CETANZ
Civil Engineering Testing Association of New Zealand

Creating what matters for future generations

NZS4431 Standards Review - 2021

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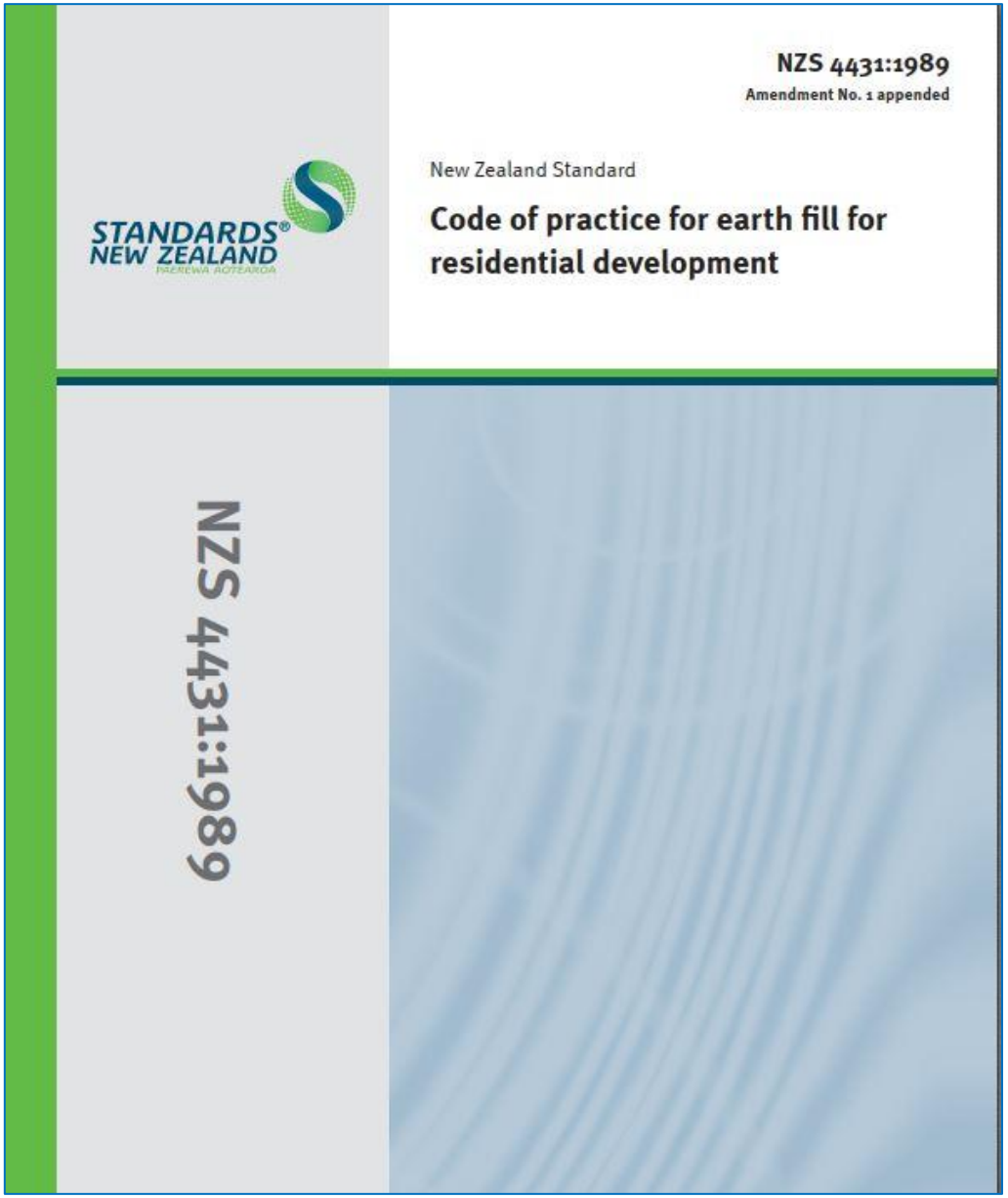
“Do unto those downstream as you would have those upstream do unto you”

Novelist Wendell Berry

NZS4431: 1989



NZS4431 - Review Committee Makeup

Name	Nominating Organisation
William Gray	CETANZ
Ross Roberts	Auckland Council
	Heritage New Zealand
	New Zealand Geotechnical Society (NZGS)
	Civil Contractors New Zealand
	Kāinga Ora
	University of Canterbury
	Building System Performance, MBIE
	Registered Master Builders Association
	University of Waikato
	Christchurch City Council
	GNS Science

