

Superseded

**Specification (Measurement)**

**Transport and Main Roads Specifications  
MRS52 Erosion and Sediment Control**

**October 2016**

Superseded

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Superseded

## 1 Introduction

This Specification applies to the provision of temporary sediment and erosion control for all activities relating to the Contract.

This Specification shall be read in conjunction with MRS01 *Introduction to Specifications*, MRS50 *Specific Quality System Requirements* and other specifications as appropriate.

This Specification forms part of the Transport and Main Roads Specifications Manual.

The cost and description of work items for permanent structures and vegetation are found in other specifications such as:

- MRS03 *Drainage, Retaining Structures and Protective Treatments* applies to drainage controls that become permanent including sheet or strip filter drains.
- MRS16 *Landscape and Revegetation Works* applies to permanent revegetation (including specifications for cover crop to be included within permanent seed mixes).
- MRS27 *Geotextiles (Separation and Filtration)* applies to geotextiles that are part of permanent works.

Contractors are encouraged to install permanent controls as early as possible within the project.

## 2 Measurement of work

### 2.1 Standard Work Items

In accordance with the provisions of Clause 2 of MRS01 *Introduction to Specifications*, the Standard Work Items incorporated in this Specification are listed in Table 2.1

**Table 2.1 – Standard Work Items**

Standard Item No.	Description	Unit of Measurement
<b>General</b>		
1231	Erosion and Sediment Control Plan/s	lump sum
1341	Water Quality Monitoring [ <i>location</i> ]	lump sum
1232	Independent Verification and Auditing	lump sum
<b>Drainage Controls</b>		
1233P	Catch Drains [ <i>material</i> ] (Provisional Quantity)	m
1234P	Flow Diversion Bank / Berm [ <i>material</i> ] (Provisional Quantity)	m
1235P	Batter Chutes [ <i>material</i> ] (Provisional Quantity)	m
1236P	Check Dams [ <i>material</i> ] (Provisional Quantity)	each
<b>Erosion Controls</b>		
1237P	Geobinders (Provisional Quantity)	m <sup>2</sup>
1345P	Erosion Control Blanket (Provisional Quantity)	m <sup>2</sup>
1238P	Temporary Cover Crop (Provisional Quantity)	m <sup>2</sup>

Standard Item No.	Description	Unit of Measurement
1239P	Mulch (Provisional Quantity)	m <sup>2</sup>
<b>Sediment Controls</b>		
1241P	Sediment Basin < 100 m <sup>3</sup> (Provisional Quantity)	each
1242P	Sediment Basin 100 – 200 m <sup>3</sup> (Provisional Quantity)	each
1243P	Sediment Basin 200 – 500 m <sup>3</sup> (Provisional Quantity)	each
1244P	Sediment Basin 500 – 1000 m <sup>3</sup> (Provisional Quantity)	each
1245P	Sediment Basin 1000 – 2000 m <sup>3</sup> (Provisional Quantity)	each
1246P	Sediment Basin 2000 – 5000 m <sup>3</sup> (Provisional Quantity)	each
1247P	Sediment Basin > 5000 m <sup>3</sup> (Provisional Quantity)	each
1248P	Kerb Inlet Protection (Provisional Quantity)	each
1249P	Drop Inlet Protection (Provisional Quantity)	each
1344P	Silt / Sediment Fence (Provisional Quantity)	m
1251P	Site Exit Point – Shaker Ramp [ <i>description</i> ] (Provisional Quantity)	each
1252P	Site Exit Point – Wheel Wash (Provisional Quantity)	each
<b>In Stream</b>		
1253P	In-Stream Silt Curtain (Provisional Quantity)	m
<b>Other</b>		
1254	Erosion and Sediment Control Devices (Non-Itemised)	lump sum

The Contractor is responsible for designing, installing and maintaining temporary Erosion and Sediment Controls (ESC).

The purpose of development of a schedule of rates for erosion and sediment control items is to ensure that sufficient allowance has been made by the department in the cost estimate that ESC has been appropriately costed by all tenderers, and a level playing field is set during tender phase.

