



Appendix H

Proposed Geotechnical Consent Conditions

Proposed Geotechnical Consent Conditions

Land Use

1. At least 20 working days prior to the commencement of bulk earthworks for any stage or sub-stage of the development, a Settlement Monitoring Plan (SeMP) prepared by a SQEP, must be submitted to Council for certification. Any later proposed amendment of the SeMP must also be submitted to Council for certification.

The purpose of the SeMP is to set out the practices and procedures to be adopted to ensure compliance with the consent conditions regarding earthworks fill settlement monitoring and shall include, at a minimum, the following information:

- (a) A monitoring location plan, showing the location and type and construction detail of all settlement monitoring points;
- (b) Details of the monitoring frequency;
- (c) All monitoring data, the identification of services susceptible to damage and all building/service condition surveys undertaken to date; and
- (d) Details of criteria to confirm that fill induced settlements have sufficiently attenuated.

Settlement monitoring results must be presented in the Geotechnical Completion Report (refer Condition XX).

2. The placement and compaction of fill material, construction of geogrid reinforced slopes, retaining walls and subsoil drainage works must be supervised by a SQEP. In supervising the works, the SQEP must ensure that they are constructed and otherwise completed in accordance with the recommendations contained within the Geotechnical Report (reference: XX), approved under Condition XX, relevant engineering code of practice, and the detailed plans forming part of the application and approved under Condition XX.
3. Within 20 working days from the completion of earthworks, subsoil drainage and slope protection structures, a Geotechnical Completion Report (GCR) signed by the chartered geo-professional must be provided to the Council. The GCR must include (but not to be limited to):
 - (a) Earthworks operations (e.g. fill compaction, testing, inspections etc.);
 - (b) Results of settlement monitoring;
 - (c) Statement of professional opinion (as per schedule 2A of NZS4404:2010); and
 - (d) Certified as-built plans for the implemented earthworks and subsoil drainage.

4. The GCR must also provide justification on soil expansivity, subsoil site class, foundation requirements, confirming that the works have been completed in accordance with the approved construction methodology as required by Condition XX and evidence of settlement monitoring as required by Condition XX have been met. The GCR must include results of settlement monitoring and demonstration that sufficient settlement attenuation has occurred and be provided to the satisfaction of the Council.
5. All earthworks must be managed to ensure that they do not lead to any uncontrolled instability or collapse either affecting the site or adversely affecting any neighbouring properties. In the event that such collapse or instability does occur, it must immediately be rectified.

Subdivision

6. The consent holder must construct the earthworks, geogrid reinforced soils slopes, retaining walls and subsoil drainage in accordance with the recommendations of the Riley Consultants Ltd Geotechnical Investigation Report (reference: XX) approved under Condition XX to ensure the site is stable and suitable for development.
7. A Geotechnical Completion Report (GCR) from a suitably qualified and experienced chartered geo-professional must be prepared and submitted to Council to confirm that all residential lots are stable and suitable for development when applying for a certificate under section 224(c) for a subdivision stage (or sub-stage). The GCR must include a Building Restriction Zone plan that identifies specific design zones and no-build zones. Development must be undertaken in accordance with the recommendations of the GCR.

The preceding paragraph must be registered as a consent notice on the records of title for all residential lots to ensure that it is complied with on a continuing basis. The specific name and date of the GCR provided must be referenced in the consent notice.

Advice note: Refer to Auckland Council Code of Practice 2023 (Chapter 2) which details expectations of a geotechnical completion report.

8. As-built details of installed counterfort drains shall be included within the Geotechnical Completion Report, together with records of counterfort drain commissioning observations and flushing.

Advice Note: The drain commissioning information will provide baseline data for the counterfort drain operation and maintenance plan. The as-built drawings shall also include locations of the flushing ports and outlet structures.

9. Where counterfort drains are installed within a stage of the development, a counterfort drain operation and maintenance plan shall be provided as an attachment to the GCR, incorporating a staged maintenance approach. This shall include the observations to be made, their frequency and any associated actions.

