



Manual

Train Operating Conditions (TOC) Manual – General Instructions

Version 28.0

Issue date: 28 February 2024

Disclaimer

This document has been prepared by Transport for NSW (TfNSW) specifically for its own use and is also available for use by NSW public transport agencies for transport assets.

Any third parties considering use of this document should obtain their own independent professional advice about the appropriateness of using this document and the accuracy of its contents. TfNSW disclaims all responsibility and liability arising whether directly or indirectly out of or in connection with the contents or use of this document.

TfNSW makes no warranty or representation in relation to the accuracy, currency or adequacy of this document or that the document is fit for purpose.

The inclusion of any third party material in this document, does not represent an endorsement by TfNSW of any third party product or service.

For queries regarding this document, please email Transport for NSW Asset Management Branch at standards@transport.nsw.gov.au or visit www.transport.nsw.gov.au

Document information

Owner: Director Fleet Engineering, Asset Management Branch
Authoriser: Director Engineering, Asset Management Branch
Approver: Executive Director, Asset Management Branch on behalf of the AMB Configuration Control Board

Document history

Version	Summary of changes
1.0	First issue (December 2013)
2.0	Second issue (December 2014)
3.0	Third issue (April 2015)
4.0	Fourth issue (August 2015)
5.0	Fifth issue (December 2015)
6.0	Sixth issue (April 2016)
7.0	Seventh issue (August 2016)
8.0	Eighth issue (December 2016)
9.0	Ninth issue (April 2017)
10.0	Tenth issue (August 2017)
11.0	Eleventh issue (December 2017)
12.0	Twelfth issue (April 2018)
13.0	Thirteenth issue (August 2018)
14.0	Fourteenth issue (December 2018)
15.0	Fifteenth issue (April 2019)
16.0	Sixteenth issue (August 2019)
17.0	Seventeenth issue (December 2019)
18.0	Eighteenth issue (April 2020)
19.0	Nineteenth issue (August 2020)
20.0	Twentieth issue (December 2020)
21.0	Twenty-first issue (April 2021)
22.0	Twenty second issue (August 2021)
23.0	Twenty third issue (December 2021)
24.0	Twenty fourth issue (April 2022)
25.0	Twenty fifth issue (August 2022)
26.0	Twenty sixth issue (December 2022)
27.0	Twenty seventh issue (April 2023)
28.0	Current issue (December 2023)

Preface

The Asset Management Branch (AMB), formerly known as Asset Standards Authority (ASA) is a key strategic branch of Transport for NSW (TfNSW). As the network design and standards authority for NSW Transport Assets, the AMB identifies, selects, develops, publishes, maintains and controls a suite of requirements documents on behalf of TfNSW, the asset owner.

The AMB deploys TfNSW requirements for asset and safety assurance by creating and managing TfNSW's governance models, documents and processes. To achieve this, the AMB focuses on four primary tasks:

- publishing and managing TfNSW's process and requirements documents including TfNSW plans, standards, manuals and guides
- deploying TfNSW's Technically Assured Organisation (TAO) scheme
- continuously improving TfNSW's Asset Management Framework
- collaborating with the Transport cluster and industry through open engagement

The TAO scheme authorises engineering organisations to supply and provide asset related products and services to TfNSW. It works to assure the safety, quality and fitness for purpose of those products and services over the asset's whole-of-life. TAOs are expected to demonstrate how they have applied the requirements of AMB documents, including TfNSW plans, standards and guides, when delivering assets and related services for TfNSW.

Compliance with AMB requirements by itself is not sufficient to ensure satisfactory outcomes for NSW Transport Assets. The AMB expects that professional judgement be used by competent personnel when using AMB requirements to produce those outcomes.

About this document

This Train Operating Conditions (TOC) Manual has been published by the AMB to provide an update from the April 2023 issue of the TOC Manual.

This TOC Manual aims to provide a single reference and technical guidance for train operations on the TfNSW Metropolitan Heavy Rail network.

The content, information and data within this TOC Manual are derived from updates since the last edition on 18 July 2023. The information is compiled from a number of sources. The AMB performs limited validation of this information as it is deemed to be sourced from competent organisations.

This December 2023 issue of the TOC Manual comprises three parts as follows:

- TS TOC.1: 2023 issue 2; this document
- TS TOC.2: 2023 issue 2

- TS TOC.3: 2023 issue 2

As the AMB continues to evolve, future iterations of the TOC Manual and the information contained within it may be made available in different formats and delivery mechanisms to facilitate ease of access and usability.

Table of contents

Introduction	12
Purpose	12
Scope.....	12
Application	13
Referenced documents	13
Terms and definitions	14
Summary of changes	19
Page layout	20
Format of division pages.....	20
Format of division pages – explanation	21
Where can locomotives run?	23
Draw capacity tonnage and maximum train length / brake type	24
Format of speed sign table	25
Format of station data table and rolling stock data pages.....	26
1. Route standards	29
1.1. Sydney Metropolitan – Classification of lines and locations of tunnels and field devices	29
1.2. Sydney Metropolitan – Safeworking systems.....	30
1.3. Northern Division – Classification of lines and locations of tunnels and field devices	31
1.4. Northern Division – Grades and Safeworking systems Hornsby to Newcastle.....	32
1.5. Western Division – Classification of lines and locations of tunnels and field devices	33
1.6. Western Division – Grades and Safeworking systems Penrith to Bowenfels	34
1.7. Illawarra Division – Classification of lines and locations of tunnels and field devices.....	35
1.8. Illawarra Division – Grades and Safeworking systems Waterfall to Bomaderry / Port Kembla	36
1.9. Rail Operations Centre Sydney – Areas controlled by Train Control Boards.....	37
1.10. Diagram indicating track width classifications	38
1.11. Train operating length diagram.....	39
2. Locomotive operations	41
2.1. Marshalling of locomotives	41
2.2. Maximum speed of light locomotives.....	41
2.3. Assisting (banking) locomotives	41
2.4. Distributed power	44
2.5. Excessive sanding	44
2.6. De-sanding equipment.....	44
2.7. Locomotive wheel spin	45
2.8. Locomotive(s) dead attached or off line	45
2.9. Marshalling of locomotives due to brake valve type	45
2.10. Multiple unit working of locomotive	46
2.11. Mixing locomotive types.....	47
2.12. Mixing AC with DC type locomotives.....	48
2.13. Mixing locomotive types (ECP brakes).....	49

2.14.	Locomotive load categories	49
2.15.	Block working of all classes of light locomotives	54
2.16.	Block working of Diesel Multiple Unit trains (DMU)	55
2.17.	Block working of single unit diesel cars	56
3.	Train operations.....	59
3.1.	Amalgamation of trains	59
3.2.	Operation of trains on steep descending grades.....	59
3.3.	Holding a train stationary on a grade.....	61
3.4.	Train speed	61
3.5.	Operation of freight trains and light locomotives in Sydney Metropolitan area	62
3.6.	Operation of locomotives and passenger vehicles not fitted with toilet holding tanks	63
3.7.	Track speed signs.....	63
3.8.	Advisory speed signs	65
3.9.	WOLO speed restrictions.....	65
3.10.	Stabling a train on a running line or in a shunting neck when authorised	68
3.11.	Emergency equipment.....	68
3.12.	Driver safety systems	70
4.	Train marshalling.....	73
4.1.	Train marshalling	73
4.2.	Draw capacity	73
4.3.	Length restrictions due to brake type	73
4.4.	Main reservoir	74
4.5.	Trailing tonnage table	75
4.6.	Wooden bodied vehicles.....	77
4.7.	Locomotive hauled passenger cars on freight trains	77
4.8.	Test accommodation and crew cars.....	77
4.9.	Vehicles under test	77
4.10.	Dangerous Goods.....	77
4.11.	Dangerous Goods Exemption No. EXEM2000/65 explanatory notes	78
4.12.	Exemption EXEM2000/65.....	80
5.	Loading restrictions	85
5.1.	General requirements for the safe transit of freight on rail	85
5.2.	Container load distribution and securement.....	86
5.3.	Multiple stacking of containers	86
5.4.	Nested container bases (Transi Flats).....	87
5.5.	Out of gauge loads	87
5.6.	Diagrams 1, 1A, 1B and 2.....	88
5.7.	Area of operation for Diagrams 1, 1A, 1B and 2.....	89
5.8.	Diagram 3 and Note R10	90
5.9.	Area of operation for Diagram 3 and Note R10	91
6.	Train inspection	93
6.1.	Train inspection	93

6.2.	Full mechanical inspection.....	94
6.3.	General mechanical inspection.....	95
6.4.	Air brake inspection and tests.....	96
6.5.	When is a train inspection required	97
6.6.	Brake pipe leakage test	97
6.7.	Brake pipe continuity test.....	97
6.8.	Brake holding test	98
6.9.	Changing or attaching locomotives	100
6.10.	Attaching pre inspected vehicles	101
6.11.	Attaching uninspected vehicles	101
6.12.	Attaching or detaching assisting locomotives.....	102
6.13.	Locomotive run around movements	102
6.14.	Detaching vehicles.....	103
6.15.	Programmed preventative maintenance.....	103
7.	Train numbering	107
7.1.	Train numbering.....	107
7.2.	Passenger trains.....	108
7.3.	Sydney Trains and NSW TrainLink trains.....	109
7.4.	Passenger trains – heritage operator tours (HOT).....	115
7.5.	Light locomotives – heritage operators.....	116
7.6.	Intrastate trains	117
7.7.	Spare paths.....	123
7.8.	Interstate trains – freight and passenger	123
7.9.	Coal trains – (South and West) (in conjunction with ARTC).....	125
7.10.	Coal trains – (North) (in conjunction with ARTC).....	126
7.11.	Light locomotives	127
7.12.	Light locomotives between Woodville Junction – Cardiff Workshops – Woodville Junction	129
7.13.	Trip trains Sydney area bounded by Botany / Minto / Clyde Yard and Yennora.....	129
7.14.	Trip trains Newcastle area bounded by Woodville Junction / Broadmeadow / Sulphide Junction	130
7.15.	Trip trains Illawarra area bounded by Port Kembla / Inner Harbour.....	130
7.16.	Maintenance trains – TfNSW Metropolitan Heavy Rail network area	131
7.17.	Maintenance trains – ARTC and CRN area	132
7.18.	AK track inspection cars	133
7.19.	Mechanised track inspection	133
7.20.	Train numbering district map	134
7.21.	Digital Systems Program (DSP) Traffic Management System (TMS) train numbering.....	135
8.	Disabled trains and defective vehicles	137
8.1.	Disabled trains and defective vehicles	137
8.2.	Removing a disabled train	137
8.3.	Assisting with a passenger train	138
8.4.	Assisting a disabled train from the rear	138
8.5.	Assisting a disabled train from the front	139
8.6.	Using an emergency coupler.....	140

8.7.	Assisting disabled track maintenance vehicles	141
8.8.	Defective air brake	141
8.9.	Defective brake pipe	146
8.10.	Defective main reservoir pipe on passenger trains	147
8.11.	Defective air springs	147
8.12.	Defective handbrake or parking brake.....	147
8.13.	Defective wheels.....	148
8.14.	Defective failed or open plug doors	151
8.15.	Bearing and Brake Temperature (BBT) system response to wayside alarms – Hot Bearing Detector (HBD) alarms	153
8.16.	Bearing and Brake Temperature (BBT) system response to wayside alarms – Dragging Equipment Detector (DED) alarms	157
8.17.	Bearing and Brake Temperature (BBT) system response to wayside alarms – Hot Wheel Detector (HWD) alarms	158
8.18.	Dynamic Weighbridge (WB) system response to wayside alarms and alerts – Overloaded platform and bogie alarms and alerts	162
8.19.	Pantograph Condition Monitoring System (PCMS) response to alarms	167
8.20.	Defective drawgear	168
8.21.	Transferring defective vehicles	169
9.	Operation of infrastructure maintenance vehicles	173
9.1.	Introduction	173
9.2.	Types of infrastructure maintenance vehicles	173
9.3.	Emergency equipment.....	174
9.4.	Speed of infrastructure maintenance vehicles.....	174
9.5.	Lights	174
9.6.	Transfer of on-track infrastructure maintenance vehicles	175
9.7.	Infrastructure maintenance vehicles operating track circuits.....	175
9.8.	Infrastructure maintenance vehicles restricted to operation within worksites	176
9.9.	Infrastructure maintenance vehicles operating safety	176
10.	Locomotive and rolling stock data	179
10.1.	Explanation of notes for locomotive and rolling stock data	179
10.2.	3801 Limited	181
10.3.	Aurizon.....	182
10.4.	Australian Railway Historical Society A.C.T. Division	187
10.5.	Australian Rail Track Corporation.....	188
10.6.	Australian Wheat Board (AWB Grainflow).....	189
10.7.	Bradken Resources Pty Ltd	190
10.8.	BlueScope Steel (Pacific National operated).....	190
10.9.	Boxcar	191
10.10.	Boyd Munro.....	191
10.11.	Canberra Heritage Railway Restoration Pty Ltd.....	191
10.12.	Capital Region Heritage Rail	192
10.13.	Centennial Coal	193
10.14.	Chumrail Pty Ltd.	194

10.15.	CIMC Rolling Stock Australia.....	195
10.16.	Ettamogah Rail Hub.....	195
10.17.	FCL.....	195
10.18.	Fletcher International Exports Pty Ltd.....	196
10.19.	FreightLink.....	196
10.20.	Geelong Road Bus Service Pty Ltd.....	196
10.21.	Gemco Rail.....	197
10.22.	GrainCorp Operations Ltd.....	197
10.23.	Great Southern Railway.....	198
10.24.	Greentrains.....	199
10.25.	Heritage Locomotive Company.....	200
10.26.	Junee Railway Workshop.....	201
10.27.	Lachlan Valley Railway.....	201
10.28.	Locomotive Demand Power (LDP).....	203
10.29.	Macfield Leasing Corp.....	203
10.30.	Manildra Flour.....	204
10.31.	Mineral Resources Limited (MRL).....	204
10.32.	Museum of Applied Arts and Sciences.....	205
10.33.	National Rail Equipment Co (NREC).....	205
10.34.	North West Coach Builders.....	206
10.35.	NSWGR Holdings Pty. Ltd.....	206
10.36.	NSW TrainLink.....	206
10.37.	Nova Coal Australia.....	209
10.38.	One Rail Australia.....	210
10.39.	Pacific National.....	213
10.40.	Patrick PortLink.....	233
10.41.	PHC Rail Pty Ltd.....	234
10.42.	QUBE Logistics Rail.....	234
10.43.	Rail Experience.....	237
10.44.	Rail First Asset Management.....	237
10.45.	RailPower Pty Ltd.....	242
10.46.	Rothbury Riot Railway & Steam Museum Group Ltd.....	242
10.47.	Seymour Rail Heritage Centre Inc.....	242
10.48.	Southern Shorthaul Railroad.....	243
10.49.	Specialised Container Transport (SCT).....	246
10.50.	Sydney Electric Train Society.....	248
10.51.	Sydney Trains.....	250
10.52.	Tank Wagons – Miscellaneous.....	258
10.53.	The Rail Motor Society.....	260
10.54.	Toll.....	260
10.55.	Transport Equipment Company.....	261
10.56.	Transport Heritage NSW.....	261
10.57.	Whitehaven Coal Ltd.....	265

10.58.	Winarch.....	265
10.59.	Xstrata.....	266
10.60.	Xstrata Rail (NSW) Ltd.	266
11.	On-track infrastructure maintenance vehicle data.....	269
11.1.	Explanation of notes for on track infrastructure maintenance vehicle data.....	269
11.2.	Abigroup.....	271
11.3.	Aurizon.....	271
11.4.	Australian Rail Track Corporation.....	271
11.5.	Azbuild	272
11.6.	Blue Scope Steel	272
11.7.	Brimble Rail Pty Ltd	273
11.8.	Daracon Rail	274
11.9.	Downer EDI Rail	274
11.10.	Harbinger Plant.....	274
11.11.	Harsco Track Technologies	274
11.12.	John Holland	275
11.13.	Kennards.....	278
11.14.	Laing O'Rourke	278
11.15.	Martinus Rail	280
11.16.	McConnell Dowell	280
11.17.	Queensland Rail	281
11.18.	Rhomberg Rail	281
11.19.	Speno Rail Maintenance.....	283
11.20.	Swietelsky	284
11.21.	Sydney Trains	284
11.22.	RKR Engineering	287
11.23.	Taylor Rail Australia Pty Ltd.	287
12.	Road rail vehicle data.....	289
12.1.	Explanation of notes for on-track infrastructure track maintenance and road-rail vehicle data	289
12.2.	Road rail vehicle data	291

Introduction

This document contains the General Instruction Pages, which shall be read in conjunction with the relevant standard working timetables for the purpose of safe train operations and is applicable to all freight, passenger and infrastructure maintenance operations on the TfNSW Metropolitan Heavy Rail network.

The December 2023 issue of the TOC Manual comprises three parts:

- TS TOC.1: 2023 issue 2 *Train Operating Conditions (TOC) Manual – General Instructions*; this document
- TS TOC.2: 2023 issue 2 *Train Operating Conditions (TOC) Manual – Division Pages*
- TS TOC.3: 2023 issue 2 *Train Operating Conditions (TOC) Manual – Track Diagrams*

This document encompasses the following information:

- General Instruction Pages

TS TOC.2: 2023 issue 2, *Train Operating Conditions (TOC) Manual – Division Pages*, contains the following:

- Northern Division Pages
- Western Division Pages
- Illawarra Division Pages
- Sydney Metropolitan Area Division Pages
- Passenger Train Operating Condition Pages
- Coal Train Working Pages

TS TOC.3: 2023 issue 2, *Train Operating Conditions (TOC) Manual – Track Diagrams* contains the following:

- Track Diagrams

Purpose

The TOC Manual specifies conditions for the operation of trains and rolling stock on the TfNSW Metropolitan Heavy Rail network.

