



# FNQROC DEVELOPMENT MANUAL

## SPECIFICATION

S1

## EARTHWORKS

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## GENERAL

### S1.01 SCOPE

1. This specification details all requirements pertaining to earthworks operations associated with construction sites. This specification excludes earthworks associated with roadworks construction.
2. Where there is any conflict determined between the requirements specified herein and the requirements of any referenced Australian Standard, Statutory Authority Standards or otherwise, the requirements specified herein shall apply.

### S1.02 REFERENCE DOCUMENTS

**Note: Where Acts or reference documents are updated, reference should be made to the current version.**

#### Australian Standards

- AS 3798 Guideline on Earthworks for Commercial and Residential Developments.
- AS 4373 Pruning of Amenity Trees
- AS 4970 Protection of Trees on Development Sites

#### International Erosion Control Association

- Best Practice Erosion and Sediment Control (BPESC)

All documents referenced in this specification shall be the current edition

**MATERIALS**

**S1.03 TOPSOIL**

1. Topsoil is defined as surface soils normally high in organic matter and contaminated by residual grass seed and grass roots. Topsoil shall be free from large roots, stones, rocks and unsuitable material as defined below.

**S1.04 UNSUITABLE MATERIAL**

1. Reference is made to AS 3798 Section 4.2 "Unsuitable Materials" for definitions and guidelines regarding unsuitable materials with regard to earthworks operations.

**S1.05 SUITABLE MATERIAL**

1. Reference is made to AS 3798 Section 4.3 "Suitable Materials" for the definition and guidelines regarding acceptable materials for earthworks operations.

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## CONSTRUCTION

### S1.06 GENERAL

1. Specific reference is made to AS 3798 in relation all activities pertaining to earthworks operations. Specific construction details are noted in Section 6 of AS 3798 and all appropriate methods of testing, frequency of testing and reporting procedures are to be in accordance with this Australian Standard.
2. Specific reference is made to AS4970 in relation to earthworks near trees selected for retention, i.e. no removal of topsoils should take place within the Tree Protection Zone as this destroys the Michorrizal root zone the tree needs for nutrient uptake.
3. Specific reference is made to AS4373 in relation to pruning work to be performed on any trees selected for retention.

### S1.07 PROTECTION OF EARTHWORKS

1. The Contractor's responsibility for care of the works shall include the protection of earthworks in accordance with the approved Erosion and Sediment Control Strategy.
2. The Contractor shall install effective erosion and sedimentation control measures, prior to commencing earthworks, and shall maintain these control measures as required.
3. Adequate drainage of all working areas shall be maintained throughout the period of construction to ensure run-off of water without ponding, except where ponding forms part of a planned erosion and sedimentation control system.
4. When rain is likely or when work is not proposed to continue in a working area on the following day, precautions shall be taken to minimise ingress of any excess water into earthworks material. Ripped material remaining in cuttings and material placed on embankments shall be sealed off by adequate compaction to provide a smooth tight surface.
5. Should insitu or stockpiled material become over wet as a result of the Contractor not providing adequate protection of earthworks, the Contractor shall be responsible for replacing and/or drying out the material and for any consequent delays to the operations.

### S1.08 CLEARING AND GRUBBING

1. Clearing and grubbing operations shall be in accordance with AS 3798 Section 6.1.4.
2. The extent of clearing and grubbing shall be taken to mean the removal and disposal of:
  - a. Trees, Shrubs and overhanging branches, both living and dead;
  - b. Tree stumps and roots to a depth not less than 300mm below ground surface;
  - c. Rocks, rubbish and other artificial obstructions from the ground surface;
  - d. Abandoned services to a depth not less than 300mm below ground surface;
  - e. Old foundations, buildings and structures;
  - f. Minor made structures (such as fences);
  - g. Other materials, which are unsuitable for use in the works.

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3. Un-grubbed rocks under embankments may be left undisturbed providing there is a depth of at least 600mm of earth covering over them when the filling operations are completed.
4. Unless otherwise specified or directed, the area to be cleared is the minimum width required to construct the works plus a margin of 2m beyond tops of cuts and toes of embankments.
5. Any trees, shrubs and overhanging branches identified on the Project Drawings to be retained or protected shall be clearly marked by the contractor prior to commencing clearing operations.
6. Beyond the areas to be cleared only those trees, shrubs and over hanging branches which directly interfere with the construction of the works shall be removed or pruned as necessary.
7. Any trees, shrubs and overhanging branches identified in the project drawings to be retained or protected must be clearly fenced off as per AS4970 prior to the commencement of any clearing and grubbing. Any clearing and other works within the Tree Protection Zones must only be done under direction of the project Arborist or suitably qualified Council officer.

