



AUS-SPEC

Infrastructure Specifications

1102 Control of erosion and sedimentation (Construction)

1102 CONTROL OF EROSION AND SEDIMENTATION (CONSTRUCTION)

IMPORTANT: This document has been adapted from the NATSPEC suite of specification templates for use in the Cessnock City Council area by both Council and industry. NATSPEC regularly updates the base templates (currently in April and October each year), and Council may incorporate changes into its version of AUS-SPEC from time to time. To assist in highlighting any changes made by Council to the NATSPEC templates, the following conventions are used.

- See ANNEXURE M at the end of this document which contains (where practical) Cessnock City Council customisations (also known as ‘office master’ text). References to the Annexure are to also be inserted at relevant clauses in the main body of the document.
- Where content is added to the main body of the document, it is to be shown **in brown text like this**.
- Where content is deleted or excluded from the main body of the document, it is to be shown ~~struck through like this~~. Such clauses are to have no effect.

Where there is a conflict between main body text and Cessnock City Council specific clauses, Council’s specific clauses shall prevail.

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide temporary and permanent measures to control erosion and sedimentation to the requirements of **Erosion and sedimentation control plan (ESCP)** in *0022 Control of erosion and sedimentation (Design)* and, as documented.

ESCP prepared by the contractor

Implementation: To control plans documented in **PRE-CONSTRUCTION PLANNING**.

Erosion and sedimentation control measures by principal/consultant

Implementation: To control measures documented in **EXECUTION**.

1.2 CROSS REFERENCES

General

Requirement: This worksection is not a self-contained specification. In addition to the requirements of this worksection, conform to the following:

- *0136 General requirements (Construction)*.
- *0022 Control of erosion and sedimentation (Design)*.
- *0152 Schedule of rates (Construction)*.
- *0161 Quality management (Construction)*.
- *0173 Environmental management (AUS-SPEC)*.
- *0257 Landscape - road reserve and street trees*.
- *1101 Traffic management*.
- *1111 Clearing and grubbing*.
- *1112 Earthworks (Road reserve)*.
- *1121 Open drains*.

General

Standards: To IECA Principles (2012), IECA Book 5 (2017) and IECA Book 6 (2010).

Turf installation: To AS 5181 (2017).

- **Documents: Managing Urban Stormwater: Soils and Construction (The Blue Book), LANDCOM, 2004**

1.3 INTERPRETATION

Abbreviations

General: For the purposes of this worksection the following abbreviations apply:

- ARI: Average Recurrence Interval.

- DA: Development consent or development application issued under Part 4 of the Environmental Planning and Assessment Act. Usually required for private developments.
- ESCP: Erosion and sediment control plan.
- NTU: Nephelometric Turbidity Units.
- REF: Review of Environmental Factors issued under Part 5 of the Environmental Planning and Assessment Act, usually in relation to infrastructure works by or on behalf of a statutory authority (e.g. Council).

Definitions

General: For the purposes of this worksection the following definitions apply:

- Erosion: The wearing away of land by the action of rainfall, running water, wind, moving ice or gravitational creep. Soil detachment (erosion) occurs when the erosive forces exceed the soil's resistance, causing the soil particles to move.
- NTU: A measure of water turbidity or the optical clarity of a liquid.
- Sediment: Sediment is the result of erosion, and consists of small detached soil particles. Sedimentation occurs when the transportation of detached soil particles ceases or slows and the soil particles then settle or fall out of suspension.
- Site sections: The site divided into sections based on the catchment area draining to each permanent drainage structure in the works, including the following:
 - . Access and haulage tracks.
 - . Borrow pits and stockpile areas.
 - . Compound areas, including Contractor's facilities and concrete batching areas.
- Waterway works licence: This licence is required for:
 - . Construction, alteration, operation, removal or decommissioning of any works on a waterway or groundwater bore.
 - . Works to deviate a waterway or private dam, and covers all domestic and stock dams that are built on waterways. This approval is not required for farm dams that are not on a waterway.
- Waterway: Include the bed and banks of the following:
 - . A river, creek, stream or other natural channel in which water flows (continuously or intermittently);
 - . The stormwater system;
 - . A lake, pond, lagoon or marsh in which water collects (continuously or intermittently).

