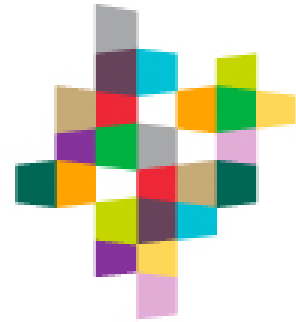


QPRC



**QUEANBEYAN PALERANG
REGIONAL COUNCIL**

**DEVELOPMENT CONSTRUCTION
SPECIFICATION**

C211

**CONTROL OF EROSION AND
SEDIMENTATION**

VERSION 1 – JANUARY 2019

Amendment Record for this Specification Part

This Specification is Council's edition of the AUS-SPEC generic specification part and includes Council's primary amendments.

Details are provided below outlining the clauses amended from the Council edition of this AUS-SPEC Specification Part. The clause numbering and context of each clause are preserved. New clauses are added towards the rear of the specification part as special requirements clauses. Project specific additional script is shown in the specification as italic font.

The amendment code indicated below is 'A' for additional script 'M' for modification to script and 'O' for omission of script. An additional code 'P' is included when the amendment is project specific.

| Amendment Sequence No. | Key Topic addressed in amendment | Clause No. | Amendment Code | Author Initials | Amendment Date |
|------------------------|---------------------------------------|------------|----------------|-----------------|----------------|
| VERSION 1 | Notice of inspections added | C211.01 | A | KD | 14/04/10 |
| | Hold Points and Witness Points added, | C211.03 | A | | |
| | Hold Points and Witness Points added | C211.04 | A | | |
| | Hold Points and Witness Points added | C211.05 | A | | |
| | Hold Points and Witness Points added | C211.08 | A | | |
| | Witness Points added | C211.12 | A | | |
| | Witness Points added | C211.14 | A | | |
| | Witness Points added | C211.15 | A | | |
| | Annexure added | C211-A | A | | |
| | Updated reference documents | C211.02 | A | TR | 11/12/18 |
| | Hold Point Added | C211.04.2 | A | CS | 4/01/19 |

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SPECIFICATION C211 –

CONTROL OF EROSION AND SEDIMENTATION - VERSION 1

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SPECIFICATION C211 CONTROL OF EROSION AND SEDIMENTATION - VERSION 1

GENERAL

C211.01 SCOPE

1. The work to be executed under this Specification consists of the construction of structures and the implementation of measures to control erosion and sedimentation in accordance with the approved Erosion and Sediment Control Plan (ESCP) or Soil and Water Management Plan (SWMP) included in the Drawings. These may be temporary or permanent.
2. The Contractor shall plan and carry out the whole of the Works to avoid erosion and sedimentation of the site, surrounding country, watercourses, waterbodies and wetlands.
3. All measures for erosion and sedimentation control shall be designed, installed and maintained by the Contractor in such a manner so as not to present a potential hazard to any person or property.
4. The Contractor shall give notice so that inspection may be made of all HOLD POINTS and WITNESS POINTS documented in this specification and tabulated in Annexure C211-A.. Release of HOLD POINTS and WITNESS POINTS shall be made by the Superintendent, with the concurrence of the Principal Certifying Authority, where stipulated in Annexure C211-A.

Notice

C211.02 REFERENCE DOCUMENTS

1. Documents referenced in this Specification are listed in full below whilst being cited in the text in the abbreviated form or code indicated.

Documents

(a) Council Specifications

Standards

- | | | |
|------|---|--|
| C212 | - | Clearing and Grubbing – Version 1 |
| C213 | - | Earthworks - Version 1 |
| C224 | - | Open Drains, Including Kerb and Gutter - Version 1 |
| C273 | - | Landscaping - Version 1 |

Test Methods

(b) NSW State Legislation

Protection of the Environment Operations Act 1997

(c) Other

- NSW Department of Land and Water Conservation (DLWC)
 - *Urban Erosion and Sediment Control: Field Guide*
 NSW Office of Environment and Heritage (OEH)
 - *Managing Urban Stormwater, Soils and Construction*, 4th Ed., Mar 2004,
 Landcom
 Institute of Public Works Engineering Australia (IPWEA)
 - *Local Government Salinity Management Handbook (2002)*

