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5. Geotechnical Requirements

Selwyn District Council's geotechnical requirements are based on the Christchurch City Council's Infrastructure Design Standard (IDS) 2018. This section of SDC's Engineering Code of Practice (ECOP) details only the differences or additional requirements between CCC's requirements and SDC's.

Generally, designers and contractors shall refer to the CCC CSS Part 2: Earthworks for all geotechnical-related areas, except where this ECOP sets out different or additional requirements.

5.1 Referenced Documents

In addition to the referenced documents listed in Parts 1 and 2 of this Code of Practice, the following documents form part of the reference suite.

Design:

- NZS 4431:1989 *Code of practice for earth fill for residential purposes*
- NZS 3604:2011 *Timber framed buildings*
- BRANZ (1987) *Assessment of slope stability at building sites, Study Report 4*
- Ministry for the Environment *Contaminated Land Management Guidelines No. 1 – Reporting on Contaminated Sites in New Zealand*
- *Geotechnical Issues in Land Development, Proceedings of NZ Geotechnical Society Symposium, Hamilton (1996)*
- *New Zealand Geotechnical Society Field Description of Soil and Rock* (December 2005)
- Landcare Research Report LC0203/111 Soil Conservation Guidelines for the Port Hills (May 2003)
- Australian Geomechanics Society (AGS) Sub-committee on Landslide Risk Assessment, Landslide Risk Management Concepts and Guidelines
- Christchurch Residential Red Zone Technical Zone Categories (description and map)
- Ministry of Business, Innovation and Employment Repairing and rebuilding houses affected by the Canterbury earthquakes and updates
- Cubrinovski et al, Liquefaction Impacts on Pipe Networks
- GNS CR2012-311: Canterbury Earthquakes 2010/11 Port Hills Slope Stability: Pilot study for assessing life-safety risk from rockfalls (boulder rolls)
- GNS CR2012-57: Canterbury Earthquakes 2010/11 Port Hills Slope Stability: Pilot study for assessing life-safety risk from cliff collapse

Where a conflict exists between any Standard and the specific requirements outlined in the ECOP, the ECOP takes preference (at the discretion of the Council).

5.1.1 Relevant standards

In addition to the guidance provided in CCC CSS Part 2: Earthworks and NZS:4431:1989, generally existing subdivision sites are overlain with top soil of varying depths often up to 600 mm.

For building to NZS 3604 standard, foundations including slabs on ground need to be on good ground or supported by compacted basecourse, weak concrete or engineered fill.

If subdivision sites are levelled and backfilled with material depths greater than 300 mm the requirements of NZS 4431 must be met by the designer.

5.1.2 Statute or District Plan requirements

Specific Selwyn District Council requirements include:

- Permission to do Earthworks Activities will not be grated within Selwyn District unless it complies with the provisions of the District Plan, Rural Volume and Township Volume C2 Rules – Earthworks.
- No earthworks shall begin on a subdivision that has been granted resource consent prior to final engineering acceptance, unless written permission from the Council is given, detailing conditions that must be adhered to.

5.2 REQUIREMENTS FOR COUNCIL APPROVALS

Geotechnical requirements relating to specific approvals are indicated in **Table 1** shown below:

Table 1 - Geotechnical Requirements

Plan change	Geotechnical report following the current Ministry of Business Innovation and Employment guidelines and including subsurface testing (Preliminary site evaluation)
Subdivision consent	Refer Council requirements and Appendix I (Typically, a preliminary site evaluation)
Building consent	Refer Council requirements and Appendix II Refer NZS 3604:2011 Ground conditions report (residential or commercial/industrial) (Typically, site testing and a geotech report)
Engineering approval	Refer Council requirements and NZS 4431 (Typically, site testing and a geotechnical report)

Note that geotech hazards and criteria vary across the Selwyn District – designers shall refer to Council's guidance.

5.3 SUBDIVISION LOT FORMATION

The considered formation of lots is a critical part of good subdivision design.

Lots shall be formed:

- To grade down to the street kerb and channel (or to the drainage system for rear lots), and
- With a minimum finished grade of 1: 300, and
- Evenly graded to ensure no ponding within lots

No allotment filling is to be placed above the existing ground levels of neighbouring properties nor a cutting below existing neighbours unless there is written agreement with the neighbouring property owners and Council. Where approval is obtained to cut below neighbouring properties agreement shall be obtained on the type of retaining structure.

Where written approval is obtained to extend fill into neighbouring properties, satisfactory arrangements must be made for the grading of the fill onto the land without ponding. Council may require positive drainage to be incorporated to prevent ponding or runoff nuisance.

The development's approach to subdivision lot formation must be:

- Proposed at Resource Consent application stage, and
- Clearly detailed at Engineering Approval application stage

5.4 QUALITY ASSURANCE REQUIREMENTS AND RECORDS

Where a development proposal has been submitted without geotechnical input and where, in the opinion of the Council, such input is required, the Council may direct that such advice is obtained before proceeding further with the proposal.

5.4.1 Geotechnical Completion Report

Wherever building sites on natural ground have ultimate bearing soil strengths less than 300 kPa or exhibit other specific characteristics that may require specific foundation design, these must be noted in the Completion Report along with any recommendations for strengthened or piled foundations for residential buildings.

5.4.2 As-Built records

In addition to the requirements of CCC CSS Part 2: Earthworks, the geotechnical engineer or subdivision engineer shall confirm if earth fill greater than 300 mm in depth has been placed on the site or not. As-built plans shall be provided show the extent of the fill and/or confirm areas where no fill has been applied. See Section 4 for further guidance.