1.4 SUBMISSIONS

ESCP prepared by the contractor

Designer: A suitably qualified and experienced Professional engineer as defined in the 0136 General requirements (Construction) worksection.

Authority requirements: as per applicable DA consent conditions or REF recommendations, and approved management plans.

Design documentation submission: Submit the following documents to the Superintendent and the Principal Certifier (e.g. Council) for review and concurrence, if control plans are prepared or revised by the contractor:

- Erosion and Soil Sedimentation control plan (ESCP).
- Survey of embankments.
- ~~Waterway Works Licence~~ Controlled Activity Approval from Water NSW (in relation to certain controlled waterway works), if required.

Calculations: Submit calculations and references supporting the design and maintenance requirements.

Execution details

Section plans: Before disturbing the natural surface of a particular site section, submit an ESCP only for that site section consistent with the previously approved ESCP.

Personnel: Submit staff names and contact details for installation, monitoring, upkeep and removal.

Working in a waterways and floodplains: Submit a reinstatement plan if work in a stream is planned or the structure of a waterway will be altered including a copy of a ~~Waterway Works Licence~~ Controlled Activity Approval.

Drop inlet sediment control: Submit details of proposed alternative methods.

Reports

Work method statement: Submit detailed Environmental Work Method Statements.

1.5 INSPECTIONS

Notice

General: Give notice so that inspection may be made of the following:

- General: Initial installation of sediment controls.
- Stockpile sites: Stockpiles are protected by approved erosion and contamination measures in the ESCP.
- Access and exit areas: Decontamination of vehicles.
- Areas not approved for clearing: Fencing and protection of areas.
- Diversion and catch drains: Construction and lining.
- Temporary sediment control: Temporary sediment traps and batter protection.
- Removal: Removal of temporary erosion and sedimentation works.
- Cleaning: Completion of cleaning.

2 PRE-CONSTRUCTION PLANNING

2.1 ESCP PREPARED BY THE CONTRACTOR

General

Requirement: To 0022 *Control of erosion and sedimentation (Design)* worksection and any applicable DA consent conditions or REF recommendations.

Schedules

Content requirement: Conform to the following:

- Work schedules for multiple contractors co-ordinated to avoid delays so that disturbed land does not remain unstabilised.
- Schedules for the construction of structures and the implementation of measures to control erosion and sedimentation programmed where possible to avoid seasonal intense rain storms.
- A work sequence with construction and stabilisation of culverts and surface drainage works at the earliest practical stage.

3 EXECUTION

3.1 SITE CONTROL AND PROTECTION

Dewatering

Requirement: Make sure that dewatering operations do not result in turbid water entering natural waterways and conform to the following:

- DA consent conditions or REF recommendations, and the Controlled Activity Approval conditions from Water NSW, a copy of which shall be provided to the Superintendent and Council's Development Engineer prior to commencement. This is a HOLD POINT.
- Treat contaminated water if turbidity exceeds 30 NTU.
- Only pump water into natural waterways if it is under safe limits to the regulatory water quality standards.
- Pump water to vegetated areas of sufficient width to remove suspended soil, or to sediment control structures.
- If discharge is to a natural waterway or a drainage system discharging to a natural waterway, monitor turbidity hourly.

Dust control

Requirement: Install measures for minimising health risk or loss of amenity due to emission of dust to the environment. and incorporate the following, if required:

- Suppression of dust by watering.
- Installation of wind fences.

