

Specification (Measurement)

Transport and Main Roads Specifications MRS330 Trackwork

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1 Introduction

This Specification applies to the construction of heavy rail and light rail trackwork.

This Specification shall be read in conjunction with MRS01 *Introduction to Specifications* and other Specifications as appropriate.

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

2 Measurement of work

2.1 Standard Work Items

In accordance with the provisions of Clause 2.1.3 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
Trackwork Removal / Demolition		
80101	Removal or demolition of track, complete, [gauge], [rail mass] kg/m	track m
80102	Removal or demolition of [turnouts catch points], [gauge], [turnout radius (tangential only) and crossing rate]	each
80103	Removal or demolition of diamonds, [description]	each
80104	Removal or demolition of ballast	m ³
80105	Removal or demolition of sleepers, [gauge]	each
80106	Removal or demolition of [rail guard rails splay rails], [rail mass] kg/m	m
80107	Removal or demolition of guard rail vees	each
80108	Removal or demolition of derailleurs, [type]	each
80109	Removal or demolition of [track monuments track signage buffer stops]	each
80110	Removal or demolition [stop blocks sand bunkers ballast or sand traps ballast or earth run off areas heavy stopping structures], [description]	each
80111	Removal or demolition of rail lubricators, [type]	each
Trackwork Modifications / Renewals		
80131	Lifting / slewing of track, [description]	track m
80132	Renewal of ballast, [description]	m ³
80133	Renewal of sleepers, [description]	each
80134	Renewal of rail, [description]	m
Trackwork Materials Supply		
80151	Supply of ballast	m ³
80152	Supply of sleepers and fastenings, complete, [gauge], [fastening type], [rail mass] kg/m, [description]	each

Standard Item No.	Description	Unit of Measurement
80153	Supply of sleepers, [gauge], [description]	each
80154	Supply of sleeper fastenings, [type], [gauge], [rail mass] kg/m	each
80155	Supply of rail, [rail mass] kg/m, [HH PC]	m
80156	Supply of [guard rails splay rails], [rail mass] kg/m	m
80157	Supply of guard rail vees, [description]	each
80158	Supply of junction rails, [rail mass] kg/m to [rail mass] kg/m	each
80159	Supply of turnouts, [gauge], [crossing rate and turnout radius]	each
80160	Supply of catch points, [gauge], [crossing rate]	each
80161	Supply of diamonds, [description]	each
80162	Supply of derailleurs, [type]	each
Trackwork Materials Transport		
80181	Transport of ballast	m ³
80182	Transport of sleepers and fastenings, complete, [gauge], [fastening type], [rail mass] kg/m, [description]	each
80183	Transport of sleepers, [gauge], [description]	each
80184	Transport of sleeper fastenings, [type], [gauge], [rail mass] kg/m	each
80185	Transport of rail, [rail mass], kg/m, [HH PC]	m
80186	Transport of [guard rails splay rails], [rail mass] kg/m	m
80187	Transport of guard rail vees, [description]	each
80188	Transport of junction rails, [rail mass] kg/m to [rail mass] kg/m	each
80189	Transport of turnouts, [gauge], [crossing rate and turnout radius]	each
80190	Transport of catch points, [gauge], [crossing rate]	each
80191	Transport of diamonds, [description]	each
80192	Transport of derailleurs, [type]	each
Trackwork Materials Supply / Transport		
80211	Supply and transport of ballast	m ³
80212	Supply and transport of sleepers and fastenings, complete, [gauge], [fastening type], [rail mass] kg/m, [description]	each
80213	Supply and transport of sleepers, [gauge], [description]	each
80214	Supply and transport of sleeper fastenings, [type], [gauge], [rail mass] kg/m	each
80216	Supply and transport of rail, [rail mass] kg/m, [HH PC]	m
80217	Supply and transport of [guard rails splay rails], [rail mass] kg/m	m
80218	Supply and transport of guard rail vees, [description]	each
80219	Supply and transport of junction rails, [rail mass] kg/m to [rail mass] kg/m	each