C211.03 EROSION AND SEDIMENTATION CONTROL PLAN/SOIL AND WATER MANAGEMENT PLAN

1. For implementation of the ESCP/SWMP, the site shall be divided into sections based on the catchment area draining to each permanent drainage structure in the works. In addition to the area bounded by the property boundaries, the sections shall include:
- Site Sections**
- (a) access and haulage tracks,
 - (b) borrow pits and
 - (c) compound areas, such as Contractor's facilities and concrete batching areas.
2. At least fourteen days before the natural surface is disturbed on each of these sections, the Contractor shall submit an ESCP/SWMP for that section. This Plan shall be superimposed on half-sized drainage drawings of the works and shall be detailed for each catchment area of the works and consistent with the approved ESCP/SWMP. This is a **HOLD POINT**.
- Section Plan
(HP)**
3. The Plan shall consist of scale diagrams indicating:
- Plan
Inclusions**
- (a) features of the site including contours and drainage paths,
 - (b) relevant construction details of all erosion and sedimentation control structures,
 - (c) all permanent and temporary erosion and sedimentation control measures, including the control measures to be implemented in advance of, or in conjunction with, clearing and grubbing operations as required under the Specification for CLEARING AND GRUBBING - VERSION 1,
 - (d) an order of works based upon construction and stabilisation of all culverts and surface drainage works at the earliest practical stage, and
 - (e) proposed time schedules for construction of structures and implementation of measures to control erosion and sedimentation.
4. The OEH publication Managing Urban Stormwater, Soils and Construction provides guidance on typical permanent and temporary erosion and sedimentation control measures which may be required and guidance in the preparation of an ESCP/SWMP.
- Guidance**
5. In known salt affected areas, the Contractor shall seek advice from the relevant land and water resource authority to ensure that its Erosion and Sedimentation Control Plan conforms with the current salinity prevention measures outlined in the IPWEA publication, *Local Government Salinity Management Handbook*.
- Salinity
Prevention**
6. No work shall commence in each section until the ESCP/SWMP has been approved. This is a **HOLD POINT**. Such approval shall not relieve the Contractor of the full responsibility to provide whatever measures are required for effective erosion and sedimentation control at all times.
- Contractor's
Responsibility

(HP)**
7. The Contractor shall adhere to the approved ESCP/SWMP. The Contractor shall submit a revised ESCP/SWMP for approval fourteen days in advance of intended variation from the approved plan. This is a **WITNESS POINT**.
- Adherence to
Plan (WP)**

C211.04 EROSION AND SEDIMENTATION CONTROL MEASURES

- | | |
|--|---|
| <p>1. Erosion and sedimentation control measures shall include, but shall not be limited to, the following:</p> <ul style="list-style-type: none"> (a) The installation of permanent drainage structures before the removal of topsoil and commencement of earthworks for formation within the catchment area of each structure. (b) The prompt completion of all permanent and temporary drainage works, once commenced, to minimise the period of exposure of disturbed areas. (c) The stabilisation of diversion and catch drains to divert uncontaminated runoff from outside the site, clear of the site. Catch drains shall be installed and lined, as specified or as directed by the Superintendent, before the adjacent ground is disturbed and the excavation is commenced. This is a WITNESS POINT. (d) The passage of uncontaminated water through the site without mixing with contaminated runoff from the site. (e) The provision of contour and diversion drains across exposed areas before, during and immediately after clearing and the re-establishment and maintenance of these drains during soil removal and earthworks operations. (f) The provision of sediment filtering or sediment traps, in advance of and in conjunction with earthworks operations, to prevent contaminated water leaving the site. (g) The restoration of the above drainage and sedimentation control works on a day to day basis to ensure that no disturbed area is left without adequate means of containment and treatment of contaminated water. (h) The limitation of areas of erodible material exposed at any time to those areas being actively worked. Any area that is not approved by the Superintendent for clearing or disturbance by the Contractor's activities shall be clearly marked, fenced off or otherwise appropriately protected against any such disturbance. This is a WITNESS POINT. (i) The minimisation of sediment loss during construction of embankments by means such as temporary or reverse superelevations during fill placement, constructing berms along the edge of the formation leading to temporary batter flumes and short term sediment traps. (j) The progressive vegetation of the site, in accordance with the Specification for LANDSCAPING - VERSION 1, as work proceeds. (k) All stockpile sites shall be situated in areas approved for such use by the Superintendent. A 5m buffer zone shall exist between stockpile sites and any stream or flow path. All stockpiles shall be adequately protected from erosion and contamination of the surrounding area by use of the measures approved in the Erosion and Sedimentation Control Plan. This is a HOLD POINT. (l) Access and exit areas shall include shake-down or other methods approved by the Superintendent for the removal of soil materials from motor vehicles. This is a WITNESS POINT. | <p>Scope</p> <p>(WP)</p> <p>(WP)</p> <p>(HP)</p> <p>(WP)</p> |
| <p>2. All permanent and temporary erosion and sedimentation control measures shall be constructed in accordance with the construction details in the ESCP/SWMP and the details as shown on the Drawings. The construction of all such measures are to be inspected by the Superintendent prior to removal of any topsoil or clearing of vegetation. This is a HOLD POINT.</p> | <p>Construction of Control Measures</p> <p>(HP)</p> |