Management of stockpiles and batters

Requirement: Manage soil stockpiles to minimise dust and sediment in run-off and conform to the following:

- Minimise the number and area of stockpiles and the time stockpiles are exposed.
- Keep topsoil and underburden stockpiles separate.
- Construct other protective measures including upstream diversion works and downstream sediment trapping devices.
- Height: < 2.5 m.
- Stockpiles and batters slopes: No steeper than 2H:1V.
- Stockpiles and batters bare for more than 28 days: Stabilise by covering with mulch, anchored fabrics or seeding with sterile grass.
- Install sediment controls around unstabilised stockpiles and batters.
- Suppress dust on stockpiles and batters, as required.
- Stockpile protection: Install the following at the end of each working day:
 - . Sandbags: Placed on downslope of stockpile to prevent movement:
 - . Waterproof cover: Placed over stockpile material.
 - . Sandbags, filter bags or fibre sausages: Locate to divert upslope flow of stormwater into grassed areas of the site and away from stockpiled material.
- Exclude timber and rubbish from stockpiles.

Access and exit areas

Decontamination measure: Decontaminate vehicles entering/exiting the site using shake-down or other approved methods.

Working in waterways and floodplains

Requirement: Minimise stress on aquatic communities and do not increase sediment load when working in waterways. Conform to the following:

- **DA consent conditions or REF recommendations, and the Controlled Activity Approval conditions from Water NSW, a copy of which shall be provided to the Superintendent and Council's Development Engineer prior to commencement. This is a HOLD POINT.**
- Plan in-stream works to minimise contact time.
- Establish special practices to minimise impacts on the waterway and disturbance of the banks.
- Stabilise the banks and the in-stream structures.
- Maintain minimum flows to make sure the viability of aquatic communities and do not limit the passage of fish up and downstream.
- Construct in-stream crossing during low flows, that are stable under expected vehicle loads and flow regimes.

3.2 EROSION AND SEDIMENTATION CONTROL MEASURES

General

Initial installation of sediment control: Prepare and present the works for inspection.

Control measures

Land clearance: Minimise in areas with highly erodible soils and steep slopes liable to water and wind erosion.

Runoff: Decontaminate in conformance with safe limits of regulatory waterway standards before dispersing. Disperse clean runoff to stable areas or natural watercourses

Drainage lines: Provide drainage to convey water through the works to minimise erosion generation. Identify drainage lines and install measures to control predicted stormwater and sediment loads generated in the mini catchment.

Limiting areas or erodible material exposed at any time: Limit to areas being actively worked.

Protection of areas not approved for clearing or disturbance: Clearly mark and fence off.

Clearing and grubbing: To *1111 Clearing and grubbing*.

Control measures: Install and maintain for the duration of the contract, control measures including the following:

- Permanent drainage structures: Install before the removal of topsoil and commencement of earthworks within the catchment area of each structure.
- Permanent and temporary drainage works: Complete promptly to minimise exposure period of disturbed areas.
- Diversion and catch drains: Construct to prevent uncontaminated runoff from passing through the site and mixing with contaminated water. Construct and line catch drains before the adjacent ground is disturbed and before excavation. **This is a WITNESS POINT.**
- Contour and diversion drains: Install across exposed areas before, during and immediately after the clearing. Re-establish and maintain these drains during soil removal and earthworks operations.
- Cut off or intercept drains: Establish cut-off or intercept drains to redirect stormwater away from cleared areas, and sloping to stable (vegetated) areas or effective treatment installations.
- Sediment filtering or sediment traps: Install before and in conjunction with earthworks operations, to prevent contaminated water leaving the site.
- Berms: Construct along the edge of the formation leading to temporary batter flumes and short-term sediment traps, to minimise loss of sediment during construction of embankments during fill placement.
- Progressive revegetation of site: To *0257 Landscape - road reserve and street trees* as each site section is complete.

Maintenance

Maintenance of controls: Make sure each disturbed area has adequate means of containment of contaminated water. Restore and replace control measures as required.

Access areas: Provide and maintain access from within the road reserve, or from other acceptable locations, for cleaning out sedimentation control works.