Standard Item No.	Description	Unit of Measurement
80220	Supply and transport of turnouts, [<i>gauge</i>], [<i>crossing rate and turnout radius</i>]	each
80221	Supply and transport of catch points, [<i>gauge</i>], [<i>crossing rate</i>]	each
80222	Supply and transport of diamonds, [<i>description</i>]	each
80223	Supply and transport of derailleurs, [<i>type</i>]	each
Trackwork Construction		
80241	Construction of track, complete, [<i>gauge</i>], [<i>rail mass</i>] kg/m, [<i>spacing</i>] mm sleeper spacing, [<i>depth</i>] mm ballast depth, [<i>width</i>] mm ballast shoulder width	track m
80242	Construction of turnouts, [<i>gauge</i>], [<i>rail mass</i>] kg/m, [<i>crossing rate and turnout radius</i>]	each
80243	Construction of catch point, [<i>gauge</i>], [<i>rail mass</i>] kg/m, [<i>crossing rate</i>]	each
80244	Construction of diamond, [<i>description</i>]	each
80245	Installation of ballast, [<i>description</i>]	m ³
80246	Installation of sleepers, [<i>gauge</i>], [<i>description</i>]	each
80247	Installation of rail, [<i>rail mass</i>] kg/m	m
80248	Installation of [<i>guard rails</i> <i>splay rails</i>]	m
80249	Installation of guard rail vees, [<i>description</i>]	each
80250	Installation of derailleurs, [<i>type</i>]	each
80251	Track resurfacing	track m
80252	Turnout resurfacing	each
80253	Rail welding, [<i>flash butt</i> <i>aluminothermic</i>]	each
80254	Rail destressing	lump sum
80255	Rail [<i>grinding</i> <i>milling</i> <i>bending</i>]	m
Trackwork Monuments and Signage		
80271	Supply and installation of track monuments	each
80272	Supply and installation of track signage, [<i>description</i>]	each
Trackwork Buffer Stops and Restraining Devices		
80291	Supply of [<i>fixed</i> <i>energy absorbing</i>] buffer stops, [<i>type</i>]	each
80292	Installation of [<i>fixed</i> <i>energy absorbing</i>] buffer stops, [<i>type</i>]	each
80293	Supply and installation of [<i>fixed</i> <i>energy absorbing</i>] buffer stops, [<i>type</i>]	each
80294	Construction of [<i>stop blocks</i> <i>sand bunkers</i> <i>ballast or sand traps</i> <i>ballast or earth run off areas</i> <i>heavy stopping structures</i>]	each
Trackwork Rail Joints		
80311	Supply of [<i>mechanical non-insulated</i> <i>mechanical insulated</i> <i>glued insulated</i>] rail joints, [<i>type</i>]	each
80312	Supply of [<i>junction plates</i> <i>junction rails</i>], [<i>type</i>]	each

Standard Item No.	Description	Unit of Measurement
80313	Installation of [<i>mechanical non-insulated</i> <i>mechanical insulated</i> <i>glued insulated</i>] rail joints, [<i>type</i>]	each
80314	Installation of [<i>junction plates</i> <i>junction rails</i>], [<i>type</i>]	each
80315	Supply and installation of [<i>mechanical non-insulated</i> <i>mechanical insulated</i> <i>glued insulated</i>] rail joints, [<i>type</i>]	each
80316	Supply and installation of [<i>junction plates</i> <i>junction rails</i>], [<i>type</i>]	each
Trackwork Miscellaneous		
80331	Testing and commissioning of trackwork, [<i>description</i>]	lump sum
80332	Construction of turnout pads, [<i>description</i>]	each
80333	Supply and installation of rail lubricators, [<i>type</i>]	each
80334	Supply and installation of ballast mats, [<i>type</i>]	m ²

2.2 Work Operations

Work Operations included in the Standard Work Items are specified in the relevant clause adjacent to each Standard Work Item listed in Table 2.1.

2.2.1 Trackwork Removal / Demolition

Item 80101 Removal or demolition of track, complete, [*gauge*], [*rail mass*] kg/m

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) removing and relocating of trackside infrastructure, where necessary
- c) removing and relocating of track mounted infrastructure, where necessary
- d) cutting of rail
- e) unfastening of rail from sleepers
- f) removal of rail
- g) removal of burrs from cut rail ends
- h) removal of sleepers
- i) removal of ballast
- j) transporting, unloading, and stockpiling of components for re-use at a later stage, where necessary
- k) transport of materials selected for salvage to the nominated storage Site
- l) removing from Site and disposing of all surplus materials, and
- m) utilising or disposing of excavated and removed or demolished materials.

Item 80102 Removal or demolition of [turnouts | catch points], [gauge], [turnout radius (tangential only) and crossing rate]

Item 80103 Removal or demolition of diamonds, [description]

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) removing and relocating of trackside infrastructure, where necessary
- c) removing and relocating of track mounted infrastructure, where necessary
- d) cutting of rail
- e) unfastening of rail from sleepers
- f) removal of rail
- g) removal of burrs from cut rail ends
- h) removal of sleepers
- i) removal of ballast
- j) transporting, unloading, and stockpiling of components for re-use at a later stage, where necessary
- k) transport of materials selected for salvage to the nominated storage Site
- l) removing from Site and disposing of all surplus materials, and
- m) utilising or disposing of excavated and removed or demolished materials.

Item 80104 Removal or demolition of ballast

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) removal of ballast
- c) transporting, unloading, and stockpiling of components for re-use at a later stage, where necessary
- d) transport of materials selected for salvage to the nominated storage Site
- e) removing from Site and disposing of all surplus materials, and
- f) utilising or disposing of excavated and removed or demolished materials.

Item 80105 Removal or demolition of sleepers, [gauge]

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) removal of sleepers
- c) transporting, unloading, and stockpiling of components for re-use at a later stage, where necessary

- d) transport of materials selected for salvage to the nominated storage Site, and
- e) removing from Site and disposing of all surplus materials.