Water Permit for Dewatering and Diversion of Groundwater

Notice of Commencement of Excavation

10. The Council must be advised in writing at least ten working days prior to the date of the commencement of excavation for the relevant sub-stage of development.

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

11. The design and construction of the excavations must be undertaken in accordance with the recommendations and analysis contained within the Geotechnical Report (reference: **XX**) approved under Condition **XX**.

Damage Avoidance

12. 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.
13. At least 20 working days prior to the commencement of bulk earthworks for any stage or sub-stage of the development, a Groundwater and Settlement Monitoring and Contingency Plan (GSMCP) prepared by a SQEP, must be submitted to Council for certification. Any later proposed amendment of the GSMCP must also be submitted to Council for certification. The purpose of the GSMCP is to set out the practices and procedures to be adopted to ensure compliance with the consent conditions and shall include, at a minimum, the following information:
 - (e) 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;
 - (f) Details of any buildings/structures that require detailed pre-condition surveys, groundwater and ground surface monitoring frequency (in accordance with Schedule B, Schedule C and Schedule D in Attachment 2 of the conditions);
 - (g) All monitoring data, the identification of services susceptible to damage and all building/service condition surveys undertaken to date;
 - (h) 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 monitoring report template (monitoring reports are to be provided at 2-monthly intervals);

- (i) Completed Schedule A for alert and alarm level triggers (refer Attachment 2 of the conditions), including reasons if changes are proposed, for example, as a result of recommendations in the building condition surveys or data obtained from pre-dewatering monitoring; and
 - (j) Details of contingency actions to be implemented if alert or alarm levels are exceeded.
14. All construction, dewatering, monitoring and contingency actions shall be carried out in accordance with the approved GSMCP. No bulk excavation (that may affect groundwater levels) or other dewatering activities shall commence until the GSMCP is certified by the Council.
15. All excavation, dewatering, retaining structures and works associated with diversion or taking of groundwater, shall be designed, constructed and maintained so as to avoid damage to buildings, structures and services on the site or adjacent properties, unless otherwise agreed in writing with the asset owner.

Pre-Excavation Services Condition Survey

16. 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 overseeing the monitoring.

Advice note: 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.

17. 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.

Advice note: 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

18. 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 the 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 overseeing the monitoring.

Advice note: 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.

Monitoring

19. Groundwater monitoring must be undertaken as shown in the approved GSMCP. The monitoring frequency may be changed if approved by the Council. Any change must be specified in the GSMCP.
20. Ground surface and building deformation monitoring stations must be established as required by the GSMCP. 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.
21. 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.
22. Monitoring of the retaining wall deflection stations and inclinometers must be undertaken and recorded in accordance with the GSMCP and must be carried out using precise levelling, or by string lines between markers. The monitoring frequency may be changed, if approved by the Council, through the GSMCP.

Alert and Alarm Level Actions

23. The activity must not cause any settlement or movement greater than the alarm level thresholds specified in the GSMCP (required by Condition **XX**).
24. In the event of any alert level being exceeded, the consent holder must:
 - (a) Notify the Council within 24 hours;
 - (b) Re-measure all monitoring stations within 50m of the affected monitoring locations 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 overseeing the monitoring, to the Council within ten 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 50m of the location of any alert level exceedance every two days until such time that the written report referred to above has been submitted to the Council.

25. 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 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 overseeing 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 overseeing 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 10 working days of re-commencement of works.

Completion of Dewatering – Building, Structure and Services Condition Surveys

26. 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 overseeing 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.

Advice note: 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

27. 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 overseeing the monitoring. The report must be submitted to the Council.
28. 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.

Access to Third Party Property

29. 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

30. 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 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 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

31. A copy of all condition surveys and photographic records required by this consent must be provided to the Council upon request.

Notice of Completion

32. The Council must be advised in writing within ten working days of when the construction phase dewatering has been completed for the relevant sub-stage of development.

Attachment 2: Inputs to the Groundwater and Settlement Monitoring and Contingency Plan

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

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	From Completion of Construction Phase Dewatering until 3 months later
GWBH	TBC	TBC	Weekly (for at least two weeks)	Weekly	Monthly

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

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