The following Work Items should be nominated in the Schedule of Rates for all construction projects:

- 1231 Erosion and Sediment Control Plan
- 1254 Erosion and Sediment Control Devices (Non-Itemised).

All high risk sites should also include:

- 1232 Independent Verification and Auditing, and
- 1341 Water Quality Monitoring [*location*].

It is recommended that the schedule of rates contain the standard work items for the main erosion and sediment control items (that is controls which will equate for a large majority of the costs). All other environmental work items missing from the schedule of rates are deemed to be included within Work Item 1254.

For large projects this approach will involve inclusion of Work Items for all sediment basins plus potentially catch drains and batter chutes. It is recommended that on large size projects specific items such as sediment fences are not included as line items as the effort involved in measuring thousands of metres of fence is not warranted for the cost of the item.

For smaller projects (< 2500 m<sup>2</sup> disturbed) where controls are less, the major items may be flow diversion berm, check dams and sediment fence, and hence sediment fences would be specified as a line item.

## 2.2 Work Operations

### Item 1231 Erosion and Sediment Control Plan/s

Work Operations incorporated in the above item include:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*, and
- b) preparation of the Erosion and Sediment Control Plans in accordance with Clause 6 of MRTS52
- c) review of plan/s by an independent appropriately qualified person where required and in accordance with Clause 6.3 of MRTS52
- d) submission of plan/s to Superintendent and amendment (where necessary)
- e) updating, submitting and amending the Erosion and Sediment Control Plan as needed throughout project.

### Item 1341 Water Quality Monitoring [*location*]

Work Operations incorporated in the above item include:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*, and
- b) water quality monitoring as outlined in Clause 8 of MRTS52 and Clause 4 of Annexure MRTS52, including:
  - i. water quality monitoring
  - ii. testing in NATA laboratory (if required)
  - iii. recording, reporting and analysing water quality monitoring results
  - iv. investigation of any results that exceed criteria.

### Item 1232 Independent Verification and Auditing

Work Operations incorporated in the above item include:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) auditing of erosion and sediment controls by independent appropriately qualified person including preparation and submission of report in accordance with Clause 9.1.2 of MRTS52.

**Drainage Controls**

Standard work items have been specified for the main categories of temporary drainage controls. The material used for controls will generally be a decision for the Contractor within the ESC plan. However in certain circumstances the Principal may elect to specify the particular material that control is to be constructed with in the tender schedule using square brackets [x] for example:

- 1233.01P Catch Drains [*grass lined*]
- 1233.02P Catch Drains [*rock lined*]

Standard work item numbers have not been created for items that are likely to be permanent, for example, cellular confinement systems. If needed these should be created using a 9000 series number within the tender schedule.

**Item 1233P Catch Drains [*material*] (Provisional Quantity)**

Work Operations shall include but not be limited to:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) design of catch drain in accordance with *IECA Manual* - Design Fact Sheets (Book 4)
- c) supplying all materials
- d) clearing the location of the catch drain, including removal and disposal of trees, roots, stumps and other debris
- e) grading or excavating the drain to the required slope and disposal of unsuitable material
- f) constructing all works in accordance with *IECA Manual* – Book 6 Standard Drawings Catch Drains (CD-01) and other relevant drawings that is Catch Drains – Grass Lined (CD-03), Catch Drains – Geotextile Lined (CD-04), Catch Drains – Rock Lined (CD-05). Type C drains (triangular V drains) not to be used on dispersive soils
- g) where required, installing an energy dissipater or spreader at the outlet of the drainage line
- h) maintenance of the drainage line, including but not limited to the removal and disposal of sediment deposition and repair/replacement of lining, grass or turf
- i) removal of catch drain and all materials, including grading the area and smooth it out in preparation for stabilisation works.