Item 80106 Removal or demolition of [rail | guard rails | splay rails], [rail mass] kg/m

Item 80107 Removal or demolition of guard rail vees

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) removing and relocating of trackside infrastructure, where necessary
- c) removing and relocating of track mounted infrastructure, where necessary
- d) cutting of rail
- e) unfastening of rail from sleepers
- f) removal of burrs from cut rail ends
- g) removal of rail
- h) transporting, unloading, and stockpiling of components for re-use at a later stage, where necessary
- i) transport of materials selected for salvage to the nominated storage Site, and
- j) removing from Site and disposing of all surplus materials.

Item 80108 Removal or demolition of derailleurs, [type]

Item 80109 Removal or demolition of [track monuments | track signage | buffer stops]

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) removal of components
- c) transporting, unloading, and stockpiling of components for re-use at a later stage, where necessary
- d) transport of materials selected for salvage to the nominated storage Site, and
- e) removing from Site and disposing of all surplus materials.

Item 80110 Removal or demolition [stop blocks | sand bunkers | ballast or sand traps | ballast or earth run off areas | heavy stopping structures], [description]

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) carrying out any necessary excavations
- c) removing or demolishing concrete components
- d) transporting, unloading, and stockpiling of components for re-use at a later stage, where necessary
- e) transport of materials selected for salvage to the nominated storage Site

- f) removing from Site and disposing of all surplus materials
- g) utilising or disposing of excavated and removed or demolished materials, and
- h) backfilling resulting excavations.

Item 80111 Removal or demolition of rail lubricators, [type]

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) removal of grease delivery hose(s), blade(s), anchor block, main container, and all clamps, fixing bolts, nuts, and washers
- c) transporting, unloading, and stockpiling of components for re-use at a later stage, where necessary
- d) transport of materials selected for salvage to the nominated storage Site, and
- e) removing from Site and disposing of all surplus materials.

2.2.2 Trackwork Modifications / Renewals

Item 80131 Lifting / slewing of track, [description]

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) preparing and levelling of Site, where necessary
- c) supply and delivery of all materials (excluding geotextile and/or high-strength geosynthetic reinforcement, where required)
- d) excavation of existing Subgrade in accordance with the Work Operations of Standard Work Item 32101 in MRS04 *General Earthworks* Clause 2.2.5, where required
- e) compaction of base of excavation, where required
- f) placing and compacting of embankment in accordance with the Work Operations of Standard Work Item 32201 in MRS04 *General Earthworks* Clause 2.2.6, where required
- g) sampling and testing of Fill Material, where required
- h) trimming of Subgrade to tolerance, where required
- i) rehandling and transport of materials on the Site where necessary
- j) distribution of ballast
- k) watering of ballast prior to loading and during construction
- l) preparation of alignment for track construction (surveying, marking, etc)
- m) placing, trimming, and compacting of additional ballast
- n) cutting of rails, where necessary
- o) slewing of track to new alignment
- p) placing of top ballast
- q) lifting and tamping of track to the finished line, level, and superelevation

- r) supply, loading, transporting, unloading, and distributing of additional top ballast, as necessary
- s) compacting of ballast
- t) regulating of ballast
- u) welding of rail in accordance with the Work Operations of Standard Work Item 80253 in Clause 2.2.6
- v) surveying of the completed rail, as required
- w) testing for stress free temperature
- x) destressing in accordance with the Work Operations of Standard Work Item 80254 in Clause 2.2.6, where necessary, and
- y) removal of surplus materials from Site.

Item 80132 Renewal of ballast, [description]

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) removing, relocating, and reinstalling of trackside infrastructure, where necessary
- c) removing, relocating, and reinstalling of track mounted infrastructure, where necessary
- d) removing, relocating, and reinstalling of rail, where necessary
- e) removing, relocating, and reinstalling of sleepers, where necessary
- f) removal of ballast
- g) transporting, unloading, and stockpiling of components for re-use at a later stage, where necessary
- h) transport of materials selected for salvage to the nominated storage Site
- i) removing from the Site and disposing or reusing of all surplus materials
- j) utilising or disposing of excavated and removed or demolished materials
- k) rehandling and transport of materials on the Site, where necessary
- l) distribution of ballast
- m) watering of ballast prior to loading and during construction
- n) placement of ballast
- o) lifting and tamping of track to the finished line, level, and superelevation
- p) regulating of ballast
- q) stabilising of track, where required,
- r) surveying of the completed rail, as required
- s) testing for stress free temperature, and
- t) destressing in accordance with the Work Operations of Standard Work Item 80254 in Clause 2.2.6, where necessary.