Scope

The TOC Manual describes the network, defines operating conditions for trains and rolling stock, and lists all rolling stock authorised to operate on the TfNSW Metropolitan Heavy Rail network.

The TfNSW Metropolitan Heavy Rail network is bounded by Newcastle Interchange (165.746km), Woodville Junction (163.981 km and 164.045 km), Bomaderry (153.630 km),

Unanderra (91.080 km), Macarthur (57.965 km), and Bowenfels (158.800 km) but does not include the South Sydney Freight Line and Metropolitan Freight Network (bound by Marrickville 6.370 km, Flemington South Junction 18.909 km, and Sefton Park East Junction 21.285 km). In addition Light Rail Networks and Metro Networks are not included in the TfNSW Metropolitan Heavy Rail network.

Application

The TOC Manual is to be used by train planners, train timetablers, train control personnel, and train crews, and shall be read in conjunction with the relevant Safeworking rules and procedures.

Referenced documents

The following documents are cited in the text. For dated references, only the cited edition applies. For undated references, the latest edition of the referenced document applies.

Transport for NSW standards

These are available from the TfNSW web site: www.transport.nsw.gov.au

TS 03976 (ESR 0330) *Wheel Defect Manual*

TS 04052 (T HR RS 00000 ST) *RSU 000 Series – Minimum operating standards for rolling stock – General Requirements*

TS 04053 (T HR RS 00100 ST) *RSU 100 Series – Minimum Operating Standards for Rolling Stock – General Interface Requirements*

TS 04069 *RSU Appendix D – Train (Driver) Safety Systems*

TS 04090.1 (T HR RS 30020 ST) *Road/rail vehicle certification and recertification*

TS 04091.1 (T HR RS 30030 ST) *Trolley, trailer & quadricycle certification and recertification*

TS 06302 (T HR RS 20004 ST) *Risk Assurance for Distributed Power Freight Trains*

TS TOC.2 *Train Operating Conditions (TOC) Manual – General Instructions*

TS TOC.3 *Train Operating Conditions (TOC) Manual – Track Diagrams*

TS TOC.4 *Train Operating Conditions (TOC) Manual – Road rail vehicle data*

Sydney Trains Network Rules

These are available from the RailSafe web site: <https://railsafe.org.au/>

NGE 210 *Speed restrictions during very hot weather (WOLO)*

NGE 216 *Level crossings*

NGE 232 *Responsibilities of Train Crews and Track Vehicle Crews*

NSG 604 *Indicators and signs*

NSG 608 *Passing signals at STOP*

NSY 512 *Manual block working*

NTR 404 *Using brakes*

NTR 406 *Using lights*

NTR 412 *Defective running gear*

NTR 414 *Defective vehicles*

NTR 416 *Disabled rail traffic*

NTR 418 *Yard limits*

NWT 316 *Track vehicles*

Sydney Trains Network Local Appendix

These are available from the RailSafe web site: <https://railsafe.org.au/network-local-appendices>

NLA 108 *Central – Sydenham (via Green Square)*

NLA 218 *Lithgow*

NLA 312 *Gosford*

The above Network Local Appendices are specifically referenced in this manual; however all Network Local Appendices are applicable.

Sydney Trains Forms

These are available from the RailSafe web site: <https://railsafe.org.au/forms>

NRF 002 *Track Occupancy Authority (TOA)*

NRF 004 *Condition Affecting the Network (CAN)*

NRF 005 *Special Proceed Authority (SPA)*

Other Networks

ARTC *Train operating conditions manual*

CRN *Train Operating conditions manual*

Legislation

Protection of the Environment Operations Act 1997 (NSW)

Terms and definitions

Version August 2018

The following terms and definitions apply in this document:

Terminology is consistent with the Network Rules

airbrake a braking system activated by change of air pressure

articulated platform the individual end or intermediate units of an articulated vehicle

articulated vehicle a vehicle comprising of two or more units, adjacent ends of individual units being supported on a common bogie and permanently connected by a device that permits a degree of free rotation in all planes

automatic airbrake a braking system where the loss air pressure (e.g. brake pipe) automatically results in an emergency brake application

bank locomotive a locomotive provided at the rear of a train to assist it up a steep grade (bank)

basic block working a form of manual block working which does not require the issue of a Condition Affecting the Network (CAN) form

block train a train required to travel under manual block working in track-circuited territory

block working see 'manual block working'

brake pipe continuity the brake pipe coupling hoses are connected and coupling cocks are open between vehicles to ensure changes in air pressure in the brake pipe is transmitted from one end of the train to the other end

consist listed order of the vehicles arranged to make up a complete train

convoy a group of track vehicles not coupled but travelling closely together under a single Proceed Authority or a Track Occupancy Authority

coupling cock a cock (valve, tap) fitted at each end of the brake pipe(s), main reservoir pipe, etc. enabling the air connection to the coupling hose to be opened or closed when required

coupling hose a flexible connection generally fitted to the coupling cock of the brake pipe(s), main reservoir pipes, etc. to provide an air connection between adjacent vehicles

diesel multiple unit (DMU) a distributed power passenger train made up of similar diesel powered and non-powered vehicles capable of carrying passengers and operating as a train

distributed power a train operating with power units located at the front and one or more other locations in the train consist. Remote power units may be controlled from the lead locomotive by radio signal or hard wired through the train

draw capacity the strength of a vehicle (couplers, draftgear, underframe, etc.) used to determine the load that can be hauled behind the vehicle

driver safety system a system fitted to rail vehicles to provide a means of stopping the vehicle/train in case the driver becomes incapacitated or the vehicle/train passes a signal at stop. These include vigilance control system, deadman, and trip stops

ECP electrically controlled pneumatic

electric multiple unit a distributed power passenger train made up of similar electric powered and non-powered vehicles capable of carrying passengers and operating as a train

electrically controlled pneumatic a braking system activated by electrical signals along the length of the train with air supplied by the train pipe

emergency cock a readily accessible manually operated valve or tap, in a vehicle with an automatic air brake that exhausts the brake pipe to atmosphere causing an emergency brake application. Sometimes referred as an emergency brake pipe tap

emergency coupler an adaptor used to couple vehicles with incompatible coupling systems

EMU electric multiple unit

end-of-train marker (EOTM) a device other than tail-lights fitted to the trailing end of the last vehicle of a train

fit for purpose able to be used for the required function

handbrake a mechanical device used to secure a rail vehicle against movement. Handbrake includes a spring parking brake

handlamp a lamp or torch that can display red, white, and green lights

haul to move rail traffic using motive power source at the leading end of the train

head end power a train operating with all motive power units located at the front of the train consist

horn see whistle

light locomotive one or more locomotives not attached to another vehicle

loading cycle cycle of operation of a freight train including travelling to a loading location, loading, travelling to destination and unloading

loading outline the maximum height and width to which rail vehicles can be loaded for a particular line without fouling, as prescribed in the Train Operating Conditions manual, Section 5, Loading Restrictions

locomotive a self-propelled rail-bound vehicle that may be used to move other vehicles

manual block working a method of special working which ensures sole occupancy by manually maintaining a block behind a rail traffic movement

marker lights lights that indicate the front or rear of the train

marshal to arrange the order of vehicles in a train's consist

multiple unit locomotive two or more locomotives marshalled together to provide the power to move itself or other vehicles

multiple unit train diesel multiple unit or electric multiple unit

Network Rules rules issued by Sydney Trains to mandate the requirements for safe operation on the TfNSW Metropolitan Heavy Rail network

normal speed a speed that does not exceed the current speed limit for the track and class of rail traffic

on-track vehicles infrastructure maintenance vehicles (self-propelled or trailer) that can operate on rail, and are typically used for track construction, maintenance and restoration, servicing and inspection of overhead electrical infrastructure

operator an organisation that manages, operates or maintains rail traffic on the TfNSW Metropolitan Heavy Rail network

operator specific procedures a set of instructions prepared by an Operator on the TfNSW Metropolitan Heavy Rail network, such as Sydney Trains, specifically for that organisation's use

operator's representative a person authorised by an Operator to act on the Operator's behalf

OSP operator specific procedures

partial train inspection a train inspection carried out when the train consist is altered and includes only parts of a full train inspection

power car a self-propelled vehicle, which may or may not convey passengers and/or freight, and operates in conjunction with similar vehicles in a multiple unit consist

prescribed train a train laden in excess of a specified percentage of its maximum load that can be hauled by the motive power unit, for that portion of line

propel to manage airbrake operation of moving rail traffic from a cab that is not in the lead vehicle of a train

qualified worker a worker certified as competent to carry out the relevant task

rake of vehicles a number of vehicles that are kept together in a fixed train consist

road-rail vehicle pneumatically tyred or crawler tracked road vehicles fitted with attachments that permit operation on rail, which can be readily transferred from one mode to another without additional facilities. Sometimes referred as Hi-rail vehicles

Rova Mech see TOC Waiver

ruling grade the maximum grade on a section of track. Used to determine the motive power required for a train and the load that can be hauled

run around locomotive movement where the locomotive is moved from one end of a train to the other end

scaled wheel a build-up of metallic material on a wheel tread's surface, generally as a result of overheating from sticking brakes or dragging brakes causing wheels to slide on the rail

shall the word 'shall' indicates that a statement is mandatory

single self-propelled vehicle a rail vehicle that can operate under its own power without being coupled to another vehicle

skidded wheels flat areas on the wheel tread, caused when wheels "lock up" under braking or seized axles and the wheels slide or skid on the rail

tail-lights red lights used as end-of-train markers

TfNSW Metropolitan Heavy Rail network is the network name, formerly the RailCorp network, refer to the document 'scope' which defines the area associated with the network

thermal cracks cracks in the running surface and adjacent areas of a wheel, caused by thermal effect of heating and cooling resulting from on-tread friction braking

TOC Waiver (Train Operating Conditions Waiver) a notice of changes or exceptions to the requirements specified in the published Train Operating Conditions Manual

tonnage signal a signal at the foot of a steeply rising grade, fitted with a sign that directs Drivers of prescribed trains

track the combination of rails, rail connectors, sleepers, ballast, points, and crossings

track circuit an electric circuit where current is carried through the rails and used to detect the presence of trains. Track-circuits are used in the operation and control of points, signalling equipment and indicators

track circuit shorting clip a cable that can be clamped to a line's rails to activate track-circuits

track maintenance vehicle see track vehicle

track speed the allowable maximum train speed for a portion of track

track vehicle a vehicle, usually self-propelled, used mainly for inspecting and maintaining track and infrastructure

track vehicle operator a qualified worker controlling the movement of a track vehicle

trackside monitoring equipment devices that monitor and respond to track, trackside, and rail vehicle condition

train a locomotive or self-propelled vehicle, alone or coupled to one or more vehicles

train consist a group of vehicles coupled together to form a train

train (identification) number a train or run number used to provide unique identification of a train

trolleys small rail vehicles that can be operated on rail and are moved manually

vehicle any item of rolling stock that can operate on rail

wheel scale a build-up of metallic material on a wheel tread's surface

whistle a device such as a horn, whistle, bell, siren, or hooter fitted to a train or track maintenance vehicle to give audible warning

WOLO speed restrictions applied during hot weather

work out of service to work to a suitable yard, service depot, siding, or location where rolling stock can leave the running line for repair or replacement of vehicle equipment

Summary of changes

Table 1 provides a summary of changes to the content of this section of the manual since its previous publication. Changes to front matter, formatting, branding, and governance are not included.

Table 1 – Summary of changes from the April 2023 AMB reprint

Area of manual	Page	Section	Change
Locomotive operations	47	2.11 Mixing locomotive types	Updated RL as per 203-1350
Locomotive operations	49	2.14 Locomotive load categories	Updated RL as per 203-1350
Train numbering	109	7.3 Sydney Trains and NSW TrainLink trains	Added new Table for MTPV for TMS/DSP as per 203-1338, corrected table heading for live complex shunting.
Train numbering	115	7.4 Passenger trains – heritage operator tours (HOT)	Updated train numbering as per 203-1318
Train numbering	117	7.6 Intrastate trains	Added numbering as per 203-1314
Train numbering	126	7.10 Coal trains – (North) (in conjunction with ARTC)	Updated North coal numbering as per 203-1306
Train numbering	135	7.21 Digital Systems Program (DSP) Traffic Management System (TMS) train numbering	Updated train numbering as per 203-1337 (new section TMS/DSP)
Disabled trains and defective vehicles	153	8.15 Bearing and Brake Temperature (BBT) system response to wayside alarms – Hot Bearing Detector (HBD) alarms	Updated 8.15, 8.16, and 8.17 as per 203-1303
Locomotive and rolling stock data	184	10.3.2 Aurizon – Freight rolling stock	Updated QHAH / QHBH as per 203-1327
Locomotive and rolling stock data	217	10.39.7 Pacific National – Grain hoppers	Updated NGGF/KF/PF as per 203-1312
Locomotive and rolling stock data	237	10.44.1 Rail First Asset Management – Locomotives	Updated CF class locomotives as per 203-1367
Locomotive and rolling stock data	206	10.35 NSWGR Holdings Pty. Ltd.	Added car 2367 as per 203-1320
Locomotive and rolling stock data	207	10.36.2 NSW TrainLink – Passenger rolling stock	Added XAMB as per 203-1326
Locomotive and rolling stock data	243	10.48.1 Southern shorthaul Railroad – Locomotives	Updated RL class as per 203-1350
On-track infrastructure maintenance vehicle data	275	11.12 John Holland	Added Geismar plant as per 205-439

Page layout

Format of division pages

Version April 2015

FORMAT OF DIVISION PAGES

MAXIMUM SPEED OF LOCOMOTIVE AND ROLLING STOCK

ITEM 1 Sections → 14. Western Division pages

Version December 2014

Maximum speed of locomotives and rolling stock

ITEM 2
Classification of tracks

ITEM 3
Maximum speed of locomotives

ITEM 4
Multiple locomotive working

ITEM 5
Classification of freight vehicles

ITEM 6
Classification of passenger vehicles

ITEM 7
Safeworking systems

Class of Line Line Map Reference	Penrith – Lithgow	Lithgow – Valley Heights	Valley Heights – Penrith
	DOWN MAIN	UP MAIN	UP MAIN
1	A	B	C
LOCOMOTIVES			
Class	Max Speed km/h		
90, TT	N/A	N/A	N/A
31, L, LQ, LZ	100	100	100
92, 93, 8000, 8020, ACC, C, CEY, CF, GWA, GWJ, LDP10, RL, SCT, TT100, WH, XRN	115	115	115
82, CLP, GLNR	115	115	115
T4, 31, ALF, AN, BL, CLF, G, VL	115	115	115
42, 30, 30a, B, DL	115	115	115
T8	90	90	90
442, 442a, 700, GM(12) S, X	115	115	115
22, 421, 422, 44, 45, 45a, 800, DC, EL, FL, GM(1) HL	115	115	115
43, 44a, 930	115	115	115
423	80	80	80
D, K, T	100	100	100
47, 48, 48200, 48a, 49, 830, 900, GPU, MM, PL	100	100	100
73 (c)	70	70	70
28, 38 Electric	100(b)	100(b)	100(b)
Multiple Locomotive working	4	5	4
FREIGHT			
Class A	115	115	115
Class B	100	100	100
Class C	80	80	80
Class D	65	65	65
Class E	80	80	80
Class F	65	65	65
Class G	N/A	N/A	N/A
PASSENGER			
XPT	160	160	160
XPLORER	145	145	145
DIESEL RAILCARS	115	115	115
LOCO HAULED	115	115	115
		(a)	
NOTES			
(a) See instructions contained in General Instructions for operation of trains and light locomotives over the section Katoomba to Valley Heights.			
(b) Applies to SINGLE and distributed locomotives (separated by at least 70 metres of train). No OHW restrictions apply. Both pantographs may be raised.			
(c) Only locomotives fitted with vigilance control system are approved to operate outside shunting yards.			
SAFeworking SYSTEMS			
Penrith – Edgecombe	#Rail Vehicle Detection		
Edgecombe – Zig Zag	Rail Vehicle Detection (Bi-directional)		
Zig Zag – Lithgow Coal Stage Signal Box	Rail Vehicle Detection		
Lithgow Coal Stage Signal Box – Lithgow Yard Signal Box	Rail Vehicle Detection		
#Valley Heights to Springwood – Two way running Down Main			

ITEM 8
LINE MAP

Double track
Single track

Subsection break

Signal Box/
Control centre

Crossing
loop length

ITEM 9
Private siding

PAGE LAYOUT

Format of division pages – explanation

Version April 2015

Table 2 explains the format of the division pages.

