CHAPTER 3 -
EARTHWORKS AND LAND STABILITY
3.1 EXTRACTS FROM THE DISTRICT PLAN

Refer Appendix 13 Subdivision and Development Standards – Earthworks & Land Stability

3.2 TECHNICAL RESPONSIBILITIES

Where any land development involves the carrying out of bulk earthworks, the assessment of slope stability or the detailed evaluation of the suitability of natural ground for the foundations of buildings, roads, services or other works then a Soils Engineer shall be appointed to carry out the following functions:

a) Prior to detailed planning of any development to undertake a site inspection and such investigations of subsurface conditions as may be required.

b) Before work commences, to review the drawings and specifications defining the earthworks proposed and submit a written report to the Engineer on Foundation and stability aspects and any proposed departure from this Code and associated standards.

c) Before work commences and during construction to determine the extent of further specialist soils engineering services required (including investigation and geological work).

d) Before and during construction to determine the methods and frequency of construction control tests to be carried out, determine the reliability of the testing and to evaluate the significance of test results and field inspection reports in assessing the quality of the finished work.

e) During construction to provide regular inspection (while a daily visit might be regarded as reasonable on earthwork construction on minor projects, inspection on a near full-time basis is often necessary).

f) On completion to submit a written report to the Engineer attesting to the compliance of the earthworks with these Standards and as to the suitability of the development for building construction.

For Subdivision or Developments, the Subdivider’s/Developer’s Representative may act as the Soils Engineer if he possesses suitable qualifications and experience.

The construction control testing shall be carried out by an organisation (preferably that of the Soils Engineer or under his control) with Telarc Registration in all relevant tests. (Minor testing using Scala Penetrometer or Pilcon Vane may be exempt from this requirement).

3.3 SITE INVESTIGATIONS

3.3.1 PRELIMINARY SITE EVALUATION

Prior to any detailed planning or design, the Soils Engineer, as applicable, should undertake a preliminary evaluation of the general nature and character of the site in sufficient detail to determine the likely requirements for earthworks and/or the need for further investigations into the suitability of foundation conditions, and the stability of the natural ground. The preliminary evaluations should be carried out in the context of the total surroundings of the site and should not be influenced by details of land tenure, political or other boundary conditions.
considerations. In simple cases a visual appraisal may be sufficient, but in other cases depending on the nature of the project, its locality the scale of development proposed and individual site characteristics, particular attention may need to be given to the following matters.

3.3.2 SLOPE STABILITY

Some natural slopes exist in a state of only marginal stability and relatively minor works such as trenching, excavation for roads or building platforms removal of scrub and vegetation or the erection of buildings can lead to instability and to failure.

Signs of instability include (but are not limited to) cracked or hummocked surfaces, crescent shaped depressions, crooked fences, trees or power poles leaning uphill or downhill, uneven road surfaces, swamps or wet ground in elevated positions, plants such as rushes growing on a slope and water seeping from the ground.

3.3.3 FOUNDATION STABILITY

A study of the general topography of the site and its surrounding areas may indicate areas which have previously been built-up as a result of natural ground movement or by the deliberate placing of fill material. Unless such fill has been placed and compacted under proper control, long term differential settlements could occur, causing damage to superimposed structures, roads, services or other development works.

3.3.4 SPECIALIST SERVICES

Where a Soils Engineer has been appointed then he shall submit to Council a written report setting out the particulars of any investigations carried out, including details of contours, natural features and modifications proposed thereto; and shall furnish to Council a statement of professional opinion as to the suitability of the land for its proposed use or subdivision with details of any special conditions that should be imposed. This statement is to be in the format given in Appendix 1.

3.4 STORMWATER CONTROL

Due to the increased rate of run-off brought about by the denuding of the ground of its natural growth in mass earthworks, particular care shall be taken to control stormwater and to ensure that it is permitted free entry to stormwater culverts at all times. The Developer shall be responsible for ensuring that adequate grids or similar approved traps are constructed and maintained during the construction period of the work, and until such time as the land has become stabilised to the satisfaction of the Engineer. Any of Council’s stormwater infrastructures blocked by silt shall be thoroughly cleaned by the Developer or at the Developer’s expense.

Developers are reminded of the erodibility of pumice soils and the necessity to protect the whole of the works from erosion by surface water for the duration of the work, including the maintenance period.

Developers are also reminded of the requirements of the Regional Councils with regard to excavation and the removal of ground cover. All necessary consents must be obtained prior to commencement of works.
3.5 CONSTRUCTION PROCEDURES

Before any earthworks are commenced, areas of cut and fill should be clearly defined. Where necessary, sufficient fencing or barriers should be provided around trees or other features to be protected. All site activities including clearing, storage, cutting and filling must be kept away from the root zone of the trees. This zone can be best defined as the extent of the canopy projected onto the ground.

Earthworks are to be carried out, as appropriate, in accordance with the:

a) Specification for Earthworks Construction (F/1) – Transit New Zealand.

b) NZS 4431 – 1989 “Code of Practice for Residential Development”.

3.6 EXEMPTION FROM TESTING REQUIREMENTS

Where the volume of the fill does not exceed 50 cubic metres and the depth does not exceed 450mm the requirements for testing will not be enforced.

3.7 EARTH FILLS RELATED TO GROUND WATER

For areas with high water tables the ground water table must be established. In the case of land adjacent to rivers and streams, the ground water tables must be established with reference to the average water level of the river or stream at maximum lake level. For areas in close proximity to lakes, the ground water table must be established with reference to the maximum desirable lake levels. Filling to not less than 1m above mean water table level as above will be required. Minimum floor levels of habitable buildings will be required to be fixed at 1.5m above mean water table level and recorded as a restriction on property titles and Council’s hazard/Caution Register. In reserve areas and other areas not required to support buildings or services, the Council may agree to lower standards than for the remainder of the earth fill. The extent of such low density fills shall be defined on the “As-Built” drawings and on the title, if appropriate.

3.8 PROTECTION OF PROPERTY FROM INUNDATION

In accordance with Section 106 of the Resource Management Act 91 and Section 36 of the Building Act 91, Council shall not grant Subdivision or Building Consents if land or buildings are subject to inundation, unless satisfactory means of avoidance, remedial works or investigation are carried out.

New Primary (normally piped) stormwater systems shall be capable of carrying surface water resulting from a storm having a 10% probability of occurring annually.

Secondary flow (normally surface flow) paths and systems capable of carrying surface water resulting from a storm having a 2% probability of occurring annually (50 yr return) shall be constructed to ensure that such surface water shall not enter buildings (refer also to clause 5.4.2. Protection from Flooding).

Low lying areas that are prone to inundation by a 50 year return period storm must be identified and restricted from building.

Building floor levels must be 300mm above the 50 year flood levels.