



## 0222 Earthworks

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# 00 Design principles

## 0.01 Main considerations

It is a requirement to undertake the [00 PLANNING AND DESIGN/0001R - DESIGN REFERENCE](#) and [GLOSSARY OF TERMS](#) information into all aspects of design, detailing and delivery when developing the content here within. Clear demonstration of adherence to these requirements is part of the services and will be called upon at key points in the project and during at the discretion of the Department of Education (DoE).

## 0.02 Earthworks

Policy is to minimise site disturbance and to balance cut and fill operations where practicable, i.e. to develop each site as economically as possible.

Site specific factors needed to be considered when determining the extent of earthworks possible to achieve a genuinely economical solution include:

- Existing vegetation
- Site and surrounding topography
- Soils
- Drainage
- Levels

As well as functional factors such as:

- Site availability
- Access between facilities
- Maintenance

Site soil engineering qualities must be established when balancing cut and fill. Frequently some of the site soil is not suitable for foundation purposes.

## 0.03 Landscape Level Changes

Refer to [DESIGN FRAMEWORK/SCHOOL SITE SELECTION AND DEVELOPMENT](#)

- 1:4 or 25 % (max) grade for grassed areas,
- 1:3 or 33 % (max) grade for unreinforced mass planted areas

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Whilst 1:4 is a more realistic standard than past practices, several factors need to be considered including:

- Soil stability: Most soils are stable at a gradient of 1:4 while some soils are stable at considerably steeper grades.
- Useable space availability.
- Limiting factor is appropriate maintenance for a particular site.

Gang mowers are generally capable of mowing 1:5 or 20% slopes but become unstable on slopes steeper than 1:4;

Motor mowers are satisfactory on slopes up to 1:4.

Specialist mowing equipment such as strimmers and “Fly-Mos” can be used to maintain very steep grassed banks.

Specialist mowing equipment, may be a better long-term solution than mass planted areas, however it should be noted that General Assistants have very limited time for landscape maintenance.

Mass planting of slopes steeper than 1:4 or 25% is a viable surface finish if planting is maintained and the bank does not interrupt pedestrian desire lines: non-maintained planted banks deteriorate, become unsightly and suffer erosion.

Reinforcing banks with synthetic or wire mesh is not recommended because of inherent danger to pupils if/as the bank deteriorates.

Use retaining walls or steps for at least part of the level change where banks must be steeper than 1:3 and grass maintenance with specialist equipment is not viable. This will also maximise useable space.

## 0.04 Pedestrian Access

Refer to [DESIGN FRAMEWORK/SCHOOL SITE SELECTION AND DEVELOPMENT](#)

- Necessary level changes where possible, should be turned to advantage on a school site, especially in association with site facilities.
- Seating steps overlooking Playing Fields, PE courts or Assembly Areas (particularly on the north or south side) can facilitate spectator viewing and supervision.

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Refer to [00 PLANNING AND DESIGN/0001C DESIGN CHECKLIST - LANDSCAPE AND OPEN SPACE](#)

- Grass banks overlooking Playing Fields, PE courts or Assembly Areas can provide informal spectator seating.
- Allow easy pedestrian access along logical desire lines to playing fields, where extensive banks occur, by modifying grading in parts, to reduce deterioration to the bank surface.

## 0.05 Management of Turf Wear

Turfed areas will not stand up to a regular concentration of pedestrian traffic. Where possible, distribute traffic, particularly between the Canteen/COLA and Games Court, through a hard-surfaced flow out area such as the Assembly Area.

Areas subject to concentrated use will occasionally need time to recover. Where possible, place turf areas relative to hard paving, so some areas may be roped off as necessary on a rotation basis.

## Specification

### 01 General

As per current NATSPEC except as follows:

### 1.8 Geotechnical and Environmental Site Investigation

GUIDE NOTE: Add the following subclause “Report” to the NATSPEC, Building Professional Template/Worksection.

#### Report

A site investigation was made and a copy of the entire report is included in the Appendix for reference.

Accuracy: The accuracy of the information is not guaranteed and will not be a basis for variation to the contract amount.

GUIDE NOTE: A geotechnical investigation report must be included in the specification

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## 02 Product

As per current NATSPEC.

## 03 Execution

As per current NATSPEC except as follows:

### 3.2 Geotechnical

GUIDE NOTE: Delete the subclause “As Found Site Conditions” nominated in the NATSPEC Building Template/Worksection and replace with the following:

#### **As found site conditions**

General: If the following are encountered, where not identified by the geotechnical report for the site or the documentation, give notice immediately and obtain instructions before carrying out any further work in the affected area:

- Bad ground
- Discrepancies
- Rock
- Springs, seepages
- Topsoil > 100mm deep

### 3.4 Removal of Topsoil

GUIDE NOTE: Delete subclause “Topsoil Stockpiles” nominated in NATSPEC, Building Template/Worksection and include the following:

#### **Topsoil stockpiles**

Stockpile site topsoil approved for re-use, and imported topsoil before placing as specified in [02 SITE URBAN AND OPEN SPACES/0251 LANDSCAPE – SOILS](#). Establish stockpiles in directed locations, to heights not exceeding 1.5m. Provide drainage, erosion protection and aeration. Do not remove plant growth occurring during storage unless approved. Do not allow traffic on stockpiles. If to remain for more than four weeks, sow with approved temporary grass

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### 3.14 Placing Fill

GUIDE NOTE: Include the following subclause:

#### **General**

Loose fill: Maximum loose layer thickness of 150mm.

### 3.17 Compaction Requirements for Fill and Subgrade

GUIDE NOTE: Consult structural / civil engineer for the % moisture content requirements.

Include the following subclauses:

#### **Moisture content**

Consult structural/civil engineer for the % moisture content requirements.

#### **Settlement of earthworks**

Fill, compact and trim all settlements of earthworks which take place during construction. Dig out soft spots or unsound areas and fill with sound material properly compacted to a condition equivalent to the surrounding material.

## 04 Selections

As per current NATSPEC.