NZS 4431:1989
Amendment No. 1 appended

New Zealand Standard

Code of practice for earth fill for residential development

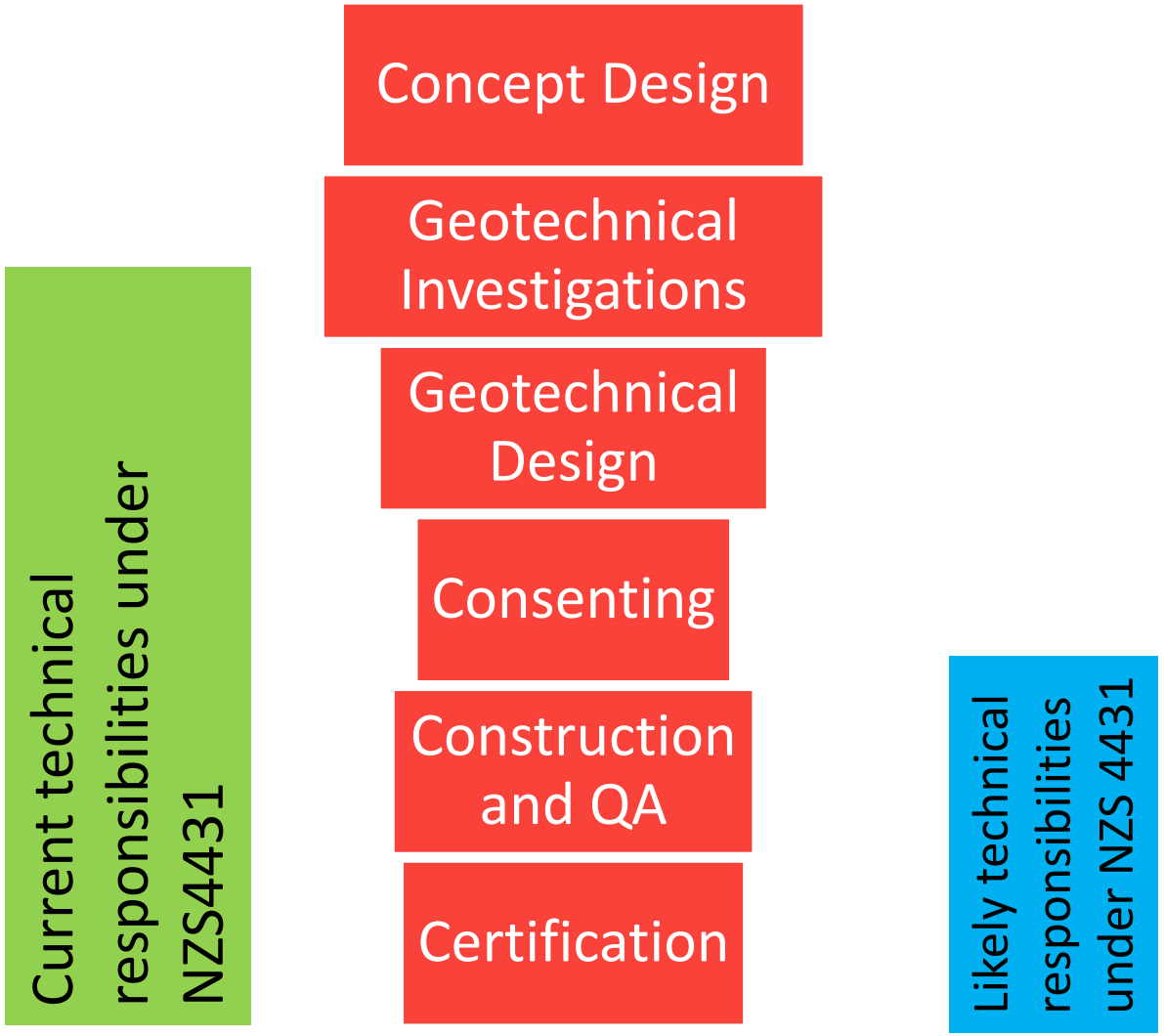
Guiding principles

- A **code of practice** - provides detailed practical guidance on how to comply with obligations (legal or contractual or technical)

- A **specification** - a standard of workmanship or materials required to be met in a piece of work

- A **standard** - a document, established by consensus and approved by a recognized body, which provides for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context.