Table 2 – Format of division pages – explanation

Item	Label	Description
Item 1	Divisions	The Train Operating Conditional Manual comprises the Western, Northern, Illawarra, and Metropolitan divisions. Each division provides the condition for operation of locomotives and rolling stock.
Item 2	Classification of track	The class of track will affect the speed and types of locomotives and rolling stock authorised to run over the various sections.
Item 3	Maximum speed of locomotives	Identifies locomotives and maximum speeds approved for that section of track.
Item 3	Operation of unlisted locomotives	The letters N/A indicate these locomotives are not approved to run over this section of track.
Item 4	Multiple locomotive working	The columns associated with locomotives headed "MULTIPLE LOCOS" shows the maximum number of locomotives powering that may run coupled together in a locomotive group on each relevant section of track. Up to a maximum of 5 locomotives total can be marshalled together in any locomotive group attached to a train. However, the number of locomotives that can be powering within each locomotive group at any given time is indicated in the multiple working section on the respective Maximum Speed of Locomotives and Rolling Stock page.
Item 5	Classification of freight vehicles	Identifies freight vehicle class and maximum speeds approved for that section of track. The letters N/A indicate these vehicles are not approved to run over this section of track.
Item 5	Operation of unlisted freight vehicles	Refer to the Asset Management Branch for authorisation.
Item 6	Classification of passenger vehicles	Identifies passenger vehicles and maximum speeds approved for that section of track. The letters N/A indicate these vehicles are not approved to run over this section of track. The grouping Diesel Railcars includes #self propelled diesel trains and Rail Motors. #Refer to Sydney Trains & NSW TrainLink pages for Endeavour/Hunter railcar approval.
Item 6	Operation of unlisted passenger rolling stock	Refer to the Asset Management Branch for authorisation.

Item	Label	Description
Item 7	Safeworking systems	<p>This section indicates the safeworking system and the area controlled by that system.</p> <p>When words 'Yard Working' appear, the nominated section of track will be worked in accordance with the instructions contained in Sydney Trains Network Rule <i>NTR 418 Yard limits</i>.</p>
Item 8	Line map	See list page 20 for details.
Item 9	Private line/siding	<p>A Private (Non TfNSW owned) Line/Siding represented in the Division Pages (Line Map) by "P" is one that is not owned by TfNSW and therefore will not necessarily have operating conditions published in this Manual.</p> <p>Where this Manual contains information relating to the operating conditions for a private line/siding, that information is published with the agreement or at the request of the owner/operator of that line/siding.</p> <p>For the purpose of train control, to and from a private line/siding, the operator in securing a train path on the TfNSW Metropolitan Heavy Rail network has certified that there is an interface understanding/agreement between the operator and the owner/operator of the private line/siding, which authorises the train/vehicles to operate within the confines of the private line/siding.</p> <p>In providing an agreed train path in accordance with the operations protocol, Sydney Trains has certified that the operator's train will be accepted from or delivered to the boundary of the private line/siding nominated in the operator's train path application.</p>

Where can locomotives run?

April 2016

PAGE LAYOUT

Where can locomotives run?
Full Sectional Loads & Schedules
Running times

The **LOAD (L)** category is determined by referring to the **General Instruction Pages - SECTION 10 Locomotive and Rolling Stock Data** or the table shown in **SECTION 2 Locomotive Operations**.

Where can locomotives run?

Where locomotives can run is indicated in the **MAXIMUM SPEED OF LOCOMOTIVES AND ROLLING STOCK** table located on the first page of the various subsections of each region.
When a speed is shown this is the authorisation for that category of locomotive to operate. Where the letters **N/A** appear that category of locomotive is not approved to operate.

Table 65--Australia Western Railroad-- Locomotives

Code	Load-Category	Description	Max Speed (km/h)	Live Weight (t)	Length -Over-Coupling Faces (m)	Draw Capacity (MN)	Horse-power	Remarks	Notes
CLF	L6	Diesel	115	128	20.5	1.80	3000		R11
CLP	L6	Diesel	115	132	20.5	1.80	3000		R11
DC	L10	Diesel	115	110	18.4	1.80	2000	Ex-Pacific National 422 class	R11
LQ/LZ	L5	Diesel	100	134	20.2	1.80	3000	Ex-L31 class. Fuel tanks only to be filled to 10,000 litres	R11
22	L10	Diesel	115	110	18.4	1.80	2000	Ex-Pacific National 422 class	R11
3T	L5	Diesel	100	137	20.2	1.80	3000	Ex-L class.	R11

14. Western-Division-pages
Version December 2014
Maximum speed of locomotives and rolling stock

Category	Code	Max Speed (km/h)	Live Weight (t)	Length (m)	Draw Capacity (MN)	Horse Power
LOCOMOTIVE	L1	115	128	20.5	1.80	3000
LOCOMOTIVE	L2	115	132	20.5	1.80	3000
LOCOMOTIVE	L3	115	110	18.4	1.80	2000
LOCOMOTIVE	L4	100	134	20.2	1.80	3000
LOCOMOTIVE	L5	100	137	20.2	1.80	3000
LOCOMOTIVE	L6	115	128	20.5	1.80	3000
LOCOMOTIVE	L7	115	132	20.5	1.80	3000
LOCOMOTIVE	L8	115	110	18.4	1.80	2000
LOCOMOTIVE	L9	100	134	20.2	1.80	3000
LOCOMOTIVE	L10	115	110	18.4	1.80	2000
LOCOMOTIVE	L11	100	137	20.2	1.80	3000
LOCOMOTIVE	L12	115	128	20.5	1.80	3000
LOCOMOTIVE	L13	115	132	20.5	1.80	3000
LOCOMOTIVE	L14	115	110	18.4	1.80	2000
LOCOMOTIVE	L15	100	134	20.2	1.80	3000
LOCOMOTIVE	L16	100	137	20.2	1.80	3000
LOCOMOTIVE	L17	115	128	20.5	1.80	3000
LOCOMOTIVE	L18	115	132	20.5	1.80	3000
LOCOMOTIVE	L19	115	110	18.4	1.80	2000
LOCOMOTIVE	L20	100	134	20.2	1.80	3000
LOCOMOTIVE	L21	100	137	20.2	1.80	3000
LOCOMOTIVE	L22	115	128	20.5	1.80	3000
LOCOMOTIVE	L23	115	132	20.5	1.80	3000
LOCOMOTIVE	L24	115	110	18.4	1.80	2000
LOCOMOTIVE	L25	100	134	20.2	1.80	3000
LOCOMOTIVE	L26	100	137	20.2	1.80	3000
LOCOMOTIVE	L27	115	128	20.5	1.80	3000
LOCOMOTIVE	L28	115	132	20.5	1.80	3000
LOCOMOTIVE	L29	115	110	18.4	1.80	2000
LOCOMOTIVE	L30	100	134	20.2	1.80	3000
LOCOMOTIVE	L31	100	137	20.2	1.80	3000
LOCOMOTIVE	L32	115	128	20.5	1.80	3000
LOCOMOTIVE	L33	115	132	20.5	1.80	3000
LOCOMOTIVE	L34	115	110	18.4	1.80	2000
LOCOMOTIVE	L35	100	134	20.2	1.80	3000
LOCOMOTIVE	L36	100	137	20.2	1.80	3000
LOCOMOTIVE	L37	115	128	20.5	1.80	3000
LOCOMOTIVE	L38	115	132	20.5	1.80	3000
LOCOMOTIVE	L39	115	110	18.4	1.80	2000
LOCOMOTIVE	L40	100	134	20.2	1.80	3000
LOCOMOTIVE	L41	100	137	20.2	1.80	3000
LOCOMOTIVE	L42	115	128	20.5	1.80	3000
LOCOMOTIVE	L43	115	132	20.5	1.80	3000
LOCOMOTIVE	L44	115	110	18.4	1.80	2000
LOCOMOTIVE	L45	100	134	20.2	1.80	3000
LOCOMOTIVE	L46	100	137	20.2	1.80	3000
LOCOMOTIVE	L47	115	128	20.5	1.80	3000
LOCOMOTIVE	L48	115	132	20.5	1.80	3000
LOCOMOTIVE	L49	115	110	18.4	1.80	2000
LOCOMOTIVE	L50	100	134	20.2	1.80	3000
LOCOMOTIVE	L51	100	137	20.2	1.80	3000
LOCOMOTIVE	L52	115	128	20.5	1.80	3000
LOCOMOTIVE	L53	115	132	20.5	1.80	3000
LOCOMOTIVE	L54	115	110	18.4	1.80	2000
LOCOMOTIVE	L55	100	134	20.2	1.80	3000
LOCOMOTIVE	L56	100	137	20.2	1.80	3000
LOCOMOTIVE	L57	115	128	20.5	1.80	3000
LOCOMOTIVE	L58	115	132	20.5	1.80	3000
LOCOMOTIVE	L59	115	110	18.4	1.80	2000
LOCOMOTIVE	L60	100	134	20.2	1.80	3000
LOCOMOTIVE	L61	100	137	20.2	1.80	3000
LOCOMOTIVE	L62	115	128	20.5	1.80	3000
LOCOMOTIVE	L63	115	132	20.5	1.80	3000
LOCOMOTIVE	L64	115	110	18.4	1.80	2000
LOCOMOTIVE	L65	100	134	20.2	1.80	3000
LOCOMOTIVE	L66	100	137	20.2	1.80	3000
LOCOMOTIVE	L67	115	128	20.5	1.80	3000
LOCOMOTIVE	L68	115	132	20.5	1.80	3000
LOCOMOTIVE	L69	115	110	18.4	1.80	2000
LOCOMOTIVE	L70	100	134	20.2	1.80	3000
LOCOMOTIVE	L71	100	137	20.2	1.80	3000
LOCOMOTIVE	L72	115	128	20.5	1.80	3000
LOCOMOTIVE	L73	115	132	20.5	1.80	3000
LOCOMOTIVE	L74	115	110	18.4	1.80	2000
LOCOMOTIVE	L75	100	134	20.2	1.80	3000
LOCOMOTIVE	L76	100	137	20.2	1.80	3000
LOCOMOTIVE	L77	115	128	20.5	1.80	3000
LOCOMOTIVE	L78	115	132	20.5	1.80	3000
LOCOMOTIVE	L79	115	110	18.4	1.80	2000
LOCOMOTIVE	L80	100	134	20.2	1.80	3000
LOCOMOTIVE	L81	100	137	20.2	1.80	3000
LOCOMOTIVE	L82	115	128	20.5	1.80	3000
LOCOMOTIVE	L83	115	132	20.5	1.80	3000
LOCOMOTIVE	L84	115	110	18.4	1.80	2000
LOCOMOTIVE	L85	100	134	20.2	1.80	3000
LOCOMOTIVE	L86	100	137	20.2	1.80	3000
LOCOMOTIVE	L87	115	128	20.5	1.80	3000
LOCOMOTIVE	L88	115	132	20.5	1.80	3000
LOCOMOTIVE	L89	115	110	18.4	1.80	2000
LOCOMOTIVE	L90	100	134	20.2	1.80	3000
LOCOMOTIVE	L91	100	137	20.2	1.80	3000
LOCOMOTIVE	L92	115	128	20.5	1.80	3000
LOCOMOTIVE	L93	115	132	20.5	1.80	3000
LOCOMOTIVE	L94	115	110	18.4	1.80	2000
LOCOMOTIVE	L95	100	134	20.2	1.80	3000
LOCOMOTIVE	L96	100	137	20.2	1.80	3000
LOCOMOTIVE	L97	115	128	20.5	1.80	3000
LOCOMOTIVE	L98	115	132	20.5	1.80	3000
LOCOMOTIVE	L99	115	110	18.4	1.80	2000
LOCOMOTIVE	L100	100	134	20.2	1.80	3000

Schedules

Schedule loads are set so that the train can operate within a preferred timetable. They are normally set lighter than the Full Sectional Load so that full advantage can be taken of the high power to weight ratio.

DOWNloads

Version December 2014

SECTIONS	LOCOMOTIVE CLASS = L	LOAD--TONNES				TRAIN DATA		NOTES
		SINGLE	DOUBLE	TRIPLE	QUAD	VEHICLE CLASS	SECT-RUN-TIMES	
20 SYDNEY METROP-LITHGOW	L13	281	562	843	1124	ABCDE	C4	
21 SYDNEY METROP-LITHGOW	L3/L4	750	1500	2250	3000	ABCDE	D1	
22 SYDNEY METROP-LITHGOW	L5	700	1400	2100	2800	ABCDE	D1	

Indicates sections of track the schedule applies to.

Maximum trailing tonnage permitted per schedule where shown.

Speed Class of vehicle permitted on schedule.

Schedule subgrouping and speed.
Main Line
A = 115kmh
B = 100kmh
C = 80kmh
D = 65kmh

Full Sectional Loads

Indicates permitted trailing tonnage per nominated category of locomotive for the various sections of track. Where no loads appear that category of locomotive is not approved to operate.

UP--sectional running times and full-sectional loads

Version April 2015

	#SECTIONAL RUNNING TIMES					FULL-SECTIONAL LOADS														GRADE	
	A1	A2	C1	C2	D1	Loco	AC6	2	3	4	5	6	7	8	9	10	11	12	13		14
LITHGOW	2	2	2	2	2	2	4407	3855	3562	3369	3171	2803	2726	2660	2295	2210	2036	1900	1326	1:50	
LITHGOW/CSBOX	2	2	2	2	2	2	4407	3855	3562	3369	3171	2803	2726	2660	2295	2210	2036	1900	1326	1:50	
ZIGZAG	5	6	6	7	10	7	4	1500	1300	1200	1131	1056	926	909	875	750	725	660	615	410	1:40

Section timing points. Stations in capitals are staff stations, lower case stations are intermediate locations.

Running Times

Sectional running times are related to the LOADS & CONDITIONS tables. Times listed with an 'a' (e.g. 8a) are arrival times i.e. time is allowed to stop from the previous station and starting time is allowed towards the next station. All other times are passing times. In columns where there are no running times and only two dots .. appear the next running time shown beneath the dots will be the total running time. When a train is required to stop at a location that has passing times, then add ONE minute to that locations passing time, then add a further TWO minutes into the next section. Running times are shown for the front of the train to pass/arrive/depart a location. The running times into sidings/yards do not include the time taken for the whole train to clear main lines as it is dependent on the length of the train. Train length shall therefore be considered when pathing trains into sidings and yards.

Column used to determine trailing tonnage in conjunction with the TRAILING TONNAGE TABLE located page 2
General Instructions - SECTION 4 Train Marshalling
The letters DG in this column = Down Grade

Format of speed sign table

December 2018

P A G E L A Y O U T

FORMAT OF LOCATION OF SPEED SIGN TABLE



Section 11 Sydenham – Regents Park					Section 12 Central – Wollie Creek (Airport Line)				
KILO-MET-RAGE	DOWN		UP		KILO-MET-RAGE	DOWN		UP	
	Nor-mal	XPT	Nor-mal	XPT		Nor-mal	XPT	Nor-mal	XPT
5.170	738 Points		X25		0.100	Central			
5.308	Sydenham				0.183	45			
5.411			15			Airport Turnback			
	Up sign on Down Bankstown				0.270	X55		636 Points	
5.510	40				0.271			25	
6.040	70		40			Up Sign on Airport Turnback			
6.575	Marrickville				0.271	X45			
7.540			70			Airport Turnback			
7.750	60				0.353	636B Pts	X40		
7.872	Dulwich Hill				0.390			X45	
8.797	Hurlstone Park								

- Kilometrage from Sydney
- Station, siding or location
- 'Normal' speed signs apply to all trains except for XPT, Xplorer, Endeavour, Hunter, and OSC.
- A white background speed sign with the letters **MU** alongside the numerals applies only to XPT, Xplorer, Endeavour trains, Hunter and Multiple unit trains (NSG604).
- Speed signs indicate the maximum speed between signs. 'X' speeds (e.g. X40) indicate the maximum speed throughout turnouts. The maximum speed throughout the sharp curves of junctions, crossovers and turnouts is **25 kilometres per hour**, unless otherwise shown.
- XPT, Xplorer, Endeavour and Hunter trains run to XPT speed signs to the maximum speed specified under the listing of **MAXIMUM SPEED OF LOCOMOTIVES AND ROLLING STOCK**. XPT, Xplorer, Endeavour, Hunter, and OSC trains run to 'Normal' speed signs where XPT signs are not provided.
- 'Wrong Road' speed signs shown in italics.



Location of speed signs Hornsby – Hawkesbury River						
KILOM-ETRAGE	DOWN			UP		
	GENERAL	MEDIUM	HIGH	GENERAL	MEDIUM	HIGH
33.864	<i>HORNSBY</i>					
33.950	80	80	80			
33.950	X60				X65	520 Points
34.100	535 Pt	Down Sign on Up Sidings		X15		
48.711				60	60	65
48.814	<i>COWAN</i>					
49.956				60	80	80
49.958	55	60	60			
51.375	X50		X50			
51.409			X50		X50	
51.409	<i>BORONIA</i>					
51.739				60	60	60
52.479	55	70	75			
53.250	50	60	60			
53.742				60	65	65
53.745	50	55	55			

- Kilometrage from Sydney
- Station, siding or location
- 'Wrong Road' speed signs shown in italics.
- 'General' speed signs apply to locomotive hauled passenger and freight trains, track maintenance vehicles, Rail Motors and 620 class diesel trains.
- 'High' speed signs apply to XPT, Xplorer, Endeavour, Hunter, and OSC trains.
- Speed signs indicate the maximum speed between signs. 'X' speeds (e.g. X40) indicate the maximum speed throughout turnouts. The maximum speed throughout the sharp curves of junctions, crossovers and turnouts is **25 kilometres per hour**, unless otherwise shown.
- 'Medium' speed signs apply to Sydney Trains electric multiple unit trains.