Item 80133 Renewal of sleepers, [description]

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) removing, relocating, and reinstalling of trackside infrastructure, where necessary
- c) removing, relocating, and reinstalling of track mounted infrastructure, where necessary
- d) removing, relocating, and reinstalling of rail, where necessary
- e) removal of sleepers
- f) transporting, unloading, and stockpiling of components for re-use at a later stage, where necessary
- g) transport of materials selected for salvage to the nominated storage Site
- h) removing from the Site and disposing or reusing of all surplus materials
- i) rehandling and transport of materials on the Site, where necessary
- j) distribution of sleepers, bearers, insulators, pads, and fasteners
- k) cleaning of bearing surface of all sleepers, sleeper plates, pads and bottom of rails and other bearing surfaces
- l) handling and placement of sleepers
- m) rehandling of rail onto sleepers, where necessary
- n) fastening of rail
- o) installation of additional ballast material in accordance with the Work Operations of Standard Work Item 80245 in Clause 2.2.6, where necessary
- p) lifting and tamping of track to the finished line, level, and superelevation
- q) regulating of ballast
- r) stabilising of track, where required
- s) surveying of the completed rail, as required
- t) testing for stress free temperature, and
- u) destressing in accordance with the Work Operations of Standard Work Item 80254 in Clause 2.2.6, where necessary.

Item 80134 Renewal of rail, [description]

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) removing, relocating, and reinstalling of trackside infrastructure, where necessary
- c) removing, relocating, and reinstalling of track mounted infrastructure, where necessary
- d) cutting of rail
- e) unfastening of rail from sleepers

- f) removal of burrs from cut rail ends
- g) removal of rail
- h) transporting, unloading, and stockpiling of components for re-use at a later stage, where necessary
- i) transport of materials selected for salvage to the nominated storage Site
- j) removing from the Site and disposing or reusing of all surplus materials
- k) rehandling and transport of materials on the Site, where necessary
- l) distribution of rail
- m) handling and placement of rail
- n) welding of rail
- o) rehandling of rail onto sleepers, where necessary
- p) cutting of rails, where necessary
- q) clamping of rail, where necessary
- r) fastening of rail
- s) lifting and tamping of track to the finished line, level, and superelevation
- t) regulating of ballast
- u) stabilising of track, where required
- v) welding of rail in accordance with the Work Operations of Standard Work Item 80253 in Clause 2.2.6
- w) surveying of the completed rail, as required
- x) testing for stress free temperature, and
- y) destressing in accordance with the Work Operations of Standard Work Item 80254 in Clause 2.2.6, where necessary.

2.2.3 Trackwork Materials Supply

Item 80151	Supply of ballast
Item 80152	Supply of sleepers and fastenings, complete, [<i>gauge</i>], [<i>fastening type</i>], [<i>rail mass</i>] kg/m, [<i>description</i>]
Item 80153	Supply of sleepers, [<i>gauge</i>], [<i>description</i>]
Item 80154	Supply of sleeper fastenings, [<i>type</i>], [<i>gauge</i>], [<i>rail mass</i>] kg/m
Item 80155	Supply of rail, [<i>rail mass</i>] kg/m, [<i>HH</i> <i>PC</i>]
Item 80156	Supply of [<i>guard rails</i> <i>splay rails</i>], [<i>rail mass</i>] kg/m
Item 80157	Supply of guard rail vees, [<i>description</i>]
Item 80158	Supply of junction rails, [<i>rail mass</i>] kg/m to [<i>rail mass</i>] kg/m
Item 80159	Supply of turnouts, [<i>gauge</i>], [<i>crossing rate and turnout radius</i>]

Item 80160 **Supply of catch points, [gauge], [crossing rate]**

Item 80161 **Supply of diamonds, [description]**

Item 80162 **Supply of derailleurs, [type]**

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*, and
- b) supply of all materials.

2.2.4 Trackwork Materials Transport

Item 80181 **Transport of ballast**

Item 80182 **Transport of sleepers and fastenings, complete, [gauge], [fastening type], [rail mass] kg/m, [description]**

Item 80183 **Transport of sleepers, [gauge], [description]**

Item 80184 **Transport of sleeper fastenings, [type], [gauge], [rail mass] kg/m**

Item 80185 **Transport of rail, [rail mass], kg/m [HH | PC]**

Item 80186 **Transport of [guard rails | splay rails], [rail mass] kg/m**

Item 80187 **Transport of guard rail vees, [description]**

Item 80188 **Transport of junction rails, [rail mass] kg/m to [rail mass] kg/m**

Item 80189 **Transport of turnouts, [gauge], [crossing rate and turnout radius]**

Item 80190 **Transport of catch points, [gauge], [crossing rate]**

Item 80191 **Transport of diamonds, [description]**

Item 80192 **Transport of derailleurs, [type]**

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) taking delivery at the location and by the mode nominated in the Contract
- c) transport to the Site
- d) unloading at the Site
- e) storage at the Site, and
- f) provision of temporary support including packers, where necessary.