Monitoring site performance

General: Maintain slopes, crowns and drains on all excavations and embankments, and make sure there is satisfactory drainage at all times. Do not allow water to pond on the works, unless ponding is part of an approved ESCP.

Ripped material remaining in cuttings and material placed on embankments: Seal off by adequate compaction to a smooth, tight finish.

Inspection: Inspect all erosion and sedimentation control measure as follows:

- At least daily when rain is occurring on site.
- At least weekly (even if work is not occurring on site).
- Within 24 hours prior to expected rainfall.
- Within 18 hours of a rainfall event of sufficient intensity and duration to cause on site runoff.

Rectification: Immediately rectify any defects revealed during inspection and revise ESCP, if required.

3.3 TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES

General

Requirement: Install temporary erosion and sedimentation control measures to areas where the natural surface is disturbed by construction, including roads, depot and stockpile sites.

Temporary drainage control

Temporary drains: Control runoff from exposed areas with temporary contour drains and/or temporary diversion drains. Progressively implement and, if required, alter as the work progresses.

Contour drains: Construct across the natural slope at approximately the same elevation as follows:

- Timing: Immediately after site is cleared, intercept and divert runoff from the site to nearby stable areas at non-erosive velocities.
- Form: Channel with a ridge on the lower side.
- Grade: 1% to 1.5%.
- Spacing intervals: 20 m to 50 m, depending on the erodibility of the exposed soil, as documented.

Diversion drains: Construct diversion drains across haul roads and access tracks when there is an erosion risk, due to steepness, soil erodibility or potential for concentrating runoff flow, as follows:

- Form: Channel with a ridge on the lower side to intercept and divert runoff from the road or track to stable outlets.
- Spacing: Not greater than that required to maintain runoff at non-erosive velocities.

Temporary sediment control

Temporary sediment traps: Construct devices to remove sediment from sediment-laden runoff flowing from areas of 0.5 ha or more before the runoff enters the stormwater drainage systems, natural watercourses or adjacent land.

Waste barriers: Construct and maintain to prevent debris from entering natural watercourses.

Batter protection: Minimise scour of newly-formed fill batters during and after embankment construction by diverting runoff from the formation away from the batter until vegetation is established.

Drop inlet sediment control

General: Construct drop inlet sediment traps and inlet control banks on completion of gully pits, as documented.

Functional requirement: Construct the inlet control banks, as required, to prevent the surface flows bypassing gully pits. Make sure the sediment traps remove sediment from the surface flow before it enters the drainage system.

Sediment traps and control banks: Conform to the following:

- Construct the drop inlet sediment traps and associated inlet control banks consisting of at least two courses of sandbags, containing a 10:1 sand/cement mix, as documented.
- Key the bags at least 25 mm into the surface, dampen and make sure cement is sufficiently hydrated, and tamp lightly to achieve a mechanical interlock between adjacent bags.

Removal

General: Remove all measures when revegetation is established on formerly exposed areas. Remove from the site, and dispose of, all materials and components used for the temporary erosion and sedimentation control works, as documented and in conformance with regulatory authorities' requirements.

3.4 PERMANENT EROSION AND SEDIMENT CONTROL MEASURES - EARTHWORKS

Erosion and sedimentation control basins

Planned levels: Construct earthworks for permanent erosion and sedimentation control basins to the documented levels and dimensions.

Site preparation: Clear the entire storage and embankment foundation area of permanent erosion and sedimentation control basins in conformance with *1111 Clearing and grubbing*. Strip topsoil and any unsuitable material under embankments in conformance with *1112 Earthworks (Road reserve)*.

Embankments: To *1112 Earthworks (Road reserve)*.

3.5 PERMANENT INLETS, SPILLWAYS AND LOW FLOW OUTLETS

Sedimentation control basins and sediment traps

Rock mattresses: Construct inlets and spillways using rock filled woven galvanized steel mattresses and geotextile. Install the rock filled mattresses to *1121 Open drains* and *0294 Gabion walls and rock filled mattresses*.