December 2018

Format of station data table and rolling stock data pages

August 2016

P A G E L A Y O U T

FORMAT OF STATION DATA TABLE

Station data
Version: 10.0 December 2012

Station	Kilo-metrage	Signal-Box-Status	Hours-of-Signal-Box	Facilities
Penrith	55.086	A	Always	P, WC
Emu Plains	57.439		Controlled from Penrith	P
Lapstone	63.617			P

Station, siding or location

Kilometrage from Sydney

Hours of signal boxes, controlled location information, siding information.

L = Location only
LP = Local panel
P = Platform
PS = Private siding
TT = Turntable
WC = Water column

A = Always attended
C = Controlled from (location)
P = Partially attended signal box
U = Unattended

FORMAT OF ROLLING STOCK DATA PAGES

Pacific National -- Freight rolling stock -- grain hoppers

Table 124 -- Pacific National -- Freight rolling stock -- grain hoppers

Code	Description	Class	Max-Gross Mass (t)	Tare (t)	Length (m)	Draw Capacity (MN)	Brake-Type	Notes
NGDX	Grain	C	73	18.5	14.3	0.90	□ B3	
NGFF	Grain	C	76	17.8	14.6	0.75	B2	
NGGF	Grain	A	78 81	17.8	14.3	1.80	B3	
When loaded from 78 up to a maximum of 81 tonnes gross mass Class E speeds will apply.								
NGHF	Grain	C	76	17.8	14.4	1.80	•• B4	

Vehicle code

When the description indicates 'permanently coupled' or 'articulated units' the tonnage shown in the MAXIMUM GROSS MASS TONNES column will be the combined tonnage for all wagons.

Speed classification

Vehicle or multi-vehicle length over coupling faces.

Maximum draw/buff capacity of the vehicle in Meganewtons

The tare (empty) vehicle or multi-vehicle mass

Maximum vehicle or multi-vehicle gross mass permitted on Class 1 track for speed classification. When 'Empty' is shown in the 'MAX GROSS MASS TONNES' column the vehicles will operate to the maximum speed shown for the nominated classification i.e. NHPH operate to Class B speeds when empty.

•• symbol indicates vehicle is fitted with two pipe brake system. All other vehicles are single pipe brake system. □ symbol indicates vehicle is fitted with a main reservoir pipe but it does not feed the brake system. This vehicle type can be marshalled anywhere in a conventional two pipe train but it does not necessarily meet the same brake performance.

Section 1

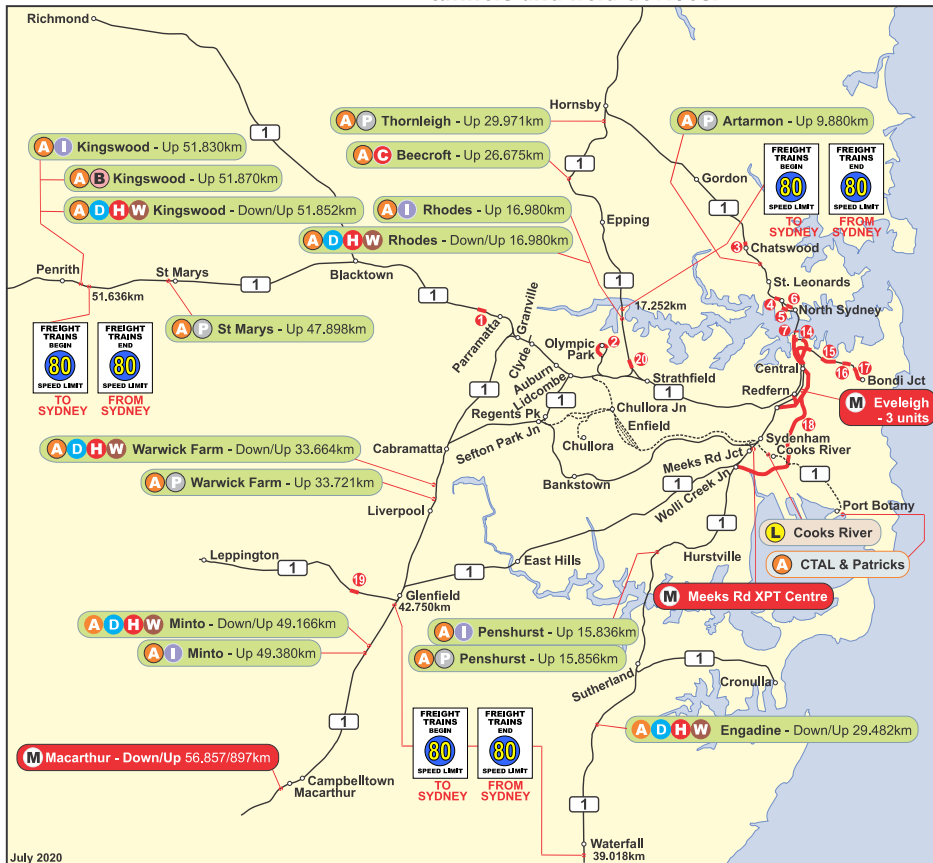
Route standards

1. Route standards

1.1. Sydney Metropolitan – Classification of lines and locations of tunnels and field devices

Version August 2020

Sydney Metropolitan - Classification of lines and location of tunnels and field devices.



July 2020

TUNNEL DATA				
Location	Type	Length	From	To
1. Up West Suburban Dive	S	111m	24,350 - 24,461	
2. Homebush Bay	S	1077m	16,654 - 17,731	
3. Chatswood	D	237m	11,926 - 12,163	
4. Bay Road	D	144m	6,297 - 6,441	
5. North Sydney Down Shore	M	422m	5,210 - 5,632	
6. North Sydney Up Shore	M	418m	5,210 - 5,628	
7. Lavender Bay	D	310m	6,860 - 7,170	
8. Down/Up Shore	M	2273m	0,563 - 2,836	
9. Centra-Wynyard-Circular Quay CO	M	2124m	0,563 - 2,687	
10. Circular Quay-Wynyard-Central CI	M	2127m	0,563 - 2,690	
11. Circular Quay-St James-Central CO	M	2130m	3,178 - 5,308	
12. Centra-St James-Circular Quay CI	M	2101m	3,178 - 5,279	
13. Erskineville - Central ESR	M	2635m	0,000 - 2,635	
14. Central-Domain Portal ESR	M	2725m	0,000 - 2,725	
15. Up Eveleigh Dive	S	297m	1,167 - 1,464	
16. Down Hawarra Dive	M	241m	1,730 - 1,971	
17. Up Hawarra Dive	M	139m	1,770 - 1,909	
18. W'mloo Viaduct-Rushcutters Bay V'ct ESR	M	620m	3,272 - 3,892	
19. Rushcutters Bay Viaduct-W'la Cutting ESR	M	332m	4,900 - 5,741	
20. Woolahra Cutting - Bondi Terminal Rd	M	1438m	5,907 - 7,345	
21. Airport Line	D	9020m	0,670 - 9,389	
22. Glenfield - Leppington Line	D	80m	43,974 - 44,054	
23. North Strathfield Rail Underpass	S	172m	13,968 - 13,240	

TUNNEL KEY	
(T) = Name of Tunnel	(D) = Single Line
(M) = Double Line	(S) = Shared - Double/Multiple
(L) = Length of Tunnel	(F) = Start Kilometerage of Tunnel
(E) = End Kilometerage of Tunnel	

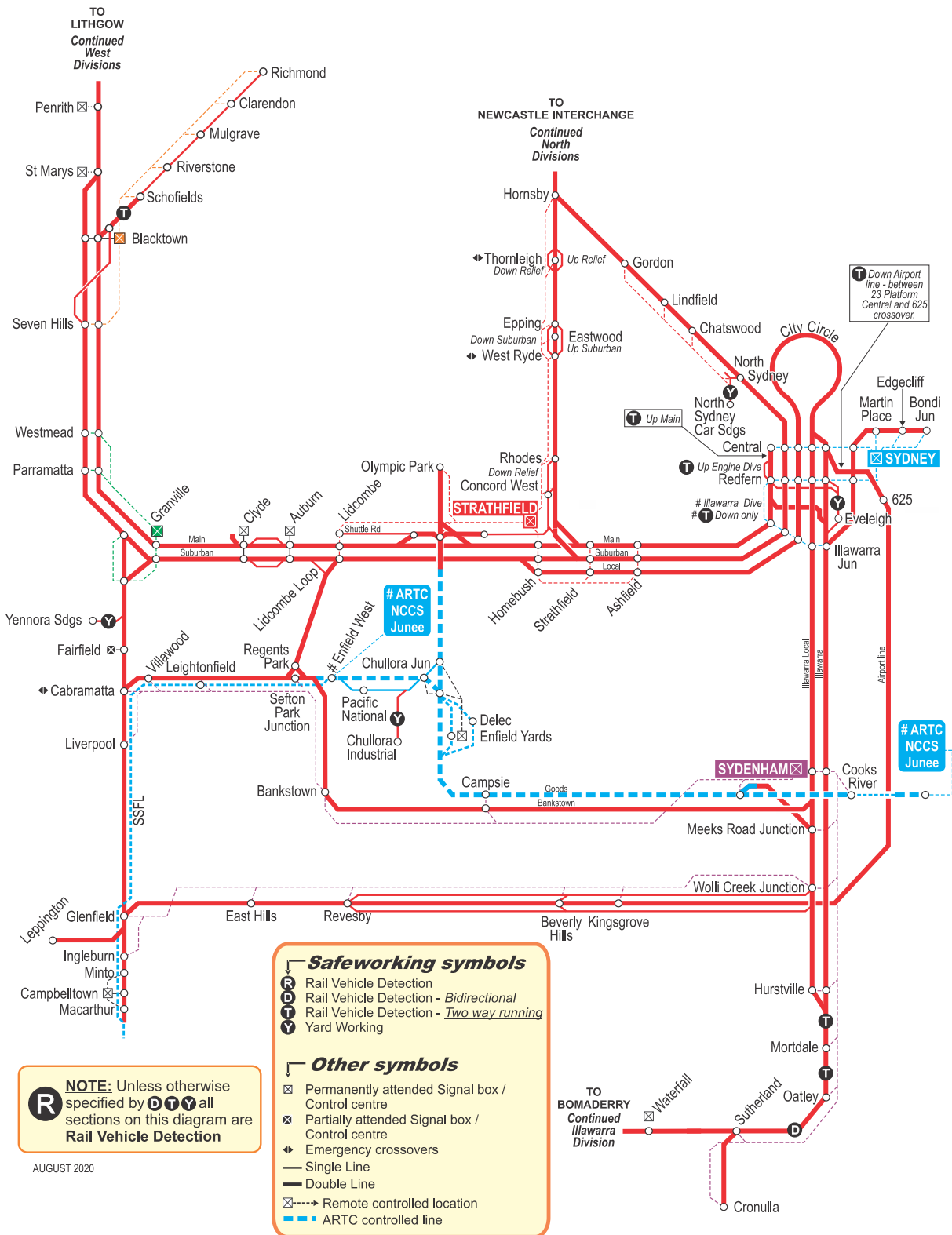
Boronia No 1 (D) 421m 50,750 - 51,171km

KEY	
A	AEI Tag reader
B	Bearing acoustic monitor
C	Angle of attack
D	Dragging equipment detector
E	Embankment slip detector
F	Embankment rockfall detector
G	Ground borne noise monitor
H	Hot bearing detector
I	Wheel impact load detector
L	High load detector
M	Track magnet for trip gear XPT/Xplorer
W	Weighbridge
P	Pantograph condition monitoring system
R	Rainfall monitor
W	Hot wheel detector
T	Tunnel
1	Track Classification (Note all tracks shown on this map are Class 1 unless otherwise noted.)

1.2. Sydney Metropolitan – Safeworking systems

Version August 2020

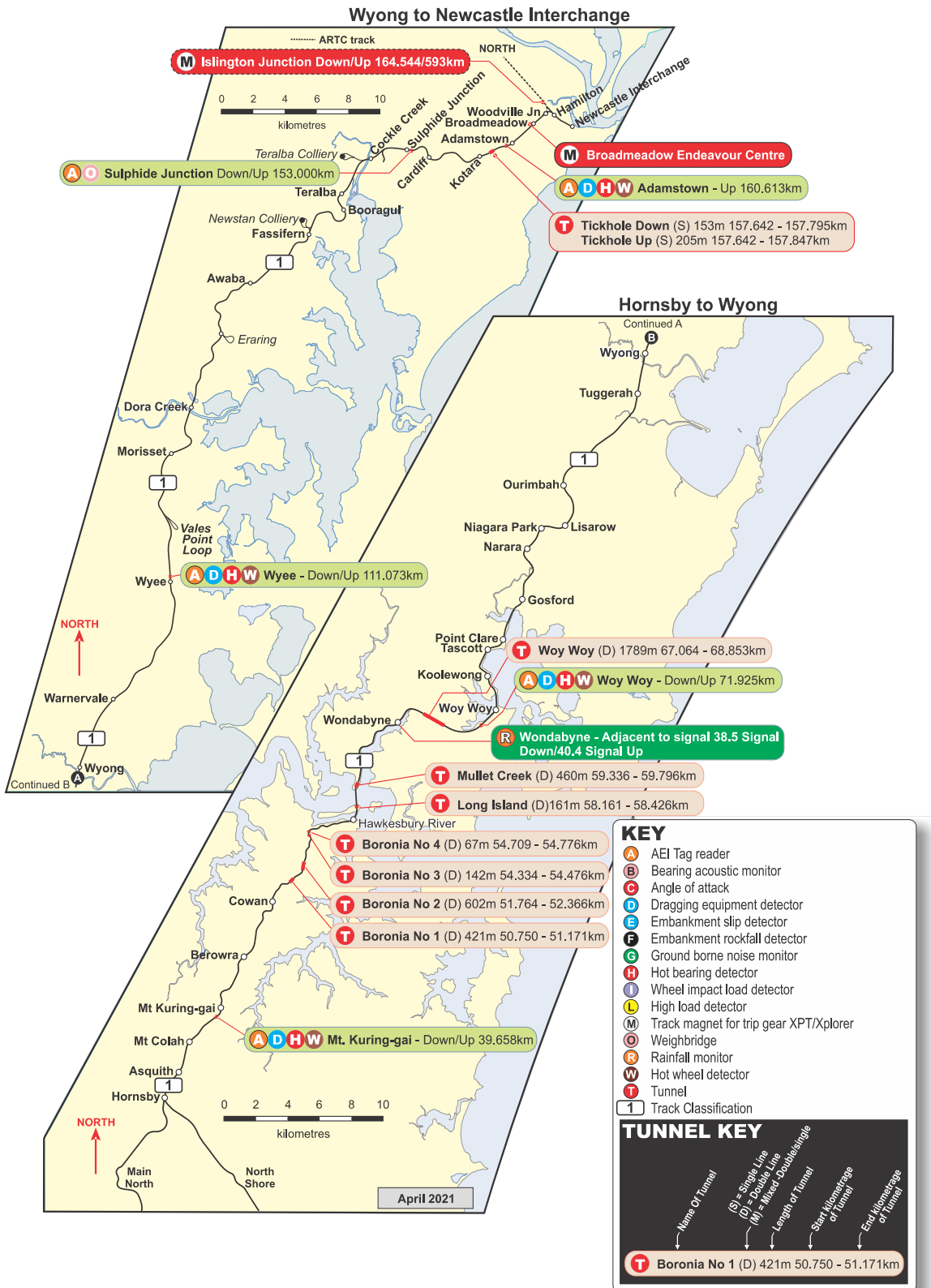
Sydney Metropolitan - Safeworking Systems



1.3. Northern Division – Classification of lines and locations of tunnels and field devices

April 2021

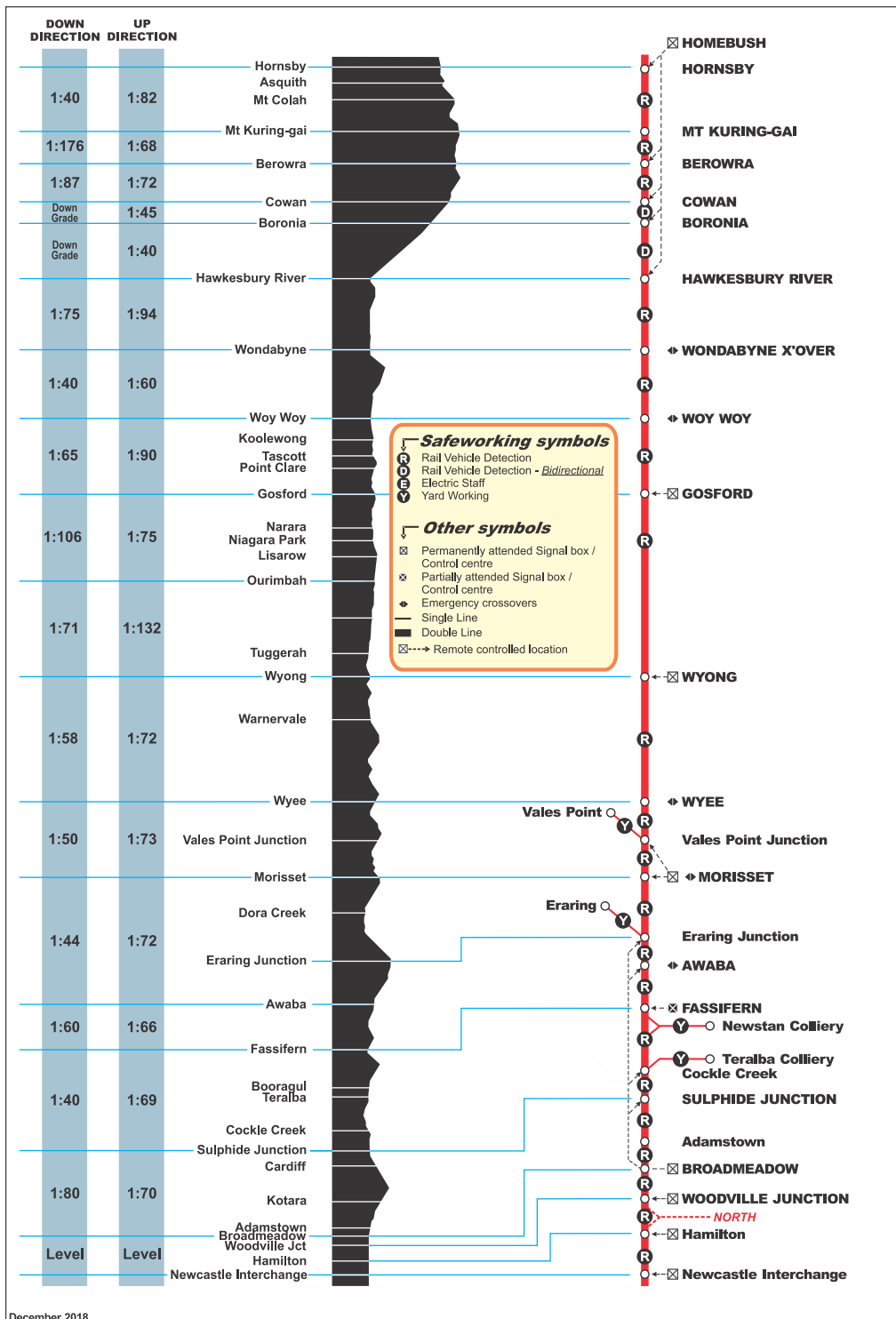
Northern Division - Classification of lines and location of tunnels and field devices.