Responsibilities under NZS4431:1989



Current Features of NZS4431:1989

Section 4 – Technical Responsibilities

- **Inspecting Engineer** – responsible for the geotechnical investigation and design (review and approval), inspection, quality assurance and reporting (certification) as to compliance with the Standard

- **Testing Agency** – approved by the Inspecting Engineer to carry out testing

- **Specialist Consultants** - appointed by the Inspecting Engineer

Likely Features of NZS4431

Section 1 - Definitions

- **Certifier** - The independent professional engineer or engineering geologist responsible for the certification of the completed earthworks in accordance with the design and consent conditions.
- **Contractor** - The organisation leading the physical construction of the earthworks.
- **Earthworks Specification** - The specification approved by the Geotechnical Designer providing details of the classification, testing and compaction requirements for the fill - New Zealand Earthworks Specification published by the NZGS

Likely Features of NZS4431

Section 1 - Definitions

- **Geotechnical Designer** - The authorised representative of the consultancy that is ultimately responsible for earthworks design and specification. The Geotechnical Designer shall be a geotechnical engineer and/or engineering geologist.....
- **Nominated Representative** - The independent and suitably qualified person delegated by the Certifier to represent them on the construction site.
- **Recognised Laboratory** - The independent, accredited engineering laboratory engaged to sample and test the earthworks in accordance with recognised New Zealand Standards.

Likely responsibilities under NZS4431

Likely technical responsibilities under NZS 4431

Current Features of NZS4431:1989

Section 7 – Soil Types

- **Cohesive**
- **Cohesionless**

SOIL means the heterogeneous aggregation of particles comprising either peats, clays, silts, sands, gravels, crushed and re-oriented rock fragments, or a mixture of any of the above. The term excludes rock, that is, intact rock masses, whether highly jointed or not.

COHESIONLESS SOIL means a soil where the attractive forces between soil particles are derived almost entirely from interlocking forces between soil grains. It is generally found that where 85 % or more by weight of the soil has a grain size in excess of 75 µm, the material can be regarded as being cohesionless. Such soils have no plasticity or cohesion and generally (but not always) do not have a well-defined optimum water content when tested in accordance with 11.8.1.

Likely features under NZS4431

Section 3 – Engineered Fill materials

Engineered Fill materials shall be classified by all of the following:

- **Source Material Type**
- **Material Condition**
- **Fill Material Type**
- **Fill Material Use**

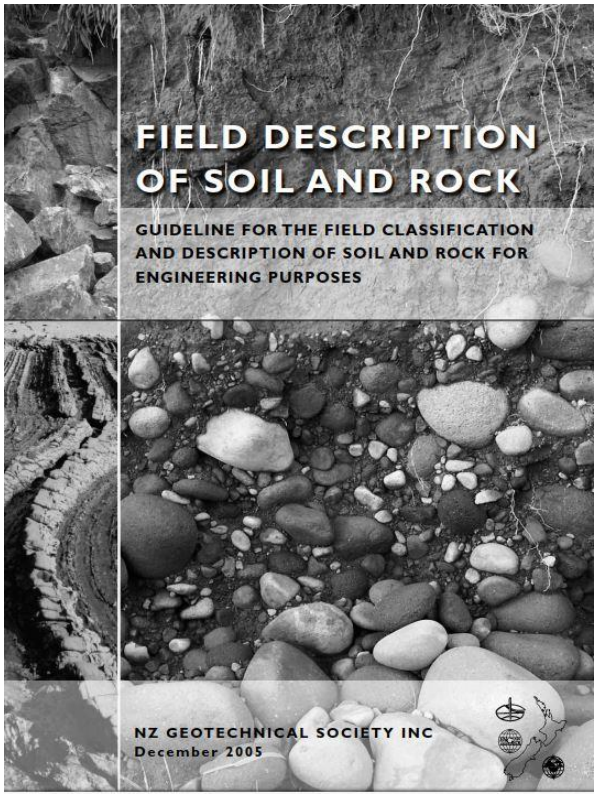
Likely features under NZS4431

Section 3 – Engineered Fill materials

Source materials (including site-won and imported materials) shall be classified into the following primary categories to reflect their geological and physical characteristics. ·