Plastic pipe outlet: Install a 150 mm diameter plastic pipe low flow outlet in locations, as documented.

3.6 CLEANING

Sedimentation control structures

Progressive cleaning: Clean out, when accumulated sediment reduces the structure capacity of the control measure to 50% or less, or when sediment has built up to a point where it is less than 300 mm below the spillway crest and conform to the following:

- Removal of accumulated sediment: Use methods which will not damage the structures.
- Sediment disposal: Remove sediment to a nominated soil stockpile site or dispose in locations that sediments will not be conveyed back into the construction areas or into watercourses.
- Access: Maintain suitable access to allow cleaning out in all weather conditions.

Completion

Requirement: Clean, before Practical Completion of the Works.

Reinstatement: Reinstatement surfaces including areas previously occupied by stockpiles and conform to the following:

- Within areas of permanent works: As documented.
- Areas outside permanent works: Reinstatement to condition at commencement of contract.

4 ANNEXURE A

4.1 ANNEXURE – SELECTIONS

This Annexure should be completed for Council or private development projects to specify parameters required in conjunction with the contract Drawings. Where there is an inconsistency between the approved Drawings and this Annexure, the approved Drawings shall prevail unless specifically noted otherwise.

Property	Details/Required?
Contact details: Installation Monitoring Upkeep Removal	
Site hazard/risk assessment: Low General risk site High risk site	
Site water quality monitoring (high risk site)	Yes <input type="checkbox"/>
Drainage control measures	
Erosion control measures	
Sediment control measures	
Note: Check the box applicable for the project.	

4.2 ANNEXURE - SUMMARY OF HOLD AND WITNESS POINTS

For private developments, certain Hold and Witness Points where specifically noted below require representatives of both the Superintendent and the Principal Certifier (e.g. Council) to authorise release.

Clause and description	Type	Submission/Inspection	Submission/Notice details	Process held
SUBMISSIONS ESCP prepared by the contractor Design documentation	H– Superintendent and Principal Certifier	Erosion and sedimentation control plan (ESCP)	3 days before disturbance of natural surface	Disturbance of natural surface
SUBMISSIONS ESCP prepared by the contractor Design documentation	H	Survey of embankments	7 days before disturbance of natural surface	Disturbance of natural surface
SUBMISSIONS ESCP prepared by the contractor Design documentation	H	Waterway works licence Controlled Activity Approval letter with conditions from statutory organisation (Water NSW) controlling access to a waterway	7 days before disturbance of waterway if applicable	Statutory approval for works in a waterway and/or floodplain
SUBMISSIONS Execution details	H	Scale diagrams showing the following: - Features of the site including contours and	7 days before disturbance of natural surface	Disturbance of natural surface

Clause and description	Type	Submission/Inspection	Submission/Notice details	Process held
Section plans		drainage paths. - Relevant construction details of all erosion and sedimentation control structures. - All permanent and temporary erosion and sedimentation control measures, including the control measure to be implemented in advance of, or in conjunction with clearing and grubbing operations.		
SUBMISSIONS Execution details Dewatering or Working in waterways and floodplains	H – superintendent and Principal Certifier	Reinstatement plan for works in a stream including a copy of Waterway Works Licence Controlled Activity Approval from Water NSW.	7 days before works in waterways and flood plains	Work in waterways and flood plains. Reinstatement plan
INSPECTIONS Notice General	H – superintendent and Principal Certifier	Initial installation of sediment controls	3 days before commencement of bulk earthworks	Commencement of bulk earthworks
INSPECTIONS Notice Stockpile sites	W	Approved protection measures are in place	2 days	
INSPECTIONS Notice Access and exit areas	W	Decontamination of vehicles	2 days before site disturbance	
INSPECTIONS Notice Areas not approved for clearing	W – superintendent and Principal Certifier	Fencing and protection of areas	3 days	
INSPECTIONS Notice Diversion and catch drains	W	Construction and lining	2 days before site disturbance	
INSPECTIONS Notice Temporary sediment control	W	Temporary sediment traps and batter protection	2 days before site disturbance	
INSPECTIONS Notice Removal	W	Removal of temporary erosion and sedimentation works	3 days	
INSPECTIONS Notice	W	Completion of cleaning	2 days	