1.4. Northern Division – Grades and Safeworking systems Hornsby to Newcastle

December 2018

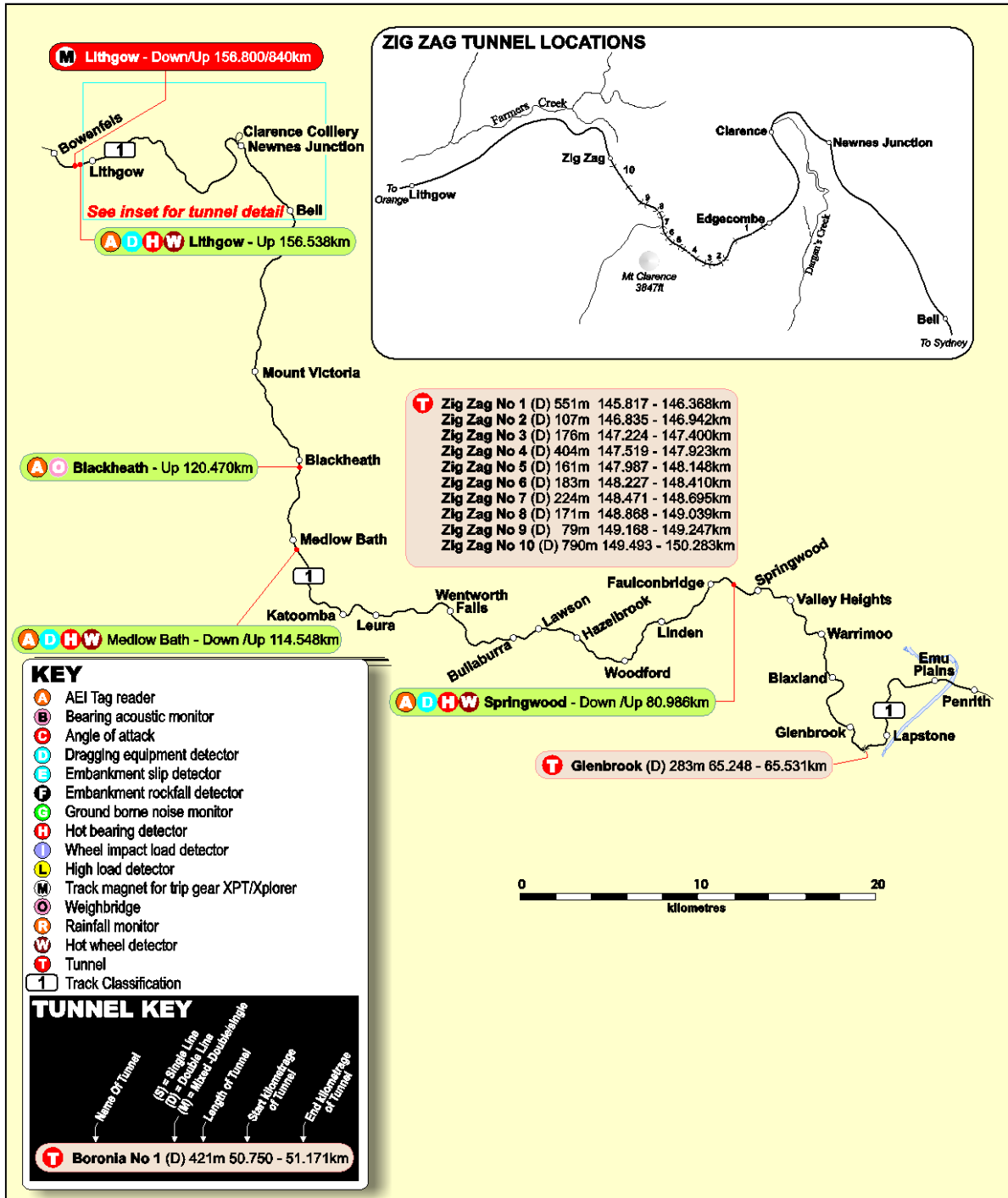
Northern Division - Grades and Safeworking systems - Hornsby to Newcastle Interchange.



1.5. Western Division – Classification of lines and locations of tunnels and field devices

April 2013

Western Division - Classification of lines and location of tunnels and field devices.

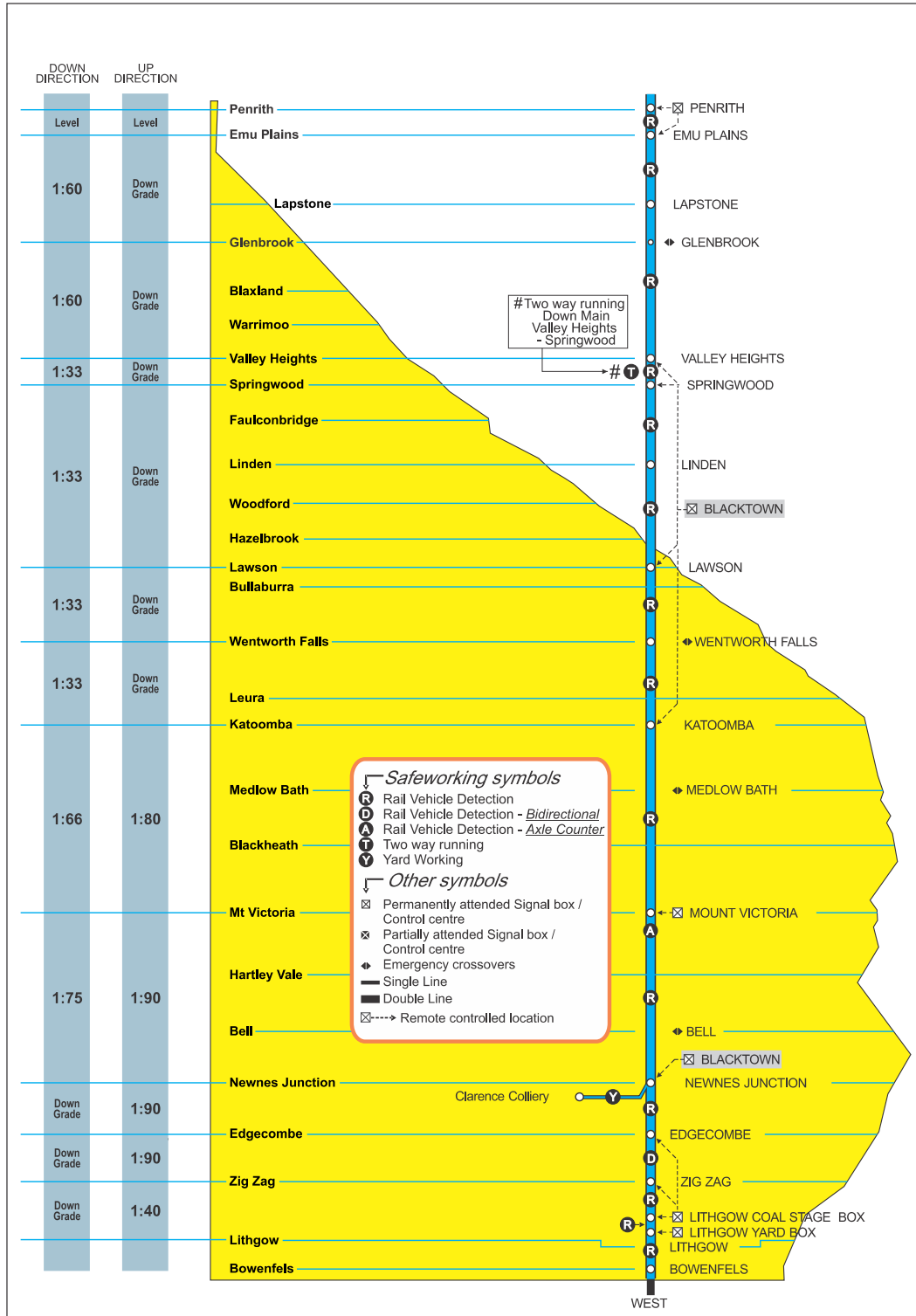


1.6. Western Division – Grades and Safeworking systems Penrith to Bowenfels

April 2021

Western Division

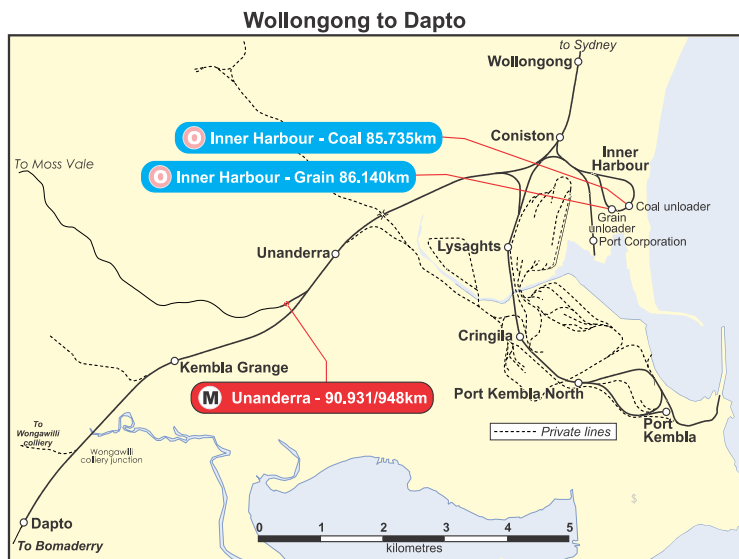
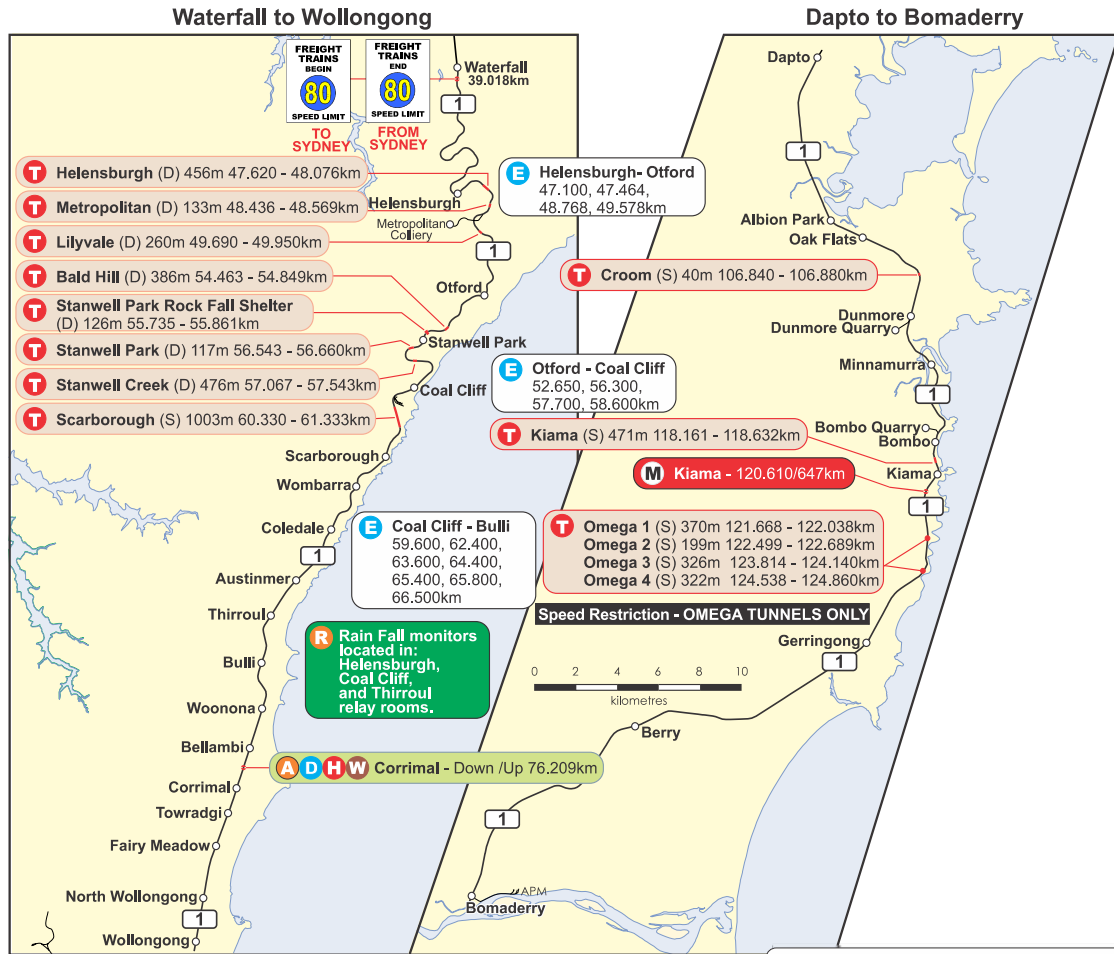
- Grades and Safeworking systems
- Penrith to Bowenfels



1.7. Illawarra Division – Classification of lines and locations of tunnels and field devices

Version August 2020

Illawarra Division - Classification of lines, tunnels and location of field devices.