2.2.5 Trackwork Materials Supply / Transport

Item 80211 **Supply and transport of ballast**

Item 80212 **Supply and transport of sleepers and fastenings, complete, [gauge], [fastening type], [rail mass] kg/m, [description]**

Item 80213 **Supply and transport of sleepers, [gauge], [description]**

Item 80214 **Supply and transport of sleeper fastenings, [type], [gauge], [rail mass] kg/m**

Item 80216 **Supply and transport of rail, [rail mass] kg/m, [HH | PC]**

- Item 80217** **Supply and transport of [guard rails | splay rails], [rail mass] kg/m**
- Item 80218** **Supply and transport of guard rail vees, [description]**
- Item 80219** **Supply and transport of junction rails, [rail mass] kg/m to [rail mass] kg/m**
- Item 80220** **Supply and transport of turnouts, [gauge], [crossing rate and turnout radius]**
- Item 80221** **Supply and transport of catch points, [gauge], [crossing rate]**
- Item 80222** **Supply and transport of diamonds, [description]**
- Item 80223** **Supply and transport of derailleurs, [type]**

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supply of all materials
- c) taking delivery at the location and by the mode nominated in the Contract
- d) transport to the Site
- e) unloading at the Site
- f) storage at the Site
- g) rehandling and transport on the Site where necessary, and
- h) provision of temporary support including packers, where necessary.

2.2.6 Trackwork Construction

- Item 80241** **Construction of track, complete, [gauge], [rail mass] kg/m, [spacing] mm sleeper spacing, [depth] mm ballast depth, [width] mm ballast shoulder width**

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) rehandling and transport of materials on the Site where necessary
- c) distribution of sleepers, bearers, insulators, pads, and fasteners
- d) distribution of ballast
- e) distribution of rail
- f) watering of ballast prior to loading and during construction
- g) preparation of alignment for track construction (surveying, marking, etc)
- h) cleaning of bearing surface of all sleepers, sleeper plates, pads and bottom of rails and other bearing surfaces
- i) handling and placement of rail
- j) welding of rail
- k) handling and placement of sleepers
- l) rehandling of rail onto sleepers, where necessary
- m) cutting of rails, where necessary

- n) clamping of rail, where necessary
- o) fastening of rail
- p) placement of ballast
- q) lifting and tamping of track to the finished line, level, and superelevation
- r) regulating of ballast
- s) stabilising of track, where required
- t) welding track in accordance with the Work Operations of Standard Work Item 80253 in Clause 2.2.6
- u) surveying of the completed rail, as required
- v) testing for stress free temperature
- w) destressing in accordance with the Work Operations of Standard Work Item 80254 in Clause 2.2.6, where necessary, and
- x) removal of surplus materials from Site.

Item 80242 Construction of turnouts, [gauge], [rail mass] kg/m, [crossing rate and turnout radius]

Item 80243 Construction of catch point, [gauge], [rail mass] kg/m, [crossing rate]

Item 80244 Construction of diamond, [description]

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) constructing of turnout pads in accordance with the Work Operations of Standard Work Item 80332 in Clause 2.2.10, where necessary
- c) rehandling and transport of materials on the Site, where necessary
- d) distribution of sleepers, bearers, insulators, pads, and fasteners
- e) distribution of ballast
- f) distribution of rail, switches, and other turnout, derailer, and/or catch point materials
- g) watering of ballast prior to loading and during construction
- h) preparation of alignment for track construction (surveying, marking, etc)
- i) cleaning of bearing surface of all sleepers, bearers, sleeper plates, pads and bottom of rails and other bearing surfaces
- j) handling and placing of sleepers and bearers into position
- k) handling and placing of rail into position
- l) cutting of rails, where necessary
- m) clamping of rail, where necessary
- n) fastening of rail
- o) temporary joining of rail, where necessary

- p) measuring of turnout assembly prior to installation, where required
- q) breaking of the assembled turnout into sections suitable for transport to the installation Site, where required
- r) installing of sections of pre-assembled turnout
- s) placing and compacting of bottom ballast
- t) placing of top ballast
- u) lifting and tamping of track to the finished line, level, and superelevation
- v) regulating of ballast
- w) stabilising of track, where required
- x) installing of components to manufacturers specifications
- y) making of all required service connections to make the components operational
- z) welding in accordance with the Work Operations of Standard Work Item 80253 in Clause 2.2.6
- aa) surveying of the completed rail, as required
- bb) testing
- cc) destressing in accordance with the Work Operations of Standard Work Item 80254 in Clause 2.2.6, where necessary, and
- dd) removal of surplus materials from Site.

Item 80245 Installation of ballast, [description]

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) rehandling and transport of materials on the Site where necessary
- c) distribution of ballast
- d) watering of ballast prior to loading and during construction
- e) placement of ballast
- f) lifting and tamping of track to the finished line, level, and superelevation
- g) regulating of ballast
- h) stabilising of track, where required
- i) surveying of the completed rail, as required, and
- j) removal of surplus materials from Site.