PERMANENT EROSION AND SEDIMENTATION CONTROL

C211.05 EARTHWORKS FOR PERMANENT EROSION AND SEDIMENTATION CONTROL BASINS

- | | |
|---|---|
| <p>1. Earthworks for permanent erosion and sedimentation control basins shall be constructed to the planned levels and dimensions shown on the Drawings or such levels and dimensions as determined by the Superintendent.</p> | <p>Planned Levels</p> |
| <p>2. The entire storage and embankment foundation area of permanent erosion and sedimentation control basins shall be cleared in accordance with the Specification for CLEARING AND GRUBBING - VERSION 1 and shall be stripped of topsoil and any unsuitable material under embankments removed in accordance with the Specification for EARTHWORKS - VERSION 1.</p> | <p>Site Preparation</p> |
| <p>3. The embankments shall be constructed in accordance with the Specification for EARTHWORKS - VERSION 1.</p> | <p>Compaction Requirements</p> |
| <p>4. If payment for embankment construction is on a Schedule of Rates basis, at least three days before construction of the embankment the Contractor shall provide the Superintendent with survey information which will be sufficient to subsequently measure the volume of the constructed embankment and sediment removal. This is a HOLD POINT.</p> | <p>Contractor to Provide Survey Information (HP)</p> |

C211.06 INLETS, SPILLWAYS AND LOW FLOW OUTLETS FOR SEDIMENTATION CONTROL BASINS AND SEDIMENT TRAPS

- | | |
|--|-----------------------------------|
| <p>1. Inlets and spillways shall be constructed using rock filled woven galvanised steel mattresses and geotextile, as shown on the Drawings or as directed by the Superintendent. The rock filled mattresses shall be installed in accordance with the requirements for rock filled wire mattress and geotextile in the Specification for OPEN DRAINS, INCLUDING KERB AND GUTTER - VERSION 1.</p> | <p>Rock Mattresses</p> |
| <p>2. A low flow outlet consisting of a 150 mm diameter plastic pipe shall be installed as shown in the Drawings. No extra payment shall be made for this work which shall be regarded as part of the construction of the sedimentation control basin.</p> | <p>Plastic Pipe Outlet</p> |

C211.07 DROP INLET SEDIMENT CONTROL

- | | |
|---|------------------------------------|
| <p>1. Drop inlet sediment traps and inlet control banks shall be constructed on completion of each gully pit unless otherwise directed by the Superintendent. These drop inlet sediment traps and inlet control banks are additional to the temporary sedimentation control measures that may be required under Clause C211.10 during construction of the gully pits.</p> | <p>Time of Construction</p> |
| <p>2. The drop inlet sediment traps are intended to remove sediment from the surface flow before it enters the drainage system. The inlet control banks shall be constructed as required to prevent the surface flows bypassing the gully pits.</p> | <p>Purpose</p> |
| <p>3. The drop inlet sediment traps shall be constructed as shown on the Drawings. The associated inlet control banks shall consist of at least two courses of sandbags containing a 10:1 sand/cement mix. The bags shall be keyed at least 25 mm into the surface, dampened sufficiently to ensure hydration of the cement and tamped lightly to provide mechanical interlock between adjacent bags.</p> | <p>Control Banks</p> |

C211.08 CLEANING SEDIMENTATION CONTROL STRUCTURES

1. The Contractor shall clean out permanent sedimentation control structures, cleaning out whenever the accumulated sediment has reduced the capacity of the structure by 50 per cent or more, or whenever the sediment has built up to a point where it is less than 300 mm below the spillway crest. This is a **WITNESS POINT**. All permanent sedimentation control structures shall be cleaned out by the Contractor prior to Practical Completion of the Works. This is a **HOLD POINT**.

Contractor's Responsibility**(WP)****(HP)**

2. Accumulated sediment shall be removed from permanent sedimentation control structures in such a manner as not to damage the structures. The sediment removed shall be disposed of in such locations that the sediment will not be conveyed back into the construction areas or into watercourses. The Contractor shall provide and maintain suitable access to permanent sedimentation control structures to allow cleaning out in all weather conditions.

Removal of Sediment**C211.09 RESERVED**

(For additional Site Specific Permanent Control Measures.)