KEY

- A** AEI Tag reader
- B** Bearing acoustic monitor
- C** Angle of attack
- D** Dragging equipment detector
- E** Embankment slip detector
- F** Embankment rockfall detector
- G** Ground borne noise monitor
- H** Hot bearing detector
- I** Wheel impact load detector
- L** High load detector
- M** Track magnet for trip gear XPT/Xplorer
- O** Weighbridge
- R** Rainfall monitor
- W** Hot wheel detector
- T** Tunnel
- 1** Track Classification

TUNNEL KEY

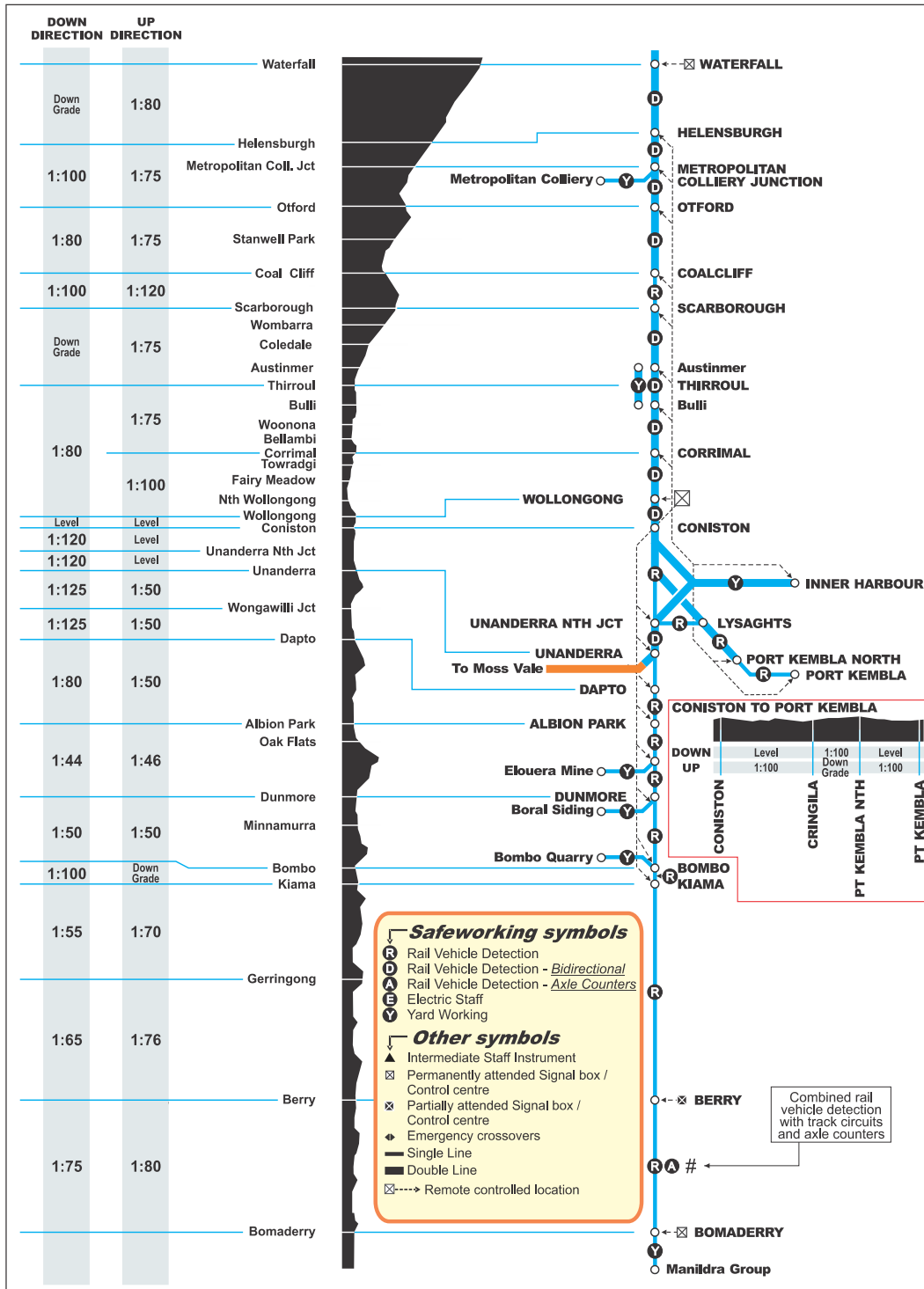
- Name Of Tunnel
- (S) = Single Line
- (D) = Double Line
- (M) = Mixed - Down/up single
- Length of Tunnel
- Start kilometrage of tunnel
- End kilometrage of tunnel

T Boronia No 1 (D) 421m 50.750 - 51.171km

1.8. Illawarra Division – Grades and Safeworking systems Waterfall to Bomaderry / Port Kembla

April 2021

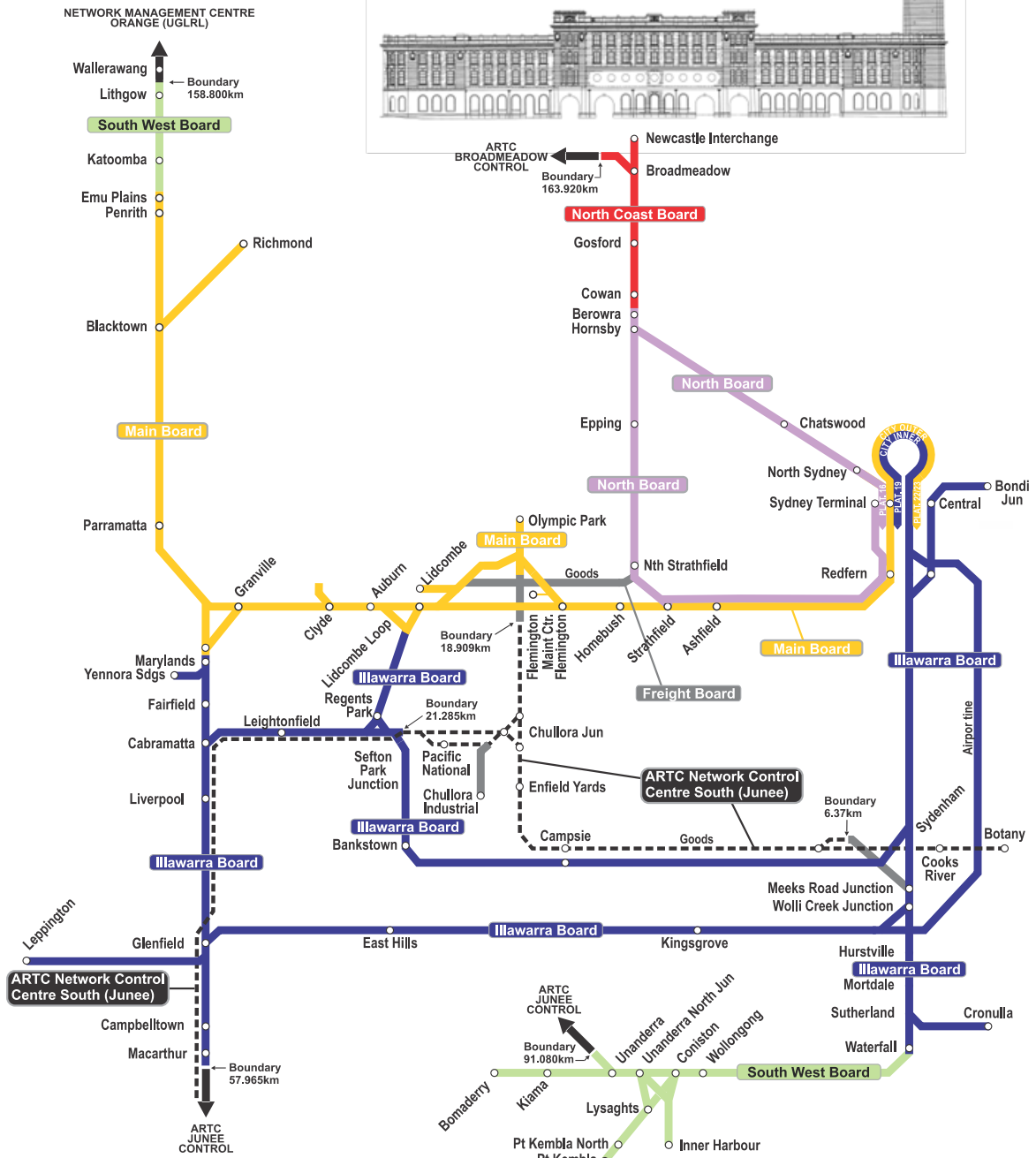
Illawarra Division - Grades and Safeworking systems - Waterfall to Bomaderry / Port Kembla.



1.9. Rail Operations Centre Sydney – Areas controlled by Train Control Boards

Version April 2023

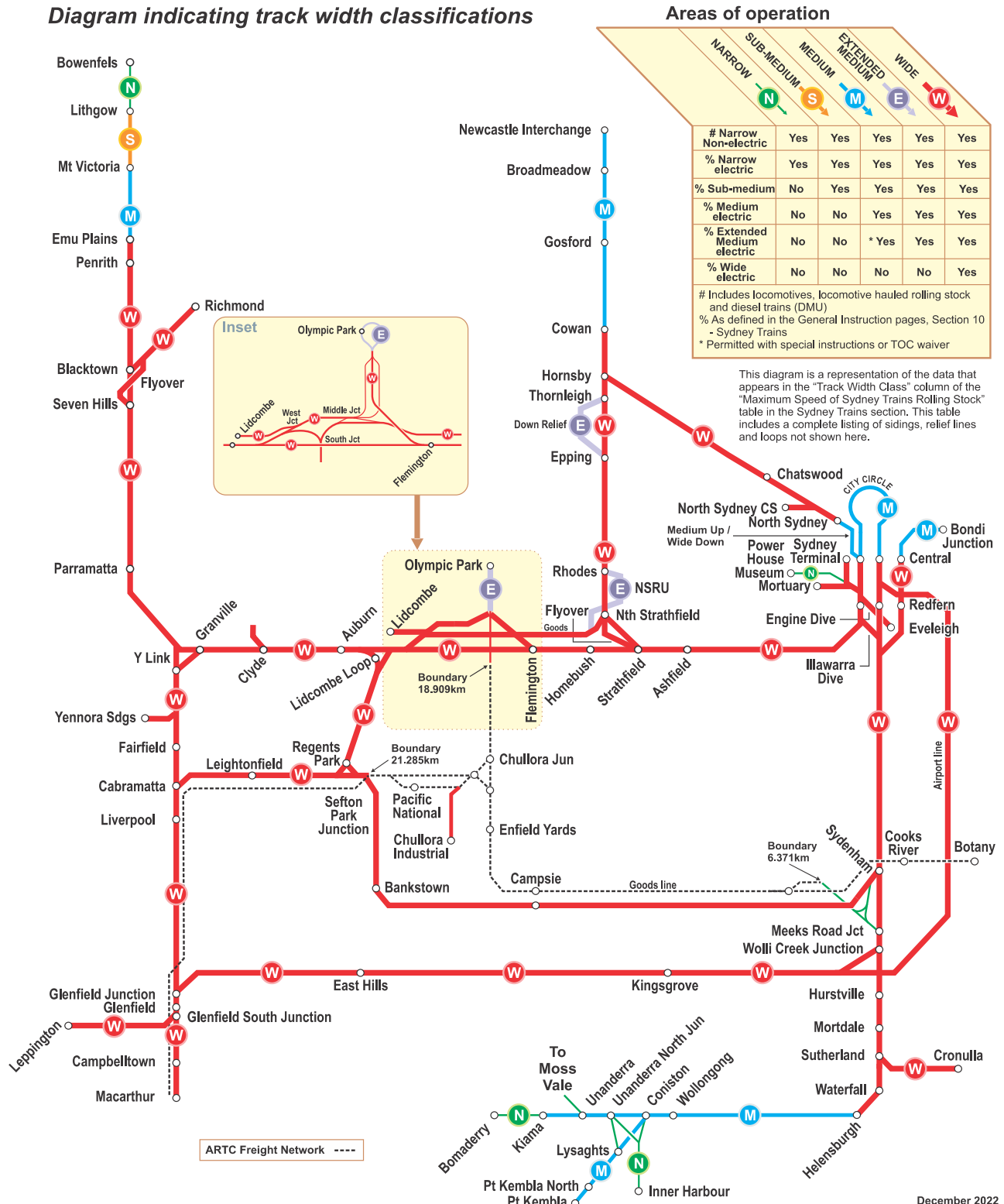
Rail Management Centre Sydney - Areas controlled by Train Control Boards



1.10. Diagram indicating track width classifications

Version April 2023

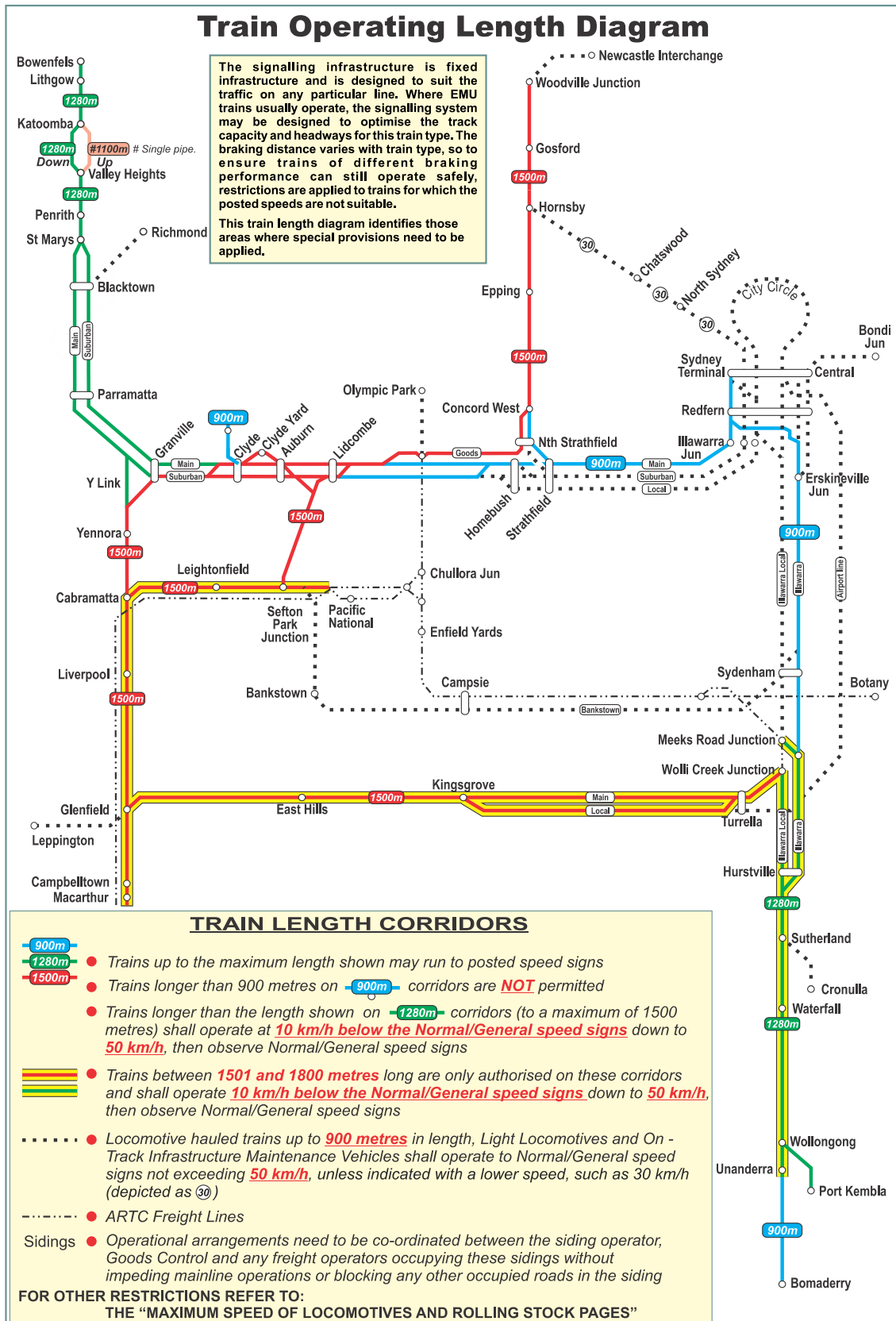
Diagram indicating track width classifications



December 2022

1.11. Train operating length diagram

Version August 2020



Section 2

Locomotive operations

2. Locomotive operations

2.1. Marshalling of locomotives

Version December 2020

Powering locomotives may be marshalled anywhere within a train subject to the requirements of Section 2.3 and Section 2.4. Powering locomotives within the train consist or at the rear of a train are called distributed power locomotives.

The number of distributed power locomotives marshalled together within a train consist and/or at the rear of a train shall not exceed the maximum horsepower limits specified in Section 2.3 for assisting (Banking) Locomotives.

Unless otherwise approved by the Asset Management Branch, the maximum number of locomotives (including dead hauled) is specified under **Multiple Locos** in the **Maximum Speed of Locomotives and Rolling Stock** table located in the respective Division Pages.

The lead locomotive in a light locomotive consist or on a train (and any crewed distributed power locomotive) **shall** be fitted with an operable approved *Driver Safety System*.

Locomotives operating in shunting yards do not require a *Driver Safety System*.

2.2. Maximum speed of light locomotives

Version April 2018

The maximum speed of light locomotives will be **80km/h** within the area as outlined in **Section 3.5 in Train Operations**, Operation of freight trains and light locomotives in Sydney Metropolitan area, page 62, or lower (50 km/h or less) as indicated in the **MAXIMUM SPEED OF LOCOMOTIVES AND ROLLING STOCK** table located in the respective Division Pages and the Train operating length diagram in Section 1.11.

2.3. Assisting (banking) locomotives

August 2019

Additional locomotives may be used to assist a train where there is insufficient train locomotive tractive effort to haul a train over the grade. Assisting locomotives may be attached to the front or rear of a train.

If the locomotives are attached at the front, the maximum number of powering locomotives specified under **Multiple Locos** in the **Maximum Speed of Locomotives and Rolling Stock** table located in the respective Division Pages, shall not be exceeded.

If the assisting locomotives are attached to the rear of the train, the minimum allowable vehicle mass for vehicles in the trailing 1/3 of the train mass is given below in Figure 1.

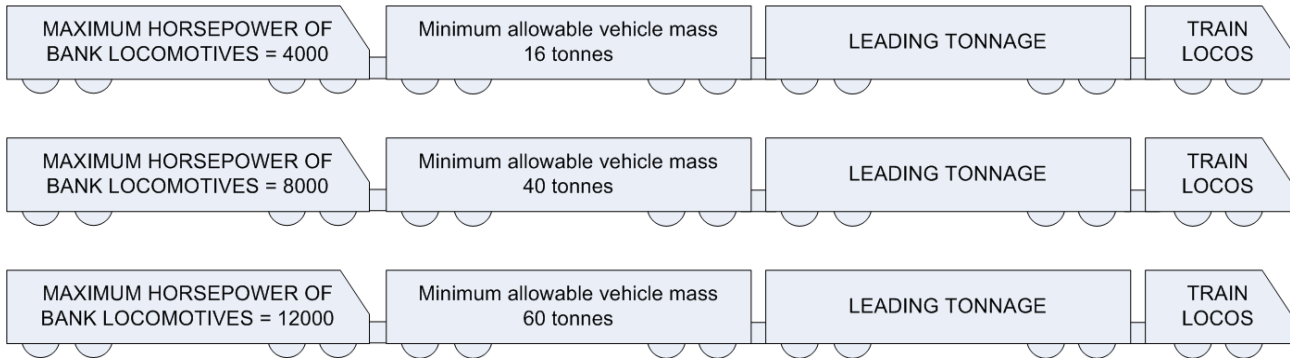


Figure 1 – Minimum allowable vehicle mass (assisting locomotives at rear of the train)

Notes:

1. *In the case of multi-pack vehicles the minimum allowable vehicle mass shall be the gross mass divided by the number of platforms (decks).*
2. *Trains conveying Rail compatible Road Trailers (that is, Trailerrail) shall not be assisted in the rear without the specific authority of the Asset Management Branch.*
3. *Low mass vehicles should be marshalled, where possible, towards the centre of the train consist.*

After a bank locomotive has been detached from the rear of a train, an end of train marker, (EOTM) shall be fitted to the end of the rear vehicle on the train.