**Item 1234P Flow Diversion Bank / Berm [*material*] (Provisional Quantity)**

Work Operations shall include but not be limited to:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) design of diversion bank or berm in accordance with *IECA Manual* - Design Fact Sheets (Book 4)
- c) supplying all materials
- d) clearing the location of the diversion bank or berm including removal and disposal of trees, roots, stumps and other debris
- e) grading or excavating the bank to the required slope, and disposal of unsuitable material or placement and compaction of material (compost, cold mix and etc.)
- f) constructing all work in accordance with relevant *IECA Manual* – Book 6 that is, Standard Drawings Diversion Bank (CD-01) or Control Berms (CB-01)
- g) where required, installing an energy dissipater or spreader at the outlet of the diversion drain
- h) maintenance of the diversion bank/berm, including but not limited to the removal and disposal of sediment deposition and repair/replacement of bank and berm

- i) removal of all materials including deposited sediment and dispose of in a suitable manner that will not cause an erosion, pollution or environmental hazard
- j) grading the area and smoothing it out in preparation for stabilisation works.

**Item 1235P      Batter Chutes [*material*] (Provisional Quantity)**

Work Operations shall include but not be limited to:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) design of batter chute in accordance with *IECA Manual* - Design Fact Sheets (Book 4)
- c) supplying all materials
- d) excavation of subgrade for batter chutes, including diversion into chute and disposal of unsuitable material
- e) compaction of the soil to at least one metre each side of the chute to minimise erosion
- f) constructing all work accordance with relevant *IECA Manual* – Book 6 Standard Drawing ie. Chutes – General (CH-01, CH-02), Chutes - Synthetic Linings (CH-03), Chutes – Rock Linings (CH-06)
- g) install appropriate outlet structure (energy dissipater) such as rock outlet pad at the base of the chute
- h) maintenance of the batter chute, including but not limited to removal/disposal of deposited sediment and replacement of damaged lining
- i) removal of all materials including deposited sediment and disposal in a suitable manner that will not cause an erosion, pollution or environmental hazard.

**Item 1236P      Check Dams [*material*] (Provisional Quantity)**

The department's preference is for rock check dams. Sandbags may be used in circumstances where rock is not available. Fibre rolls and coir logs must be appropriately secured.

Work Operations shall include but not be limited to:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) design/use of check dams in accordance with *IECA Manual* - Design Fact Sheets (Book 4)
- c) supplying all materials
- d) constructing all works in accordance with relevant *IECA Manual* – Book 6 Standard Drawing i.e., Rock Check Dams (RCD-01), Fibre rolls (FR-01) and/or Coir Logs (Log-01)
- e) maintenance of the rock check dam, including but not limited to the removal and disposal of sediment deposition, repair/replacement of check dam material
- f) removal of all materials including deposited sediment and disposal in a suitable manner that will not cause an erosion, pollution or environmental hazard.

**Erosion Controls**

The following work items relate to methods to minimise erosion from surfaces from raindrop/wind impacts (that is, erosion not relating to concentrated flow). It is the responsibility of the Contractor to determine which erosion controls shall be used where and to allow appropriate quantities.



#### Item 1237P Geobinders (Provisional Quantity)

In this specification the term geobinders refers to non-toxic materials substance sprayed on soil to prevent soil erosion. This includes bonded mulch tackifiers, polyacrylamide, and other soil binders.

Work Operations shall include but not be limited to:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supplying all materials
- c) application in accordance with manufacturers recommendations, including rate and application method.

#### Item 1345P Erosion Control Blanket (Provisional Quantity)

Erosion Control Blankets means products placed over batter to reduce impact of raindrop and low velocity flow. They may include jute blankets geotextile coir blankets or other. Products with synthetic netting may not be used where native animals are likely to traverse – for example riparian zones or adjacent to sensitive environmental areas.

Work Operations shall include but not be limited to:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) select in accordance with Erosion Control Blanket - *IECA Manual* - Design Fact Sheets (Book 4)
- c) supplying all materials
- d) excavation of toe trench to secure the leading edges of the blanket
- e) placement of blanket on batters or disturbed areas
- f) installation of pins and backfilling of toe trench following the placement of blanket
- g) constructing all works in accordance with relevant *IECA Manual* – Book 6 Standard Drawing e.g. Erosion Control Blankets (ECB-01)
- h) maintenance of placed blanket, including repining, removing built up sediment and repair to sections damaged by construction work
- i) where works require, removal and replacement to facilitate works beneath the erosion control matting
- j) removal and disposal of material when no longer required.