Item 80246 Installation of sleepers, [gauge], [description]

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) rehandling and transport of materials on the Site where necessary
- c) distribution of sleepers, bearers, insulators, pads, and fasteners

- d) cleaning of bearing surface of all sleepers, sleeper plates, pads and bottom of rails and other bearing surfaces
- e) handling and placement of sleepers
- f) rehandling of rail onto sleepers, where necessary
- g) fastening of rail
- h) installation of additional ballast material in accordance with the Work Operations of Standard Work Item 80245 in Clause 2.2.6, where necessary.
- i) lifting and tamping of track to the finished line, level, and superelevation
- j) regulating of ballast
- k) stabilising of track, where required
- l) surveying of the completed rail, as required, and
- m) removal of surplus materials from Site.

Item 80247 Installation of rail, [*rail mass*] kg/m

Item 80248 Installation of [*guard rails* | *splay rails*]

Item 80249 Installation of guard rail vees, [*description*]

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) rehandling and transport of materials on the Site where necessary
- c) distribution of rail
- d) handling and placement of rail
- e) welding of rail
- f) rehandling of rail onto sleepers, where necessary
- g) cutting of rails, where necessary
- h) clamping of rail, where necessary
- i) fastening of rail
- j) lifting and tamping of track to the finished line, level, and superelevation
- k) regulating of ballast
- l) stabilising of track, where required
- m) welding track in accordance with the Work Operations of Standard Work Item 80253 in Clause 2.2.6
- n) surveying of the completed rail, as required
- o) testing for stress free temperature

- p) destressing in accordance with the Work Operations of Standard Work Item 80254 in Clause 2.2.6, where necessary, and
- q) removal of surplus materials from Site.

Item 80250 Installation of derailleurs, [*type*]

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supply of derailleurs
- c) supply of all fixing bolts, nuts, and washers
- d) handling, transport to Site, and storage on the Site
- e) rehandling and transporting on the Site, where necessary
- f) drilling of rail, where necessary
- g) assembly of components
- h) installation of components
- i) testing of functionality
- j) cleaning of worksite, and
- k) all required services connections to make the components operational.

Item 80251 Track resurfacing

Item 80252 Turnout resurfacing

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) lifting and tamping of track to the finished line, level, and superelevation
- c) regulating of ballast
- d) stabilising of track, where required, and
- e) removal of surplus ballast from Site.

Item 80253 Rail welding, [*flash butt* | *aluminothermic*]

Work Operations incorporated in the above include the following as appropriate for flash butt welding:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) cleaning of rail ends of scale and rust to ensure electrical contact between the electrodes and the rail surface, and between rail ends
- c) positioning and clamping the rails, checking alignment within the welding head in such a way that the finished weld, when cooled, complies with the specified tolerances
- d) preheating and flashing the rails
- e) upset (forging) of weld
- f) removal of weld collar by shearing

- g) controlling of cooling rate (either through post weld heat treatment or quenching) to ensure conformance to specified hardness, microstructure and residual stresses
- h) dressing and grinding of weld
- i) numbering and placement of weld identification on the rail web adjacent to the weld
- j) testing of weld
- k) reporting to the client representative, and
- l) cutting and replacing of rail and re-welding of failed welds, where necessary.

Work Operations incorporated in the above include the following as appropriate for aluminothermic welding:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) cleaning of rail ends of scale and rust
- c) positioning and clamping the rails, checking alignment within the aluminothermic cast in such a way that the finished weld, when cooled, complies with the specified tolerances
- d) preheating and flashing the rails
- e) upset (forging) of weld
- f) controlling of cooling rate (either through post weld heat treatment or quenching) to ensure conformance to specified hardness, microstructure and residual stresses
- g) removal of weld collar by shearing
- h) dressing and grinding of weld
- i) numbering and placement of weld identification on the rail web adjacent to the weld
- j) testing of weld
- k) reporting to the client representative, and
- l) cutting and replacing of rail and re-welding of failed welds, where necessary.

Item 80254 Rail destressing

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) provision of creep monitoring points
- c) testing of stress free temperature
- d) cutting of rail
- e) unclipping of rail
- f) disturbing the rail
- g) pulling of rail
- h) welding of rail
- i) grinding of rail

- j) clipping of rail
- k) removal of surplus materials from Site, and
- l) measuring, marking out, recording, and reporting to the client representative.

Item 80255 Rail [grinding | milling | bending]

Work Operations incorporated in the above include the following as appropriate for rail grinding and rail milling:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supply of all consumables including grindstones, oils, and spares for grinding
- c) grinding of rail to the approved rail profile
- d) provision for and undertaking of fire suppression, where necessary
- e) provision for care of trackside infrastructure and equipment
- f) cleaning of the rail following grinding, and
- g) measurement of profiles and tolerances before, during, and after profiling.

Work Operations incorporated in the above include the following as appropriate for rail bending:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*, and
- b) bending or crowing of rail using an approved method.

2.2.7 Trackwork Monuments and Signage

Item 80271 Supply and installation of track monuments

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supply of posts
- c) supply of datum plates and fixings
- d) delivery to the Site
- e) unloading at the Site
- f) storage on the Site
- g) rehandling and transport on the Site, where necessary
- h) installation of monuments, and
- i) fixing of datum plate to post.