2.3.1. Assisting locomotives used to clear a section of a failed train

This section provides limits for emergency / incident situations where assist locomotives are being used to clear a section of a failed train.

For emergency or incident type situations where there is a need to clear a section of line, assisting locomotives which are normally subject to AC / DC locomotive mixing restrictions may be mixed in any combination, provided the following is met:

- Tractive effort requirements
- Draw gear requirements
- Both AC and DC locomotive consists are crewed
- AC and DC locomotive crews are in communications with each other to control the application of tractive effort
- Distributed power requirements (if applicable)
- ECP brake requirements or ECP brake recovery requirements (if applicable)

The train crews shall be vigilant of wheel spin or wheel slip events, especially in the DC locomotive, and control the traction appropriately to avoid this possible occurrence.

Some DC locomotives may power up faster than AC locomotives. A combined AC / DC locomotive consist may result in the DC locomotive taking a larger portion of the load when initially applying traction, which may lead to wheel slip. This is further

compounded by the AC locomotives being equipped with more accurate wheel slip control systems that limit wheel slip events compared to DC locomotives.

2.4. Distributed power

Version December 2020

It is permissible to distribute locomotive power throughout a train consist. In addition to the locomotives at the front of a train, additional powering locomotives may be marshalled as a group within a train consist or at the rear of a train in the case of crewed distributed power. These additional locomotives shall be crewed at all times. Operation of uncrewed remote locomotives is not permitted.

In the case of wired or wireless distributed power, the operation shall be sanctioned and approved by the Asset Management Branch prior to any movements (except in the case of the XPT passenger train or approved wired distributed power operations). Refer to TS 06302 *Risk Assurance for Distributed Power Freight Trains* for the associated process and requirements.

The train driver in the front locomotive shall have full control of the automatic air brake throughout the train including the rear locomotive(s) and shall direct the driver of the distributed power locomotives when to apply and reduce power.

Distributed power trains employing a locomotive(s) at each end for providing a shuttle operation, shall be driven from the leading locomotive in the direction of travel, except when shunting or yard working.

If the distributed power locomotives(s) are marshalled at the rear of the train, refer to Assisting (banking) locomotives section (page 41) for the minimum allowable vehicle mass for vehicles in the trailing 1/3 of the train mass.

Four-wheel vehicles and vehicles with non-automatic couplers **shall not** be included in a distributed power train consist forward of the distributed power locomotives.

Where distributed power locomotives are attached to the rear of a train, the two red marker lights on the rear locomotive shall be exhibited as tail lights to indicate the rear of the train. A flashing tail light (end-of-train marker) is not required.

2.5. Excessive sanding

Version 10.0 April 2013

Locomotives that are applying excessive sand or sanding continuously shall be stopped and the fault rectified or the sanding magnet valve isolating cock closed. The signaller/train controller shall be advised.

In this case, if adhesion conditions require the use of sand, the sand equipment may be cut in and the train worked under block working conditions until the sand is again isolated. The signaller/train controller shall be advised and be in agreement with this working.

2.6. De-sanding equipment

Version 10.0 April 2013

It is a requirement that all locomotives with sanding equipment and operating under power be fitted with de-sanding equipment.

Locomotives **not fitted** with de-sanding equipment (identified in Section 10 (page 179) General Instruction pages by **note R8**) or locomotives with inoperative de-sanding equipment, operating in **track circuited areas**, when operating as single units or as trailing units in a multiple unit consist **shall have** their sanding equipment **isolated**.

2.7. Locomotive wheel spin

Version 10.0 April 2013

Rails can be severely damaged by uncontrolled wheel spin. All cases of uncontrolled wheel spin and/or rail burns shall be reported to the signaller/train controller so that arrangements can be made to have the rails inspected to determine the extent of the damage.

When a train comes to a stand on the ruling grade due to possible loss of locomotive power, insufficient adhesion (inoperative sanding system), train overloaded or there is evidence of wheel spin within the locomotive consist, **NO ATTEMPTS** shall be made to move the train until the defect is corrected. If the defect cannot be corrected the train shall be declared a failure and be assisted from the section.

2.8. Locomotive(s) dead attached or off line

Version December 2020

Dead / off line attached locomotives may be marshalled anywhere within a train consist, subject to the maximum number of locomotives subject to Section 2.10. Locomotives that are dead attached or off line shall be included in the train load and for the purpose of train load calculations the live weight of the locomotive(s) is multiplied by 1.1 (covers an increase in rolling resistance).

If the dead attached locomotives are coupled to the train locomotives, numbers 3 and 4 control air hoses shall be coupled.

If the dead attached locomotives are marshalled in the train consist or at the rear of the consist, these locomotive(s) shall be certified as having passed the brake system sensitivity part of the single car air test before being considered fit to be marshalled in that position.

Locomotive(s) which do not pass the sensitivity test cannot operate dead attached within the train consist or on the rear of the consist unless a crew person is available, to ensure the brakes release.

2.9. Marshalling of locomotives due to brake valve type

Version 10.0 April 2013

Unless otherwise approved, the marshalling restrictions in Table 3 apply to locomotives due to the brake valve type on the **lead locomotive**.

Table 3 – Marshalling restrictions due to brake valve type

Brake valve type	Marshalling requirement
A7-EL	Not to lead in more than a two locomotive consist. This restriction is due to the independent release on A7-EL brake valves not being relied upon to release the independent brake on the third or more locomotives.
B7 – EL, 26L, 30CDW or Epic	Shall lead on multiple locomotive consists of greater than two locomotives.
ECP	Can be operated on either ECP equipped trains or normal automatic air brake trains.

2.10. Multiple unit working of locomotive

Version December 2020

This section does not apply to steam locomotives. Any operation involving for multiple steam locomotive working shall be assessed and approved on a case by case basis by TfNSW.

In TS TOC 2, Division Pages, the respective pages headed "Maximum Speed of Locomotives and Rolling Stock" have a column associated with locomotives headed "Multiple Loco Working". This shows the maximum number of locomotives powering that may run coupled together in a locomotive group on each relevant section of track.

The maximum number of locomotives in a leading or banking locomotive group is unlimited, subjected to a maximum locomotive group horsepower of 16,000 Hp for all powering locomotives in the group (except as noted below for Hawksbury River bridge). The determination of the maximum number of locomotives in a mid-train locomotive group as part of a wired or wireless distributed power operations shall form part of the assessment and approval described in Section 2.4.

Locomotive groups consisting of both powering and non-powering locomotives within a group is considered as one locomotive group. There may be more than one locomotive group within a single train consist (for example in a push pull train).

Refer to Figure 2 for a graphical representation of the requirements in relations to locomotive group horsepower limits and spacing between locomotive groups within a train.

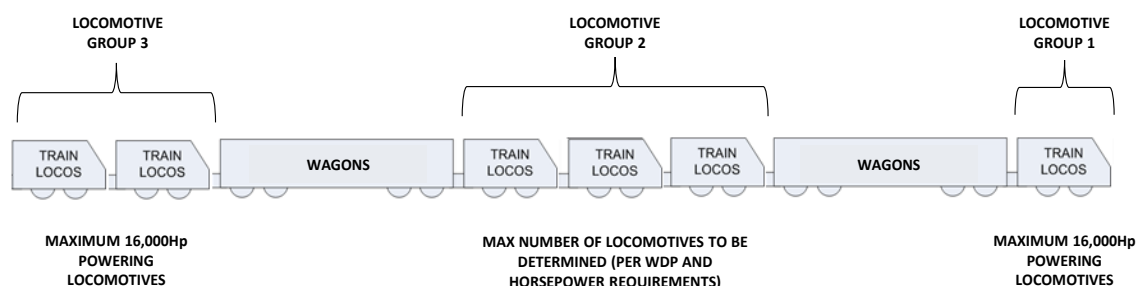


Figure 2 – Locomotive group horsepower requirements within a train

Special operating conditions for Hawkesbury River bridge (Main North: 58.446 to 59.292 km)

The maximum number of locomotives in a locomotive group is limited to 5 locomotives in total, subjected to a maximum locomotive group horsepower of 16,000 Hp for all powering locomotives in the group. In addition if there are more than one locomotive group within the train consist, the minimum distance between locomotive groups shall be no less than 3 wagons or 50 metres. Where locomotives groups are leading or within the train, the minimum distance between locomotive groups shall be no less than of 3 wagons or 50 metres.

2.10.1. Multiple unit working of locomotive – Dynamic / regenerative braking restrictions

In the following instances, dynamic / regenerative braking is not to be used alone, but shall be used in conjunction with the automatic train brake:

- when more than three locomotives are marshalled on the front of the train and are available for powering
- irrespective of the number of locomotives marshalled on the front of the train, if any empty vehicle or empty platform (in the case of multi pack vehicles) is marshalled with more than 2000 tonnes trailing that empty vehicle

2.11. Mixing locomotive types

Version December 2023

As each type of locomotive, when operating on the ruling grade and conveying its Full Sectional Load, can have different traction performance capabilities at the balancing speed, the mixing of locomotive types may result in one locomotive working excessively harder than the other(s).

To allow for this, where the loads for multiple unit mixed locomotives are not published in the **LOADS & CONDITIONS table**. The following method, unless approved otherwise below, shall be used for determining the Full Sectional Load of the locomotive consist. Add together each of the individual **FULL SECTIONAL LOADS** applicable for each powering locomotive in the consist for the required section and reduce the total by 10%.

For example, West Ryde to Epping:

81 + 44 class = 1131 t + 615 t = 1746 t – 175 t (10%) = 1571 tonnes

This rule will not apply when mixing the following classes of locomotives given in Table 4.

Table 4 – Classes of locomotives where the full sectional load rule does not apply

Group	Locomotive class	Group	Locomotive class
(a)	*C,90, 81, 82, 48 and 830	(j)	C, 80, 48 and 830
(b)	81, AN, BL, DL and NR	(k)	*C, 48, 80, 81, 82, 830, BL, G, GL, T, X
(c)	42, 421, and GM	(l)	AN, DL, NR and VL
(d)	43, 44, 44s, 45, 45s, 600, 442, 442s	(m)	G, DL, GL, RL [%] , VL and 1100
(e)	44, 442, 442s, 18, 31, and L	(n)	2 x 14 (MZ) + 1 x 44 class
(f)	#CM, G, GL, and VL	(o)	DL, 80, 81, BL, G and 82 [^]

Group	Locomotive class	Group	Locomotive class
(g)	421 and 422	(p)	S and +GM(12)
(h)	CLP, CLF, 31, L, 22, +GM(12), 48 & 830	(q)	#CM, G, *C, and BRM
(i)	G, X and T	(r)	48, 48s, 48200, 830, PL, and 49 [§]

* Locomotives C502 – C510 only

+ Nos. 12 – 47

% RL 303, 309, 310 only

Limited to a maximum of 1 x CM class in the locomotive consist

§ Limited to a maximum of 2 x 49 class in the locomotive consist

^ Limited to a maximum of 2 x 82 class in the locomotive consist

Alternate methods of determining locomotive loads may be considered but shall be sanctioned and approved by the Asset Management Branch before use.

2.12. Mixing AC with DC type locomotives

Version December 2020

The following AC traction locomotive types may be marshalled together in any combination with other AC locomotives:

- United Group Ltd – C44Aci, Downer EDI Rail – GT46C-ACe and CRRC Ziyang – SDA1

Where the number of powering C44Aci or GT46C-ACe in the locomotive consist is less than the number of SDA1, a 10% load reduction shall be applied to the sum of the individual full sectional loads

AC locomotives may be marshalled together any combination, up to 4 locomotives with the following DC locomotives:

- United Group Ltd – C44Aci: NR, AN and G
- Downer EDI Rail GT46C-Ace: NR, AN, CLP, CLF, G and X
- CRRC Ziyang – SDA1: No AC DC mixing permitted

A full list of approved AC6 locomotives (United Group Ltd – C44aci and Downer EDI Rail – GT46C-Ace) is summarised in Table 8 – Approved locomotives grouped into load categories – locomotive type AC in Section 2.14.

For mixing involving locomotives with CLP, CLF, G and X class locomotives, the load shall be reduced by 20% if an AC locomotive is leading and the trailing load is more than 80% of the sum of the individual locomotive's full sectional load. If a DC locomotive is leading, no load reductions apply. All on-board locomotive alarms shall be train-lined and the train shall cease operation and seek recovery if any sustained and excessive wheelslip is detected in any locomotive enroute.

For mixing involving AC locomotives with NR and AN class locomotives, the maximum allowable trailing loads are published in the relevant Division Pages (for example, North Division Pages). These published maximum allowable trailing loads are lower than the summation of

individual locomotives' full sectional loads. A DC locomotive shall be leading the consist and all on-board locomotive alarms shall be train-lined.

When three locomotives are marshalled at the front of a train and are powering there is a risk of track buckling due to compressive reactive forces in the rail immediately behind the last powering locomotive. To minimise this risk, an unloaded vehicle or empty platform in the case of intermodal vehicles shall not be marshalled in this position when the trailing load exceeds 70% of the maximum full sectional load.

Dynamic Braking for an individual operating locomotive shall only be used within the operating range of current DC locomotives: 230 kN max from 16 km/h to 45 km/h and reducing linearly to zero at speeds below 16 km/h.

These details are represented in Note R14 in Section 10 Locomotive and rolling stock data.

2.13. Mixing locomotive types (ECP brakes)

Version 10.0 April 2013

Mixing of ECP equipped locomotives with standard automatic air brake locomotives on ECP trains is not allowed (unless in the case of emergency).

2.14. Locomotive load categories

Version December 2023

The performance of locomotives and their load categories are only relevant for fully operational locomotives. Locomotives which are defective or have traction elements or systems cut out (for example traction motors cut out) shall not be used to haul loads to the published conditions (load category).

Table 5, Table 6, Table 7 and Table 8 list approved locomotives grouped into load categories or classes.

Table 5 – Approved locomotive load category, power, and braking features by numerical class

Loco class	Load category	Horse-power	Pressure maintaining brake valve	Extended range dynamic brake
1100	**L4, L7	3300	Yes	Yes
1200	L9	2400	Yes	Yes
14	L7	3900	No	No
18	L10	2400	No	No
22	L10	2000	Yes	No
31	L5	3000	No	No
32	L9	3190	Yes	Yes
42	L12	1750	No	No
421	L12	1800	No	No
422	L10	2000	Yes	No

Loco class	Load category	Horse-power	Pressure maintaining brake valve	Extended range dynamic brake
423	L12	1500	No	No
43	L12	1600	No	No
44	L12	1800	No	No
44s	L12	1800	No	No
442	L11	2000	Yes	No
442s	L11	2000	Yes	No
45	L12	1800	No	No
45s	L12	1800	No	No
47	L13	1000	No	No
48	L13	900	No	No
48200	L13	900	No	No
48s	L13	900	No	No
49	L13	875	No	No
73	L14	650	No	No
80	L9	2000	Yes	No
80s	L9	2000	Yes	No
81	L4	3000	Yes	Yes
82	L3	3000	Yes	Yes
90	L1	4000	Yes	Yes
92	AC6	4500	Yes	Yes
93	AC6	4500	Yes	Yes
600	L12	1800	No	No
830	L13	900	No	No
900	L13	900	No	No
6000	AC6	4500	Yes	Yes
6020	AC6	4500	Yes	Yes

Table 6 – Approved locomotive load category, power, and braking features by alphabetical class

Loco class	Load category	Horse-power	Pressure maintaining brake valves	Extended range dynamic brake
ACB	AC6	4500	Yes	Yes
ACC	AC6	4500	Yes	Yes
ACD	AC6	4500	Yes	Yes
ALF	L6	3000	Yes	Yes
AN	L2	4000	Yes	Yes
B	L12	1500	No	No
BL	L4	3000	Yes	Yes
BRM	L4	3300	Yes	Yes
C	L4, #L8	3000	Yes	Yes

Loco class	Load category	Horse-power	Pressure maintaining brake valves	Extended range dynamic brake
CEY	AC6	4500	Yes	Yes
CF	AC6	4500	Yes	Yes
CLF	L6	3000	Yes	Yes
CLP	L6	3000	Yes	Yes
CM	[§] L3, L4	3300	Yes	Yes
CSR	AC6	4000	Yes	Yes
D	L11	1950	No	No
DC	L10	2000	Yes	No
DL	L5	3000	Yes	Yes
EL	L7	2450	Yes	Yes
FIE	AC6	4500	Yes	Yes
FL	L10	2000	Yes	No
G	L4	3000	Yes	Yes
GL	L4	3000	Yes	Yes
[%] GM(1)	L13	1500	No	No
⁺ GM(12)	L12	1750	No	No
GPU	L13	900	No	No
GWA	AC6	4500	Yes	Yes
GWB	AC6	4500	Yes	Yes
GWU	AC6	4500	Yes	Yes
HL	L10	2000	Yes	No
K	L11	1950	No	No
L	L6	3000	No	No
LDP	AC6	4500	Yes	Yes
LDP10	AC6	4500	Yes	Yes
LQ, LZ	L5	3000	No	No
MM	L13	875	No	No
MRL	AC6	4500	Yes	Yes
NR	L2	4000	Yes	Yes
PHC	AC6	4500	Yes	Yes
PL	L13	900	No	No
QBX	AC6	4000	Yes	Yes
QL	AC6	4500	Yes	Yes
RL	L4, L7 [@]	3000	Yes	Yes
S	L12	1800	No	No
SCT	AC6	4500	Yes	Yes
SSR	AC6	4500	Yes	Yes
T	L13	875	No	No
TT	AC6	4500	Yes	Yes
TT100	AC6	4500	Yes	Yes
VL	L4	3000	Yes	Yes