#### Item 1238P Temporary Cover Crop (Provisional Quantity)

Work Operations shall include but not be limited to:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supplying all materials (refer to MRS16 *Landscape and Revegetation Works* for mix design)
- c) mechanical application of temporary cover crop
- d) watering of temporary cover crop to achieve a minimum 70% strike rate
- e) where the temporary cover crop fails to achieve a 70% strike rate within 20 days of seeding, or prior to the shutdown of the site (whichever comes first), the Contractor shall reapply a temporary cover crop

- f) repair of soil scours and rill erosion.

#### **Item 1239P Mulch (Provisional Quantity)**

This work item is principally for the use of vegetation mulch produced on site, it may however also refer to use of gravel, rock or other material as mulch layer to prevent erosion.

The production and stockpiling of mulch is covered by Standard Work Item 3854P (MRS16).

Work Operations shall include but not be limited to:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) place mulch evenly over area at thickness, or in berms depending on the function of the mulch control
- c) maintenance of the mulch layer including re-placement of displaced mulch and removal of captured sediment
- d) repair of soil scours and rill erosion
- e) treatment of area for weeds that appear due to use of mulch containing weed seed
- f) where required, removal and disposal of mulch control
- g) where required, stabilisation/rehabilitation of any disturbed areas created by application of removal of mulch.

#### **Sediment Controls**

Commonly used sediment controls are itemised below.

Grassed buffer zones or filter strips are not itemised as a work item as these are likely to be permanent vegetation installed early and hence should be costed using Work Item 3847 designated in MRS16. Some sediment control devices (for example, check dams) have been included previously under drainage control and are not duplicated here.

#### **Items 1241P to 1247P Sediment Basins (Provisional Quantity)**

Work Operations shall include but not be limited to:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) selection and design of sediment basins in accordance with *IECA Manual* - Design Fact Sheets (Book 4) and Clause 10 of MRTS52
- c) supplying all materials
- d) carry out excavations
- e) utilising or disposing of excavated materials, including management of excavated material required for backfilling of the basin at the completion of the works
- f) compaction of basin walls and foundations
- g) stabilisation of basin walls, being topsoil and hydromulch or similar
- h) construction of sediment basin including spillways, inlets and outlets
- i) jar test or similar to determine appropriate flocculation rate
- j) flocculation of sediment basin
- k) testing of treated water prior to release
- l) mechanical or passive release and management of all stormwater captured in the sediment basin

- m) appropriate removal and disposal of any captured sediment
- n) removal and disposal of basin and associated works when no longer required
- o) reinstatement of existing ground profile
- p) topsoil and revegetate to match adjacent landscape treatment.

**Item 1248P      Kerb Inlet Protection (Provisional Quantity)**

Care must be taken when using kerb inlet protection to ensure water does not extend into portion of the road in use. Should only be specified for minor works on existing roadways.

Work Operations shall include but not be limited to:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supplying all materials
- c) installation and maintenance all works in accordance with relevant *IECA Manual* - Book 4 - Kerb Inlet Sediment Trap Design Fact Sheet
- d) maintenance of controls including removal of accumulated sediment
- e) removal, storage and disposal of material when no longer required.

**Item 1249P      Drop Inlet Protection (Provisional Quantity)**

Work Operations shall include but not be limited to:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supplying all materials
- c) installation and maintenance all works in accordance with relevant *IECA Manual* - Design Fact Sheet for example, Excavated drop inlet protection, Fabric Wrap Drop inlet protection, Rock and aggregate drop inlet protection
- d) maintenance of inlet protection controls including removal of accumulated sediment
- e) removal of material when no longer required.