Item 80272 Supply and installation of track signage, [description]

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supply of all materials
- c) fabrication of the sign panels and sign frames, where applicable

- d) attachment of stiffeners, where applicable
- e) application of protective coatings, colour coatings, reflective coatings and messages
- f) reference marking of signs
- g) delivery to the Site
- h) unloading at the Site
- i) storage on the Site
- j) rehandling and transport on the Site, where necessary
- k) installation of posts
- l) installation of frames, where applicable, and
- m) installation of the sign faces to posts or frames.

2.2.8 Trackwork Buffer Stops and Restraining Devices

Item 80291 Supply of *[fixed | energy absorbing]* buffer stops, *[type]*

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supply of all materials
- c) delivery to the Site
- d) unloading at the Site, and
- e) storage on the Site.

Item 80292 Installation of *[fixed | energy absorbing]* buffer stops, *[type]*

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) rehandling and transport on the Site, where necessary
- c) installation of all components
- d) modifications to the track, where necessary, and
- e) all required services connections to make the components operational.

Item 80293 Supply and installation of *[fixed | energy absorbing]* buffer stops, *[type]*

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supply of all materials
- c) delivery to the Site
- d) unloading at the Site
- e) storage on the Site
- f) rehandling and transport on the Site, where necessary

- g) installation of all components
- h) modifications to the track, where necessary, and
- i) all required services connections to make the components operational.

Item 80294 Construction of [*stop blocks* | *sand bunkers* | *ballast or sand traps* | *ballast or earth run off areas* | *heavy stopping structures*]

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supply of all materials as specified in project documents
- c) delivery to the Site
- d) unloading at the Site
- e) storage on the Site
- f) rehandling and transport on the Site, where necessary, and
- g) installation of all components.

2.2.9 Trackwork Rail Joints

Item 80311 Supply of [*mechanical non-insulated* | *mechanical insulated* | *glued insulated*] rail joints, [*type*]

Item 80312 Supply of [*junction plates* | *junction rails*], [*type*]

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supply of plates, insulating plates or liners, end posts, ferrules or bushes, fixing bolts, nuts, washers, and all other components, and
- c) handling, transport to Site, and storage on the Site.

Item 80313 Installation of [*mechanical non-insulated* | *mechanical insulated* | *glued insulated*] rail joints, [*type*]

Item 80314 Installation of [*junction plates* | *junction rails*], [*type*]

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) rehandling and transport on the Site, where necessary
- c) unfastening of rail from sleepers, where necessary
- d) cutting of rails
- e) drilling of rail
- f) removal of burrs from cut rail ends
- g) preparation of rail surfaces to manufacturers specifications
- h) assembly of components

- i) installing of components to manufacturers specifications
- j) welding (for prefabricated joints)
- k) fastening of rail
- l) grinding of rail
- m) resurfacing, where necessary
- n) distressing, where necessary
- o) removal of surplus materials from Site, and
- p) cleaning of worksite.

Item 80315 Supply and installation of [*mechanical non-insulated* | *mechanical insulated* | *glued insulated*] rail joints, [type]

Item 80316 Supply and installation of [*junction plates* | *junction rails*], [type]

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supply of plates, insulating plates or liners, end posts, ferrules or bushes, fixing bolts, nuts, washers, and all other components
- c) handling, transport to Site, and storage on the Site
- d) rehandling and transport on the Site, where necessary
- e) unfastening of rail from sleepers, where necessary
- f) cutting of rails
- g) drilling of rail
- h) removal of burrs from cut rail ends
- i) preparation of rail surfaces to manufacturers specifications
- j) assembly of components
- k) installing of components to manufacturers specifications
- l) welding (for prefabricated joints)
- m) fastening of rail
- n) grinding of rail
- o) resurfacing, where necessary
- p) distressing, where necessary
- q) removal of surplus materials from Site, and
- r) cleaning of worksite.

2.2.10 Trackwork Miscellaneous

Item 80331 **Testing and commissioning of trackwork, [description]**

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) development of Testing and Commissioning Plan
- c) undertaking testing and commissioning activities in accordance with the approved Testing and Commissioning Plan
- d) inspection and test plans
- e) clearance reports
- f) weld certification
- g) rail stressing records
- h) as-built documentation
- i) track geometry reports
- j) handover documentation including test documents
- k) checking of track geometry and ride quality using an approved method
- l) reporting to client representative, and
- m) visual inspection of the track using an approved method.

Item 80332 **Construction of turnout pads, [description]**

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) design of turnout pad
- c) provision of all materials for construction of turnout pad
- d) construction and maintenance of turnout pad, and
- e) removal of turnout pad.

Item 80333 **Supply and installation of rail lubricators, [type]**

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supply of rail lubricators including grease delivery hose(s), blade(s), anchor block, main container, and all clamps
- c) supply of all fixing bolts, nuts, and washers
- d) handling, transport to Site, and storage on the Site
- e) rehandling and transport on the Site, where necessary
- f) drilling of rail, where necessary
- g) assembly of components

- h) installation of components
- i) adjusting of blade and pump plunger height as necessary
- j) filling of main container with approved grease
- k) priming of pumps and blades
- l) testing of functionality
- m) bleeding of air from the system, where necessary, and
- n) cleaning of worksite.