TEMPORARY EROSION AND SEDIMENTATION CONTROL**C211.10 GENERAL**

1. The Contractor shall ensure that effective erosion and sedimentation control is provided at all times during the Contract.

Contractor's Responsibility

2. Runoff from all areas where the natural surface is disturbed by construction, including access roads, depot and stockpile sites, shall be free of pollutants as defined in the Protection of the Environment Operations Act before it is either dispersed to stable areas or directed to natural watercourses. The Contractor shall be responsible for all temporary erosion and sedimentation control measures required for this purpose.

Pollutant Free

3. The Contractor shall provide and maintain slopes, crowns and drains on all excavations and embankments to ensure satisfactory drainage at all times. Water shall not be allowed to pond on the works unless such ponding is part of an approved ESCP/SWMP.

Maintenance by Contractor**C211.11 TEMPORARY DRAINS**

1. Runoff from areas exposed during the work shall be controlled by construction of temporary contour drains and/or temporary diversion drains. Generally, a temporary contour drain or temporary diversion drain takes the form of a channel constructed across a slope with a ridge on its lower side. They may require progressive implementation and frequent alteration as the work progresses.

Control of Runoff

2. Contour drains, which follow points on the natural surface of approximately the same elevation, shall be provided immediately after a construction site is cleared to intercept and divert runoff from the site to nearby stable areas at non-erosive velocities. Contour drains shall be formed with a grade of neither less than 1 per cent nor more than 1.5 per cent and shall be spaced at intervals of neither less than 20m nor more than 50m, depending on the erodibility of the exposed soil. Contour drains shall be constructed as shown on the Drawings.

Contour Drains

3. Diversion drains shall be provided across haul roads and access tracks when such roads and access tracks are identified as constituting an erosion hazard due to their steepness, soil erodibility or potential for concentrating runoff flow. Diversion drains shall

Diversion Drains

be formed to intercept and divert runoff from the road or track to stable outlets. Spacing of diversion drains shall not be greater than that required to maintain runoff at non-erosive velocities.

C211.12 TEMPORARY SEDIMENT TRAPS

1. Temporary sediment-trapping devices shall be provided during construction to remove sediment from sediment-laden runoff flowing from areas of 0.5 hectares or more before the runoff enters natural watercourses or adjacent land. This is a **WITNESS POINT**.

Sediment Traps
(WP)

C211.13 BATTER PROTECTION

1. The Contractor shall take all necessary action to protect batters from erosion during the Contract.

Contractor's Responsibility

2. Scour of newly-formed fill batters during and after embankment construction shall be minimised by diverting runoff from the formation away from the batter until vegetation is established.

Scour Control

C211.14 MAINTENANCE AND INSPECTION

1. The Contractor shall inspect all temporary erosion and sedimentation control works after each rain period and during periods of prolonged rainfall. Any defects revealed by such inspections shall be rectified immediately and these works shall be cleaned, repaired and augmented as required, to ensure effective erosion and sedimentation control thereafter.

Contractor's Responsibility

2. The Contractor shall provide and maintain access from within the road reserve or from other locations acceptable to the Superintendent, for cleaning out sedimentation control works. This is a **WITNESS POINT**.

Access
(WP)

C211.15 REMOVAL

1. All temporary erosion and sedimentation control works shall be removed by the Contractor when revegetation is established on formerly exposed areas before the end of the Contract. All materials used for the temporary erosion and sedimentation control works shall be removed from the site or otherwise disposed of by the Contractor to the satisfaction of the Superintendent. This is a **WITNESS POINT**.

Contractor's Responsibility
(WP)

SPECIAL REQUIREMENTS

C211.16 RESERVED

C211.17 RESERVED

C211.18 RESERVED

C211.19 RESERVED

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MEASUREMENT AND PAYMENT**C211.20 PAY ITEMS**

1. Payment shall be made for all activities associated with completing the work detailed in this Specification, in accordance with Pay Items (a) to (e) inclusive.
2. A lump sum for any item other than Pay Item C211(a) shall not be accepted.
3. If any item for which a quantity of work listed in the Schedule of Rates has not been priced by the Contractor, it shall be understood that due allowance has been made in other items for the cost of the activity which has not been priced.
4. Clearing and grubbing is measured and paid in accordance with the Specification for CLEARING AND GRUBBING - VERSION 1.
5. Landscaping works are measured and paid in accordance with the Specification for LANDSCAPING. - VERSION 1
6. Topsoil stripping and removal of unsuitable material are measured and paid in accordance with the Specification for EARTHWORKS - VERSION 1.