**Item 1344P      Silt / Sediment Fence (Provisional Quantity)**

Work Operations shall include but not be limited to:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supplying all materials
- c) carry out excavations
- d) utilising or disposing of excavated materials
- e) erecting sediment fence with support system
- f) constructing all work in accordance with Standard Drawing Sediment Fence (SF - 01 and SF - 02) from *IECA Manual* – Book 6.
- g) regular maintenance of sediment fence including the appropriate disposal of accumulated sediment
- h) removing of material when no longer required
- i) where required, stabilisation of any areas disturbed during removal of the sediment fence.

**Item 1251P Site Exit Point – Shaker Ramp [description] (Provisional Quantity)**

Site exit points may either be vibration grids or rock grids. The department's preference is for vibration grids. Where Principal wishes to specify type this can be specified within [description].

Work Operations shall include but not be limited to:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supplying all materials
- c) constructing all works in accordance with relevant *IECA Manual* – Book 6 Standard Drawing e.g. Construction Exit Rock Pad (Exit 01, Exit 02) or Construction Exit Vibration Grid (Exit-04, Exit 05)
- d) maintenance of site exit point including removal of sediment from below vibration grid, turnover of rock pad, addition of new rock or extension of rock pad when exit no longer effective
- e) removal of any sediment from adjacent sealed road
- f) removal, storage and disposal of material when no longer required.

**Item 1252P Site Exit Point – Wheel Wash (Provisional Quantity)**

Work Operations shall include but not be limited to:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supplying all materials
- c) constructing all works in accordance with relevant *IECA Manual* – Book 6 Standard Drawing e.g. Construction Exit Wash Bay (Exit 06)
- d) maintenance of site exit point including addition of new rock or extension of rock pad when exit no longer effective, discharge of dirty water to appropriate device, refilling as necessary
- e) removal of any sediment from adjacent sealed road
- f) removal, storage and disposal of material when no longer required
- g) inspect locations of water and sediment discharge for declared weeds and treat as necessary.

**In Stream Controls**

Coffer dams and other major in stream controls have not been developed as line items as these are considered part of general construction methodology.

**Item 1253P In-Stream Silt Curtain (Provisional Quantity)**

Work Operations shall include but not be limited to:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supplying all materials
- c) installation of the in-stream silt curtain in accordance with the manufacturer's specifications and Standard Drawings Floating Silt Curtain (FSC-01, FSC-02 and FSC-03) from *IECA Manual* – Book 6
- d) maintenance of silt curtain will include repair or replacement of damaged silt curtain

- e) prior to the removal of the silt curtain, the Contractor must ensure the contained water meets the project requirements for water discharge. Where required, the Contractor may need to chemically treat or pump contaminated water prior to removing the silt curtain.
- f) removal of silt curtain.

#### **Other**

This work item should be included in all tender specifications but should never be the only erosion and sediment control work item specified.

Where contractor proposes to use device not covered by standard work items it shall be incorporated into the item. The main purpose of this item is to ease the administrative burden to contractor and principal for the minor costs and devices.

### **Item 1254 Erosion and Sediment Control Devices (Non-Itemised)**

Work Operations shall include but not be limited to:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) Design, install, maintain and remove erosion and sediment control devices in accordance with manufacturer's specifications and relevant *IECA Manual* Book 6 - Standard Drawing.

## **3 Payment**

### **3.1 Regular internal inspections and audits**

Regular inspection of devices and audits of site compliance with ESCP and legislative requirements by the Contractor are considered part of Contractors quality plan and/or environmental management system. No additional payment made for these items.

Where an environmental investigation demonstrates a non-conformance with the EMP(C), the Contractor shall be responsible for investigation costs and all associated amelioration costs.

### **3.2 Payment for installation, maintenance and removal of erosion and sediment control devices**

Unless otherwise stated or negotiated, payment for all other erosion and sediment control devices shall be:

- a) 80% of tendered amount on installation of the device to appropriate standard
- b) the balance of monies owed to the Contractor (20%) is payable on removal of device and making good the area.

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