Clause and description	Type	Submission/Inspection	Submission/Notice details	Process held
Cleaning				
Note: H = Hold Point, W = Witness Point				

4.3 ANNEXURE – PAY ITEMS

This schedule applies to Council projects. For private development works use of this schedule is optional, at the Superintendent's discretion.

Pay items	Unit of measurement	Schedule rate inclusions
1102.1 Temporary erosion and sedimentation control measures	Lump sum	All costs associated with the installation, maintenance, inspection and removal of the temporary erosion and sedimentation control measures in conformance with TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES . All costs associated with Drop inlet sediment control, including inlet control bank constructed in conformance with Drop inlet sediment control .
1102.2 Permanent erosion and sediment control - Earthworks	m ³ The volume will be determined by calculation using the end area method.	All costs associated with compacted embankment constructed in conformance with PERMANENT EROSION SEDIMENTATION CONTROL MEASURES - EARTHWORKS, Erosion and sedimentation control basins . The schedule rate to cover the excavation of material from within the sedimentation control basin and embankment construction required under erosion and sedimentation control basins and will be an average rate for all types of materials. The cost of excavating and transporting material for embankment construction and obtained from within cuttings or from borrow will be included in the schedule rate for General earthworks in <i>1112 Earthworks (Road reserve)</i> .
1102.3 Permanent inlets, spillways and low flow outlets	m ² of horizontal surface area	All costs associated with the rock filled mattress constructed in conformance with PERMANENT INLETS, SPILLWAYS AND LOW FLOW OUTLETS, Sedimentation control basins and sediment traps .
1102.4 Cleaning	m ³ of in-place sediment	All costs associated with sediment removal from the structure in conformance with CLEANING, Sedimentation control structures . The volume of sediment removed will be determined by survey The schedule quantity is a provisional quantity.
Clearing and grubbing		To <i>1111 Clearing and grubbing</i> .
Landscaping		To <i>0257 Landscape - road reserve and street trees</i> .
Topsoil stripping and placement in storage stockpile	m ³ solid bank	To <i>1112 Earthworks (Road reserve)</i> .
Topsoil replacement from storage stockpiles to restore grassed areas	m ³ solid bank	To <i>1112 Earthworks (Road reserve)</i> .

4.4 ANNEXURE - REFERENCED DOCUMENTS

The following documents are incorporated into this worksection by reference:

AS 5181	2017	Use and installation of turf as an erosion, nutrient and sediment control measure
IECA Principles	2012	Principles of construction site erosion and sediment control – A training tool for the construction industry
IECA Book 5	2012	Best practice erosion and sediment control – A field guide for construction site managers
IECA Book 6	2010	Best practice erosion and sediment control – Standard drawings
Landcom	2004	Managing urban stormwater, Soils and construction

5 ANNEXURE M – CESSNOCK CITY COUNCIL SPECIFIC CLAUSES

M1.	Variations to or non-conformances with Council's AUS-SPEC are to be evaluated with reference to the procedure in Council's <i>Development Engineering Handbook</i> . Acceptance is to be obtained in writing from: an authorised representative of Council's Director of Infrastructure and Engineering Services.	Variation procedure
M2.	This specification applies in addition to any development consent (DA) conditions. If there is any inconsistency, the conditions of consent shall prevail.	DA Conditions
M3.	Refer to the Cessnock City Council <i>Development Engineering Handbook</i> for final inspection, works-as-executed and handover requirements.	Completion

6 AMENDMENT HISTORY

0	15/01/2024	First Published
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