Pay Item C211(a) TEMPORARY EROSION AND SEDIMENTATION CONTROL

1. The unit of measurement shall be a lump sum for the installation, maintenance, inspection and removal of the temporary erosion and sedimentation control measures in accordance with Clauses C211.10 to C211.15 inclusive and the Drawings.

Pay Item C211(b) EARTHWORKS FOR PERMANENT EROSION AND SEDIMENTATION CONTROL BASINS

1. The unit of measurement shall be the cubic metre of compacted volume of embankment constructed in accordance with Clause C211.05 and the Drawings.
2. The volume shall be determined by calculation using the end area method.
3. The schedule rate shall cover the excavation of material from within the sedimentation control basin and embankment construction required under Clause C211.05 and shall be an average rate for all types of materials.
4. The cost of excavating and transporting material for embankment construction and obtained from within cuttings or from borrow shall be included in the schedule rate for General Excavation in the Specification for EARTHWORKS - VERSION 1.

Pay Item C211(c) INLETS, SPILLWAYS AND LOW FLOW OUTLETS FOR SEDIMENTATION CONTROL BASINS

1. The unit of measurement shall be the square metre of horizontal surface area of rock filled mattress constructed in accordance with Clause C211.06 and the Drawings.

Pay Item C211(d) DROP INLET SEDIMENT TRAPS AND INLET CONTROL BANKS

1. The unit of measurement shall be 'each' drop inlet sediment trap including inlet control bank constructed in accordance with Clause C211.07 and the Drawings.

Pay Item C211(e) CLEANING OF PERMANENT SEDIMENTATION STRUCTURES

1. The unit of measurement shall be the in-place cubic metre of sediment removed from the structure in accordance with Clause C211.08.
2. The volume of sediment removed shall be determined by survey or by methods approved by the Superintendent. The schedule quantity is a provisional quantity.



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ANNEXURE C221-A

INSPECTIONS

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

Summary of HOLD POINTS

| Clause/subclause | Requirement | Notice for inspection | Release by |
|--|---|---|---|
| EROSION AND SEDIMENTATION CONTROL PLAN / SOIL AND WATER MANAGEMENT PLAN | | | |
| C211.03.2 - Section Plan | Submit ESCP/SWMP with detailed section plans for each catchment area and site section | 14 days before site disturbance on each section | Superintendent |
| C211.03.6 - Contractors Responsibility | Obtain ESCP/SWMP approval prior to commencement | | Superintendent |
| EROSION AND SEDIMENTATION CONTROL MEASURES | | | |
| C211.04.1(k) | Protect stockpile locations | 7 days before site disturbance or material delivery | Superintendent |
| C211.04.2 | Inspection of constructed control measures | Prior to the removal of any topsoil or clearing of vegetation | Superintendent – PCA concurrence required |
| EARTHWORKS FOR PERMANENT EROSION AND SEDIMENTATION CONTROL BASINS | | | |
| C211.05.4 - Contractor to Provide Survey Information | Survey information for volume measurement | 3 working days before embankment construction or sediment removal | Superintendent |
| CLEANING SEDIMENTATION CONTROL STRUCTURES | | | |
| C211.08.1 - Contractor's Responsibility | Clean out permanent sediment control structures | 3 working days before Practical Completion | Superintendent |

Summary of WITNESS POINTS

| Clause/subclause | Requirement | Notice for inspection by the Superintendent |
|--|--|---|
| EROSION AND SEDIMENTATION CONTROL PLAN / SOIL AND WATER MANAGEMENT PLAN | | |
| C.211.03.7 – Adherence to Plan | Submit proposed alterations to approved plan | 14 working days before ground disturbance |
| EROSION AND SEDIMENTATION CONTROL MEASURES | | |
| C211.04.1(c) | Install catch drains | 2 days before site disturbance |
| C211.04.1(h) | Delineate areas not to be disturbed | 2 days before site disturbance |
| C211.04.1(l) | Provide shake down measures at entry / exit points | 2 days before site disturbance |
| CLEANING SEDIMENTATION CONTROL STRUCTURES | | |
| C211.08.1 - Contractor's Responsibility | Clean out permanent sediment control structures | Progressive |
| TEMPORARY SEDIMENT TRAPS | | |
| C211.12.1 - Sediment Traps | Provide and maintain temporary sediment control devices | Progressive |
| MAINTENANCE AND INSPECTION | | |
| C211.14.2 - Access | Provide access to sediment control works | Progressive |
| REMOVAL | | |
| C211.15.1 - Contractor's Responsibility | Removal of temporary erosion and sedimentation control works | 3 working days before each stage of progressive removal |