Item 80334 Supply and installation of ballast mats, [type]

Work Operations incorporated in the above include the following as appropriate:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supply of ballast mats
- c) handling, transport to Site, and storage on the Site
- d) rehandling and transport on the Site, where necessary
- e) preparation of the surface, where necessary, and
- f) installation of ballast mats.

2.3 Measurement

If any item for which a quantity of work is listed in the Schedule of Rates has not been priced by the Contractor, it will be deemed that due allowance has been made in the prices of other items for the cost of the activity which has not been priced.

2.3.1 Measurement of trackwork

This Specification provides Standard Work Items for:

- a) supply only
- b) installation only, and
- c) supply and installation

of trackwork components.

Any combination of Standard Work Items relating to these methods of measurement may be used in the Schedule of Rates. However, where a Standard Work Item for supply and installation of a particular component or group of components is included in the Schedule of Rates, no supply only nor installation only Standard Work Item shall also apply to that component or group of components, as applicable.

2.3.2 Measurement of trackwork construction

This Specification provides Standard Work Items for:

- a) "installation of" ballast, sleepers, rail, etc
- b) track and turnout resurfacing
- c) rail welding

- d) rail destressing
- e) rail grinding
- f) rail milling
- g) rail bending, and
- h) “construction of” track, turnouts, catch points, and diamonds.

Any combination of Standard Work Items relating to these methods of measurement may be used in the Schedule of Rates. However, where a Standard Work Item for “construction of” a particular component or group of components is included in the Schedule of Rates, no other Standard Work Item shall also apply to that component or group of components, as applicable.

2.3.3 Unloading, handling, and temporary storage on Site

No separate Standard Work Item shall apply to, and no separate payment shall be made for unloading, multiple handling and temporary storage, and the handling to the workface of trackwork materials on the Site described by this Specification and/or the Drawings. Full payment for such activities shall be deemed to be included in the rates for the Standard Work Items included in the Schedule of Rates.

2.4 Calculation of quantities

2.4.1 General

Unless specified otherwise in Clause 2.4, quantities shall be calculated in accordance with the provisions of Clause 2.1.1 of MRS01 *Introduction to Specifications*.

2.4.2 Supply only

Where trackwork components are supplied only under the Contract (i.e., not installed), the quantity shall be the exact quantity supplied and quantities shall not be rounded in accordance with Clause 2.1.1 of MRS01 *Introduction to Specifications*.

Where trackwork components are installed only or are supplied and installed under the Contract, the quantity shall be measured in accordance with the remainder of this Clause and normal rounding of the final quantity shall apply.

2.4.3 Track

The quantity (Track Length) shall be the length along the centreline of the track as shown on or calculated from the Drawings including any length of turnouts.

2.4.4 Ballast

The quantity shall be determined from the three-dimensional shape bounded by the top of the sleepers, the Formation Level, and the shoulder slope less the volume of sleepers, as shown or calculated from the Drawings or otherwise nominated in the Contract.

2.4.5 Sleepers

The quantity shall be the number of sleepers as shown or calculated from the Drawings or otherwise nominated in the Contract, along the length of the track. Where a nominated sleeper spacing is used to calculate the quantity, the quantity shall be the Track Length divided by the sleeper spacing; where Track Length is calculated in accordance with Clause 2.4.3.

2.4.6 Rail

The quantity shall be the Track Length multiplied by the number of rails (i.e., 2 rails for narrow gauge and 3 rails for dual gauge).

2.5 *Trackwork materials supplied by the Principal*

2.5.1 Supply of trackwork materials

Where listed in the Principal Supplied Material List (Form C7827), trackwork materials shall be supplied by the Principal. Where not so listed, trackwork materials shall be supplied by the Contractor.

2.5.2 Supply location

Trackwork materials supplied by the Principal will be made available at the point of delivery and by the transport mode shown in the Principal Supplied Material List (Form C7827).

2.5.3 Time of delivery

The time of delivery shall generally conform to the construction program supplied by the Contractor with its tender.

Should on-Site construction be delayed, the Contractor may be required to accept delivery of the trackwork materials at any time after the programmed date and to store the trackwork materials at no cost to the Principal.

2.5.4 Acceptance of trackwork materials by the Contractor

The Contractor shall check the trackwork materials for quantity and condition upon taking delivery and shall immediately report to the Administrator any defect or deficiency. **Nonconformance**

2.5.5 Damage to trackwork materials

In the event of any trackwork materials sustaining damage after the trackwork materials has been accepted by the Contractor or Principal, the trackwork materials shall be set aside until it has been inspected by the Administrator or Principal. **Nonconformance** The cost of repairs to the damaged trackwork materials and the cost of replacing the rejected trackwork materials shall be borne by the Contractor or manufacturer.

