must be undertaken, if requested by the Council, for the purpose of investigating any Damage potentially caused by ground movement resulting from 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 months after the Completion of Dewatering, unless ground settlement is observed during the Dewatering period. 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.

Groundwater Monitoring

Condition 15: Groundwater monitoring must be undertaken as shown in the approved GSMCP. Groundwater level monitoring must be undertaken in accordance with Schedule B below:

Schedule B: Groundwater Monitoring Frequency					
Bore Name	**Location**		**Groundwater level monitoring frequency (to an accuracy of 10 mm)**		
	Easting (mE)	Northing (mN)	From bore construction until one month before Commencement of Construction Phase Dewatering	Two weeks before Commencement of Construction Phase Dewatering to Completion of Construction Phase Dewatering	From Completion of Construction Phase Dewatering until 3 months later
GWBH	TBC	TBC	Weekly (for at least two weeks)	Weekly	Monthly

The monitoring frequency may be changed if approved by the Council. Any change must be specified in the GSMCP. In addition, the three-month monitoring period post Completion of Construction Phase Dewatering may be extended by the Council, if measured groundwater levels are not consistent with inferred seasonal trends or predicted groundwater movement.

Advice Note:

If groundwater level measurements show an inconsistent pattern immediately prior to the Commencement of Construction Phase Dewatering (for example varying more than +/-200mm during a month), then further readings may be required to ensure that an accurate groundwater level baseline is established before Construction Phase dewatering commences.

Ground Surface and Building Deformation Monitoring

Condition 16: Ground Surface and Building Deformation Monitoring Stations must be established. The Monitoring Stations must be monitored at the frequency set out in Schedule C. The purpose of the Monitoring Stations is to record any vertical or horizontal movement. Benchmark positions must be established no less than fifty (50) metres away from the excavated area.

Schedule C: Ground Surface and Building Monitoring			
Monitoring Station and type*	**Frequency**		
	Pre-Commencement of Excavation	**Commencement to Completion of Excavation**	**Post- Completion of Excavation**
Ground: TBC	Twice to a horizontal and vertical accuracy of +/-2 mm (achieved by precise levelling)	Weekly	Monthly for 6 months
Buildings: TBC	Twice to a horizontal and vertical accuracy of +/-2 mm (achieved by precise levelling)	Weekly	Monthly for 6 months

Note: * Asterisk in the above Schedule indicates that consideration must be given to embedded column type ground settlement markers where possible for improved accuracy, for instance where tree roots or construction traffic may affect settlement.

The monitoring frequency may be changed, if approved by the Council. The Consent Holder must request termination of ground surface settlement and building settlement monitoring from Council, supported with a letter of justification for the termination, prepared by a SQEP.

Retaining Wall Monitoring

Condition 17: Retaining wall deflection stations and inclinometers (where deemed appropriate) for the measurement of lateral wall movement, must be installed along the top of retaining walls where groundwater is anticipated to be encountered.

Monitoring of the retaining wall deflection stations and inclinometers must be undertaken and recorded in accordance with Schedule D below and must be carried out using precise levelling, or by string lines between markers.

Schedule D: Retaining Wall Monitoring Frequency				
Frequency				
Pre-Commencement of Excavation	**Commencement of Excavation to one month after Completion of Excavation**		**From Completion of Excavation until 3 months later**	
Pre-Commencement of Dewatering	**Retaining Wall Deflection Stations**	**Inclinometers**	**Retaining Wall Deflection Stations**	**Inclinometers**
N/A - can only be installed after installation and immediately prior to excavation commencing	Once for every 2 metres depth (on average) of excavation, and, in any case, at a minimum of once weekly.	Once for every 2 metres depth (on average) of excavation, and, in any case, at a minimum of once fortnightly.	Fortnightly	Monthly

The monitoring frequency may be changed, if approved by the Council, through the GSMCP.

Access to Third Party Property

Condition 18: 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, the Consent Holder must provide a report to the Council prepared by a SQEP identifying an alternative monitoring programme. 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 19: 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 must 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 20: A copy of all condition surveys and photographic records required by this consent must be provided to the Council upon request.

Notice of Completion

Condition 21: The Council must be advised in writing within ten (10) working days of when 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.*

REVIEW

Technical memo prepared by:

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Date: 18 June 2025

Technical memo reviewed and approved for release by:

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Date: 19 June 2025