5.4.3 Completion Documentation

Resource Consent holders that create residential lots are required to provide the following completion documents with their application for S224c:

- Engineered Fill Certificate confirming ground suitability for residential construction that references the earthworks as-built
- Post construction geotechnical completion report
- Complaint Earthworks testing records

5.5 APPENDIX 1 STATEMENT OF PROFESSIONAL OPINION ON THE SUITABILITY OF LAND FOR SUBDIVISION

ISSUED BY:

_____

(Geotechnical engineering firm or suitably qualified Geoprofessional)

TO:

SELWYN DISTRICT COUNCIL

(Territorial authority)

TO BE SUPPLIED

TO: _____

(Owner/Developer)

IN RESPECT OF:

_____

(Description of infrastructure/land development)

AT:

_____

(Address)

I _____ on behalf of

(Geoprofessional)

_____

(Geotechnical engineering firm)

hereby confirm:

1. I am a suitably qualified and experienced Geoprofessional employed by _____ and the geotechnical firm named above was retained by the owner/developer as the Geoprofessional on the above proposed development.

2. The geotechnical assessment report, dated _____ has been carried out in accordance with the Ministry of Business, Innovation and Employment Part D - Guidelines for the geotechnical investigation and assessment of subdivisions in the Canterbury region and the Christchurch City Council Infrastructure Design Standard – Part 4: Geotechnical Requirements, and Selwyn District Council's Engineering Code of Practice and includes:

   (i) Details of and the results of my/the site investigations.
   (ii) A liquefaction and lateral spread assessment. (iii) An assessment of rockfall and slippage, including hazards resulting from seismic activity.
   (iv) An assessment of the slope stability and ground bearing capacity confirming the location and appropriateness of building sites.
   (v) Recommendations proposing measures to avoid, remedy or mitigate any potential hazards on the land subject to the application, in accordance with the provisions of Section 106 of the Resource Management Act 1991.

3. In my professional opinion, not to be construed as a guarantee, I consider that Council is justified in granting consent incorporating the following conditions:

(i) _____

(ii) _____

4. This professional opinion is furnished to the territorial authority and the owner/developer for their purposes alone, on the express condition that it will not be relied upon by any other person

and does not remove the necessity for the normal inspection of foundation conditions at the time of erection of any building limited to those items referred to in clause 2 only.

5. This statement shall be read in conjunction with the geotechnical report referred to in clause 2 above, and shall not be copied or reproduced except in conjunction with the full geotechnical completion report.

6. Liability under this statement accrues to the geotechnical firm only and no liability shall accrue to the individual completing this statement.

7. The geotechnical engineering firm issuing this statement holds a current policy of professional indemnity insurance of no less than $_____

(Minimum amount of insurance shall be commensurate with the current amounts recommended by ENGINEERING NEW ZEALAND, ACENZ, NZTA, INGENIUM.)

_____Date:_____

(Signature of engineer, for and on behalf of: _____)

Qualifications, experience and professional memberships:

_____

_____

This form is to accompany Form 9 – Resource Management Act 1991 (Application for a Resource Consent.

(Subdivision)

5.6 APPENDIX II STATEMENT OF PROFESSIONAL OPINION ON THE SUITABILITY OF LAND FOR BUILDING CONSTRUCTION

ISSUED BY:

_____

(Geotechnical engineering firm or suitably qualified engineer)

TO:

_____

(Owner/Developer)

TO BE SUPPLIED TO:
SELWYN DISTRICT COUNCIL
(Territorial authority)
IN RESPECT OF:

_____

(Description of infrastructure/land development)

AT:

_____

_____

(Address)

I _____on

behalf of (Geoprofessional)

_____

(Geotechnical engineering firm)

hereby confirm:

1. I am a suitably qualified and experienced Geoprofessional and was retained by the owner/developer as the Geoprofessional on the above development.
2. The extent of my inspections during construction, and the results of all tests carried out are as described in my/the geotechnical completion report, dated _____
3. In my professional opinion, not to be construed as a guarantee, I consider that (delete as appropriate):
   - (a) the earthfills shown on the attached Plan No _____ have been placed in compliance with the requirements of the Selwyn District Council and my/the specification.
   - (b) the completed works give due regard to land slope and foundation stability considerations.
   - (c) the original ground not affected by filling is suitable for the erection thereon of buildings .designed according to NZS 3604 provided that:

(i) _____
(ii) _____

   - (d) the filled ground is suitable for the erection thereon of buildings designed according to NZS 3604 provided that:
     (i)_____
     (ii) _____

(e) The original ground not affected by filling and the filled ground are suitable for the construction of a development/subdivision and are not subject to erosion, subsidence or slippage provided that:
(i) _____
(ii) _____

NOTE: The sub-clauses in Clause 3 may be deleted or added to as appropriate.

4. This professional opinion is furnished to the territorial authority and the owner/developer for their purposes alone, on the express condition that it will not be relied upon by any other person and does not remove the necessity for the normal inspection of foundation conditions at the time of erection of any building.

5. This statement shall be read in conjunction with my/the geotechnical report referred to in Clause 2 above, and shall not be copied or reproduced except in conjunction with the full geotechnical completion report.
6. Liability under this statement accrues to the geotechnical firm only and no liability shall accrue to the individual completing this statement.
7. The geotechnical engineering firm issuing this statement holds a current policy of professional indemnity insurance of no less than $_____

(Minimum amount of insurance shall be commensurate with the current amounts recommended by ENGINEERING NEW ZEALAND, ACENZ, NZTA, INGENIUM.)

_____Date:_____
(Signature of engineer)

Qualifications and experience
_____

_____