### **S1.09 TOPSOIL OPERATIONS**

1. Stripping of topsoil shall be in accordance with AS 3798 Section 6.1.5.
2. For trees selected for retention and protection, no stripping of topsoil is to be done within the Tree Protection Zone as per AS4970, unless under the direction or advice of the project Arborist or suitably qualified Council officer.
3. Removal of topsoil shall only commence after erosion and sedimentation controls have been implemented and when clearing, grubbing and disposal of materials have been completed on that section of the Works.
4. Topsoil throughout the extent of the work shall be removed and stockpiled separately clear of the work with care taken to avoid contamination by other materials.
5. Topsoil material stripped from the site shall be stockpiled for later use in spreading on footpaths, allotments and parkland areas.
6. Topsoil stockpiles shall not contain any timber or other rubbish and shall be trimmed to a regular shape.
7. To minimise erosion, stockpiles are to be protected by effective usage of erosion and sediment control devices, which are to be defined within the Erosion and Sediment Control Management Plan.
8. Where seeding of stockpiles to encourage vegetation cover is specified, such work shall be carried out in accordance with the Specification S8 LANDSCAPING.
9. Nominally 75mm depth of topsoil is to be re-spread over such areas with an absolute minimum of 40mm material to be provided in any one location.

### **S1.10 GENERAL EARTHWORKS**

1. Placement and Compaction of earthworks shall be in accordance with AS 3798 Sections 5 and 6.
2. The methods of testing and frequency of testing shall be in accordance with AS 3798 Sections 7 and 8.
3. Unless a higher level of testing is specified or directed the minimum level of geotechnical testing services to be accorded earthworks activities shall be as determined by Level 2 in Appendix B of AS 3798.
4. All testing is to be carried out by a NATA registered laboratory with appropriate accreditation and suitably qualified personnel



**S1.11 EXCAVATIONS**

1. Materials encountered in excavation shall be loosened and broken down as required so that they are acceptable for incorporation in the works.
2. All excavations shall be constructed to the shape and slopes shown on the approved Project Documents.
3. Batter shall be trimmed neatly to the shapes specified and shall be free of loose or unstable material.
4. Horizontal tolerances for the excavation of batters, measured at right angles to the batter line, shall be – 50mm +250mm (where the + tolerance is in the direction which increases the width of excavation).
5. Vertical tolerances for all excavation shall be  $\pm 50$ mm.
6. When completed all culvert excavations, benches, berms and drains shall be free draining.
7. At all times the requirements of the Workplace Health and Safety Act shall be complied with and all works shall be made safe during the performance of such activities.
8. No excavations may take place within the Tree Protection Zone of trees selected for retention and protection unless under the direction or approval of the project Arborist or suitably qualified Council officer.

**S1.12 EMBANKMENTS / FILL AREAS**

1. All embankments and fill areas shall be constructed to the shape and slopes shown on the approved Project Documents.
2. When completed, the average planes of the batters of embankments shall conform to those shown on the approved Project Documents.
3. Horizontal tolerances for the embankment batters, measured at right angles to the batter line, shall be – 0mm +250mm (where the + tolerance is in the direction which increases the width of embankment).
4. Vertical tolerances for all embankments / fill areas, shall be  $\pm 50$ mm except where such fill defines the subgrade level for a structure, then the vertical tolerances are to be +15mm – 30mm.
5. When completed all embankments / fill areas shall be free draining.
6. At all times the requirements of the Workplace Health and Safety Act shall be complied with and all works shall be made safe during the performance of such activities.

**S1.13 TRENCHING OPERATIONS**

1. The excavation for trenches shall be taken out to the exact alignment, width and level as shown on the Project Drawings and associated specifications.
2. Trenches shall not be excavated wider than the dimensions shown on these relevant drawings and the Contractor shall take all precautions as necessary to ensure that the excavation is made in a careful manner and that it is rendered secure and safe by all appropriate means.

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3. At all times the requirements of the Workplace Health and Safety Act shall be complied with and all works shall be made safe during the performance of such activities.
4. Suitable drainage shall be accorded to all trenching activities and de-watering of trenches shall be undertaken should infiltration of water occur. All materials excavated from trenches shall be separated by material type for later inclusion into the works or disposal from the site should these materials be deemed unsuitable in accordance with the requirements of AS 3798.
5. Excavation and trenching operations shall proceed with sufficient resources to ensure uninterrupted progress and continuance of the works with subsequent services. Completion and backfilling are to be undertaken as soon as possible so as to minimise the extent of site open to the effects of the environment.
6. No trenching operations may be performed within the Tree Protection Zone of trees selected for retention and protection unless under the direction or approval of the project Arborist or suitably qualified Council officer.
7. Where alignment of conduits or pipes cannot avoid the Tree Protection Zone (TPZ) of a tree selected for retention and protection, alternative methods of installation may be considered in consultation with Council and under direction of the project Arborist, i.e. boring under the tree, hand digging through the TPZ to create space under or between roots, or Hydro-excavation using a high volume water jet only, to avoid damage to the park roots. Any excavation past the TPZ requires refilling with good quality topsoil and watered in to remove any voids formed as a result of the excavation.