- Material Type T (Topsoil)
- Material Type S (Fine grained soil)
- Material Type A (Coarse grained soil or aggregate)
- Material Type R (Rock)
- Material Type M (Manufactured)

NZGS Field Description of Soil and Rock (2005)



2.2 SOIL GROUPS

The framework for the classification and description of soil is provided in the following sections. For engineering purposes soil is grouped as shown in Table 2.1:

Table 2.1 Soil Groups

COARSE SOILS (granular soils or non-cohesive soils)		FINE SOILS (cohesive soils)		OTHER SOIL
Gravel	Sand	Silt	Clay	Organic Soils

The following notes give a brief outline of the engineering meaning attached to the above terms, and the basis on which they are identified or differentiated between.

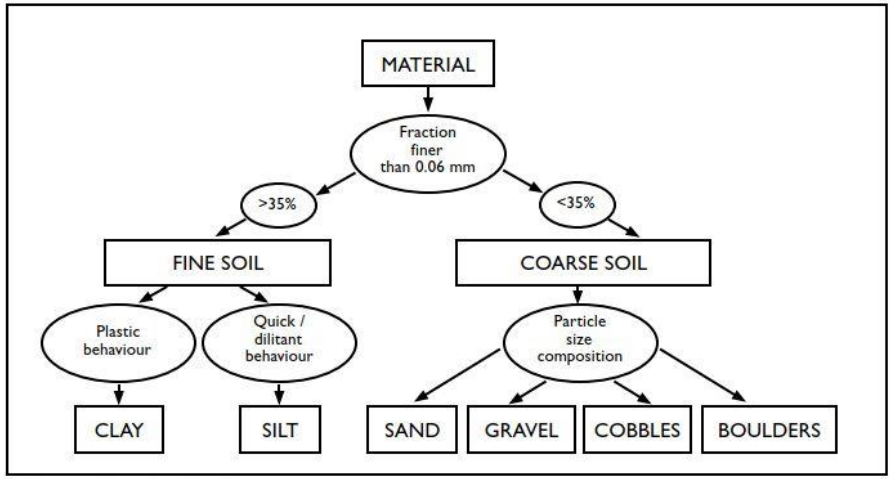


Figure 2.1 Soil Classification

Likely features under NZS4431

Section 3 – Engineered Fill materials

The condition of each proposed fill material shall be assessed to identify limitations on use, or conditioning required before placement. The condition shall be assigned when the material is excavated, and shall be modified if the condition has changed whether this change be through planned treatment or the result of natural changes.

- A (Acceptable) -W (Wet) -D (Dry) -U1 (Physically unsuitable) -U2 (Chemically unsuitable) -X (Restricted)

Likely features under NZS4431

Section 3 – Engineered Fill materials

- **Fill Material Type**
- **Fill Material Use**

Related to the site specific geotechnical design.

Likely features under NZS4431

- **Safety in design** - The design of Engineered Fill shall ensure that the works can be implemented in a manner that clearly identifies, understands, mitigates and where reasonably practicable removes safety hazards during construction (including the provision of temporary works), and in future during the operation, maintenance and deconstruction of the fill.
- **Sustainability in design** - The design of Engineered Fill shall ensure that the works can be implemented in a manner that ensures that materials can be sourced and used sustainably, and where possible waste materials are reused.

Likely appearance of new NZS4431

- Use the layout features similar to NZS3604

2.4 Conditions of consent

Where required by Regional or District Plans or the Building Consent Authority, consents shall be in place for the works and preparations for the earthworks fill construction shall meet the published consent conditions at all times.

Where a consent is not required, a check shall be made of whether site cultural heritage, archaeological or environmental aspects still require specific attention.

It is an offence under S87 of the Heritage New Zealand Pouhere Taonga Act 2014 to modify or destroy an archaeological site, recorded or unrecorded, without an authority from Heritage New Zealand Pouhere Taonga irrespective of whether the works are permitted or consent has been issued under the Resource Management Act.

An archaeological site is defined in the Heritage New Zealand Pouhere Taonga Act 2014 (HNZPT Act) as any place in New Zealand (including buildings, structures or shipwrecks) that was associated with pre-1900 human activity, where there is evidence relating to the history of New Zealand that can be investigated using archaeological methods.

https://www.ice.org.uk/eventarchive/europe%E2%80%99s-first-earthworks-standard-london

Thank you

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