Loco class	Load category	Horse-power	Pressure maintaining brake valves	Extended range dynamic brake
WH	AC6	4500	Yes	Yes
X	L9	2000	No	No
*X	L7	3000	No	No
XRB	L5	3000	Yes	Yes
XRN	AC6	4500	Yes	Yes
XR-2	L5	3000	Yes	Yes

Table 7 – Approved locomotives grouped into load categories – locomotive type DC

Load category	Locomotive class – DC	Horse-power
L1	90	4000
L2	AN, NR	4000
L3	§CM	3300
L3	82	3000
L4	BRM, CM, **1100	3300
L4	81, BL,C, G, GL, RL@, VL	3000
L5	31, DL, LQ, LZ, XRB, XR-2	3000
L6	ALF, CLF, CLP, L,	3000
L7	14	3900
L7	1100	3300
L7	RL@	3000
L7	EL	2450
L7	*X	2000
L8	#C	3000
L9	32	3190
L9	80, 80s, X, 1200	2000
L10	18, 22, 422, DC, HL, FL	2000
L11	442, 442s	2000
L11	D, K	1950
L12	42, 421, 423, 43, 44, 44s, 45, 45s, 600, B, +GM(12), S	1800
L13	47, 48, 48200, 48s, 49, 830, 900, %GM(1), GPU, MM, PL, T	900
L14	73	650

Notes to Table 5, Table 6 and Table 7:

Applies only to C501

** Applies only to X46, X47 and X51*

% Nos. 1 – 11

+ Nos. 12 – 47

@ Multiple RL at L4 and single RL restricted to L7 (for RL 301, 302, 304, 305, 306, 307 only) (RL 303, 309, 310 at L4 single and multiple)

§ Multiple CM only (single CM not permitted with L3, single CM restricted to L4 only)

*** Single 1100 class shall be L7, L4 shall only apply to 1100 class when operating in multiple unit locomotive consists.*

Table 8 – Approved locomotives grouped into load categories – locomotive type AC

Load category	Locomotive type – AC	Horse-power
AC6 (Downer EDI Rail – GT46C-Ace)	GWA, GWB, LDP, LDP10, SCT, TT, TT100, WH, SSR	4500
AC6 (United Group Ltd – C44aci)	92, 93, 6000, 6020, ACB, ACC, ACD, CEY, CF, FIE, GWU, MRL, QL, XRN, PHC	4500
AC6 (CRRC Ziyang – SDA1)	CSR, QBX	4000

When a locomotive shown in the **LOADS AND CONDITIONS** section with an associated load, is unavailable, a superior or equivalent locomotive may be used for that load.

Locomotives that appear on the same line are deemed to be equivalent locomotives and can operate to the same loads. However, these locomotives do not necessarily operate at the same speed when hauling their full load on the ruling grade. Accordingly, reference shall be made to the Mixing locomotive types table (page 47) to ascertain if a 10% load reduction is required before operating any mixed locomotive loads on the TfNSW Metropolitan Heavy Rail network.

When a superior locomotive has been selected, reference shall be made to the relevant **Maximum Speed of Locomotives and Rolling Stock** table for the track section covering the intended area of operation, to check that the locomotive is approved to operate.

2.15. Block working of all classes of light locomotives

Version August 2020

All classes of light locomotives when travelling as a single unit or double consist and operating over the track circuited lines as indicated in Figure 3, **shall be worked under block working conditions** as shown in Sydney Trains Network Rule *NSY 512 Manual block working*.

Powering electric locomotives are exempt from this requirement, as are **XPT power cars** when shunting within the confines of the XPT maintenance centre.

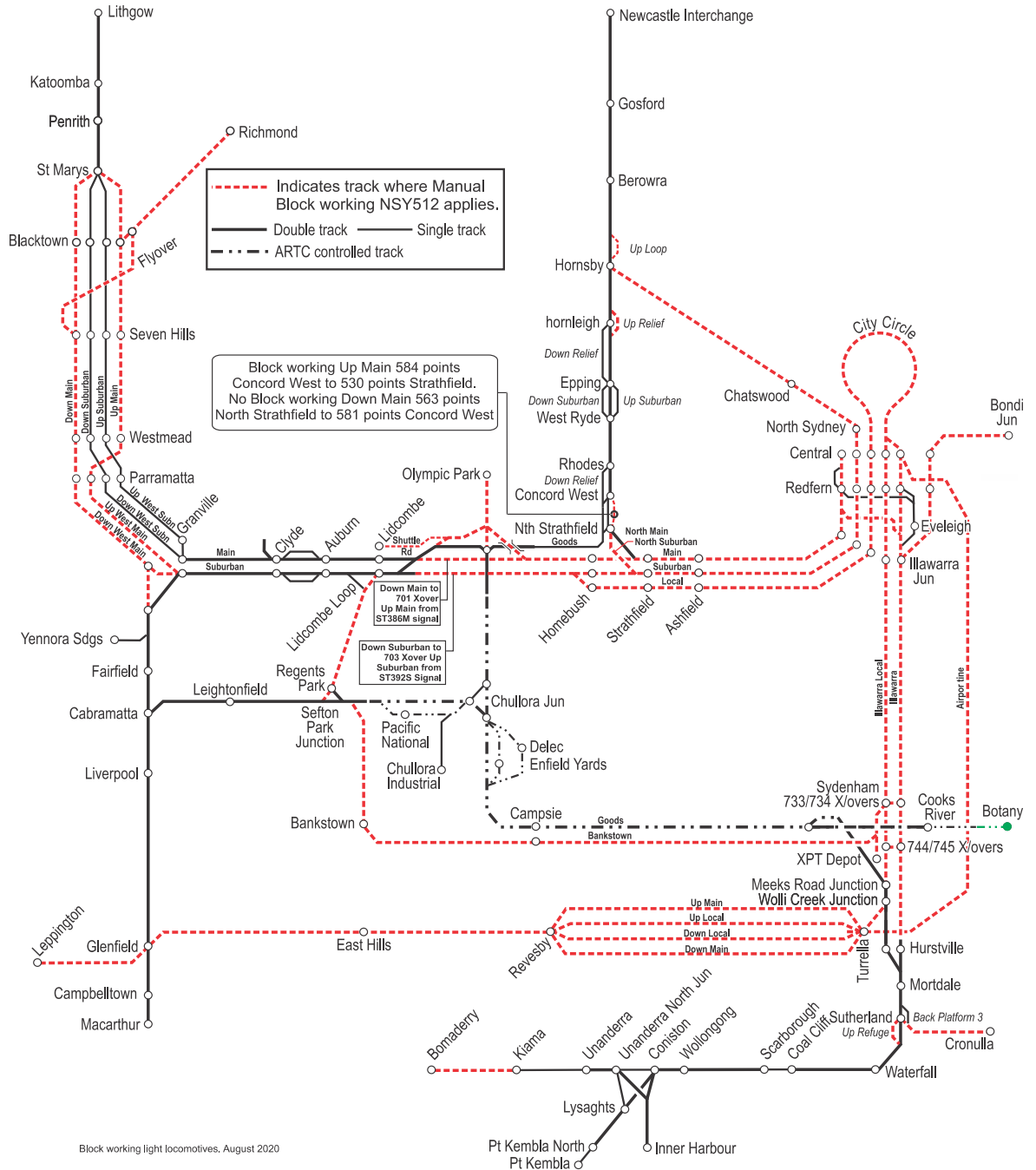


Figure 3 – Block working of all classes of light locomotives

2.16. Block working of Diesel Multiple Unit trains (DMU)

Version December 2020

2.16.1. Diesel Multiple Unit trains (DMU) fitted with Track Circuit Assistors (TCA's)

The following DMU trains are approved to operate under track signalling (block working not required), provided that at least one TCA per train is operational:

- Endeavour
- Xplorer
- Hunter RailCar

When both TCA's on any train are offline, failed, or inoperative, block working requirements as shown in Sydney Trains Network Rules, NSY 512 Manual block working, shall apply when operating over the track circuited lines indicated in Figure 4 in section 2.16.2. In this case, Xplorer and Endeavour are exempt from mandatory block working between Kiama and Bomaderry.

2.16.2. Diesel Multiple Unit trains (DMU) without Track Circuit Assistors (TCA's)

Diesel multiple unit (DMU) passenger trains (includes CPH Railmotors, 620/720 class diesel rail cars), when operating over the track circuited lines as indicated in Figure 4 **shall be worked under block working conditions** as shown in Sydney Trains Network Rule *NSY 512 Manual block working*.

This requirement does not apply to XPT trains (XPT power cars with XPT trailers) which do not require block working conditions. XPT power cars are treated as light locomotives and may require block working conditions, refer to section 2.15 Block working of all classes of light locomotives.

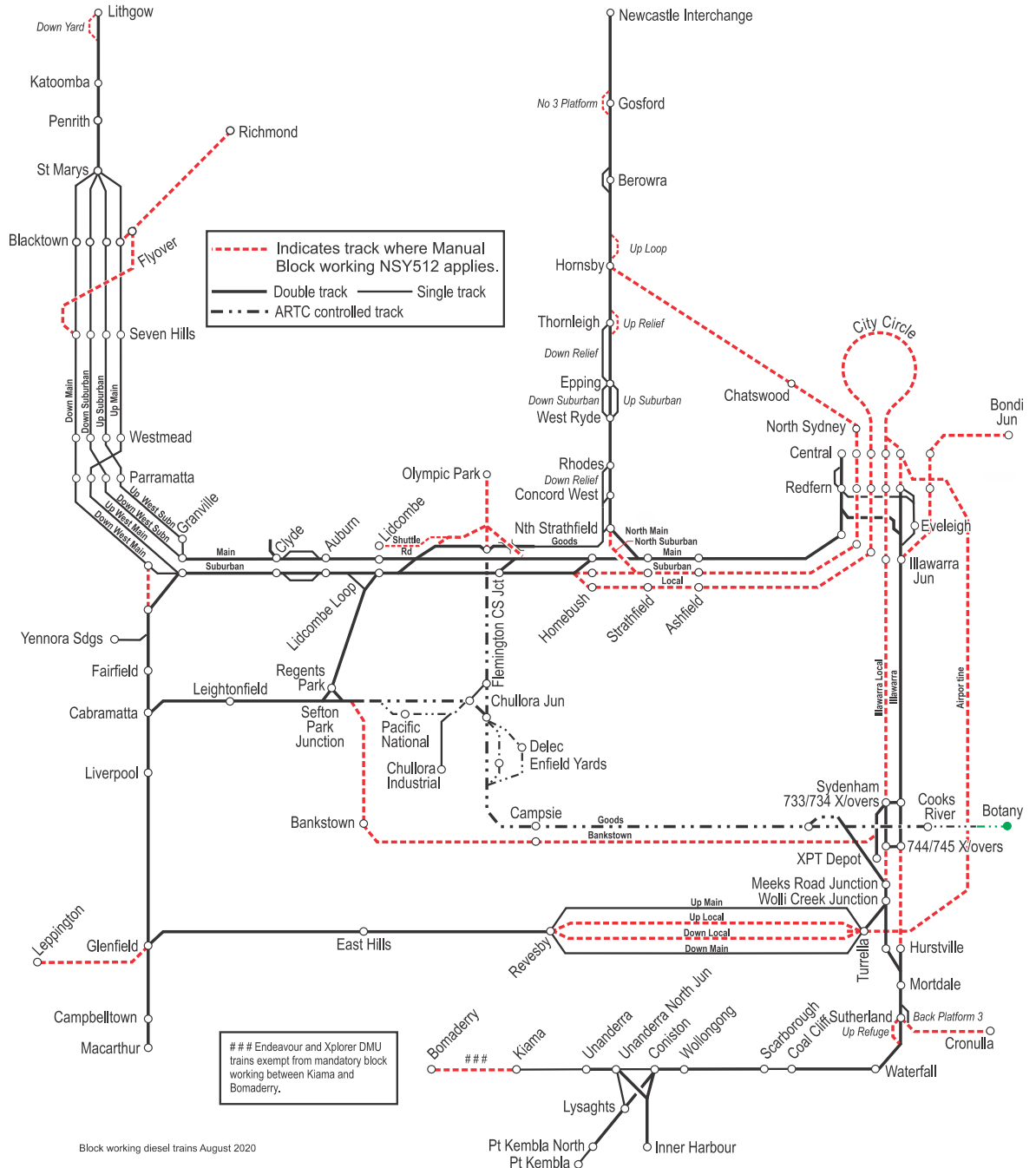


Figure 4 – Block working of Diesel Multiple Unit trains (DMU)

2.17. Block working of single unit diesel cars

Version December 2020

All single unit diesel cars, including but not limited to those listed in Table 9, when operating over any part of the network as single cars only, **shall be worked under block working conditions** as shown in Sydney Trains Network Rule NSY 512 Manual block working.

Endeavour, Xplorer and Hunter RailCars when operating as single cars, even when fitted with Track Circuit Assistor (TCA's) shall be block worked under block working conditions as shown in Sydney Trains Network Rule NSY 512 Manual block working.

This requirement does not apply to XPT power cars as XPT power cars are considered locomotives and are not considered single unit diesel railcars. For XPT power cars refer to Section 2.15 Block working of all classes of light locomotives.

Table 9 – Some single unit diesel cars subject to block working conditions

Single Unit Diesel cars:	Codes
Xplorer cars	EA, EC
Endeavour cars	LE, TE
Hunter Rail cars	HM, HMT
620 class	NPF
Rail Motor	CPH
Rail Motor	HPC 402
Track Maintenance Vehicle	ML039 (RVX4)
Track Maintenance Vehicles	MTPV1 / MTPV2 (with offline, failed or inoperable TCA's)

Section 3

Train operations

3. Train operations

3.1. Amalgamation of trains

Version 1.2 August 2010

Two trains may be amalgamated to form one longer train for operational reasons.

If two trains are amalgamated with all the locomotives marshalled at the front of the train, this is considered a normal train and no special conditions shall apply. All standard marshalling conditions and train path conditions, however, will apply.

If the trains are amalgamated with the locomotives on the second train coupled to the rear vehicle of the leading train, the following conditions shall apply:

- The train driver of the leading train shall have full control of the automatic air brake throughout both of the trains including the locomotive(s) on the second train and shall direct the driver of the second train when to apply and reduce power.
- All vehicles published in Section 10 (page 179) may be included in an amalgamated train with the exception that four wheel vehicles and vehicles with non-automatic couplers shall not be marshalled in the leading train.
- Communication between the crew on each train shall comply with current Safeworking requirements.
- The brake pipe and main reservoir pipe (where applicable) shall be continuous throughout the train.
- There shall be no marker lights exhibited on the locomotive(s) marshalled on the second train.

Refer to *Distributed power* (page 44) Section 2 *Locomotive operations* for conditions of operation.

3.2. Operation of trains on steep descending grades

Version August 2021

Specific braking requirements apply to freight trains descending grades of 1 in 40 or grades of 1 in 33 or steeper. These braking requirements are specified in the relevant Division Pages of the Train Operating Conditions Manual.

3.2.1. Operation of trains on steep descending grades – Freight trains descending grades of 1 in 33 or steeper

Freight trains descending such grades shall be fitted with fixed exhaust chokes to at least 80% of the train mass (excluding locomotives). Older wagons fitted with grade control valves shall not exceed 20% of the train mass (excluding locomotives) and the grade control valves shall be placed in the 'IP' position.

Wagons fitted with grade control valves are not permitted to operate between Unanderra and 91.080km (ARTC Boundary).

Where there is less than 80% of the train mass (excluding locomotives) fitted with fixed exhaust chokes the train shall not descend the grade.

Fixed exhaust chokes (as required for pneumatic only brake systems) do not apply to ECP braked trains or dual overlay systems running in ECP mode.

Dynamic or regenerative brake shall be used when available.

The maximum speed when descending a **1 in 33** grade is **50 km/h**, and **30 km/h** when descending a **1 in 30** grade.

3.2.2. Operation of trains on steep descending grades – Light locomotives/trains descending grades of 1 in 33 or steeper

The following rule applies to light locomotive(s) and locomotive hauled trains where the total hauled mass is less than the mass of the locomotive(s) hauling it.

Dynamic or regenerative brake shall be fitted and operational, on single locomotives or at least on 50% of the locomotives (including the lead locomotive) in the case of multiple unit locomotives. Dynamic or regenerative brake shall be operational and able to be controlled from the lead locomotive.

The handbrake on the light locomotive(s) shall be operational.

The speed of light locomotive(s) when descending a **1 in 33** grade is **40 km/h**, and **30 km/h** when descending a **1 in 30** grade.

3.2.3. Operation of trains on steep descending grades – Descending grades of 1 in 40

Freight trains descending such grades shall be fitted with fixed exhaust chokes to at least 50% of the train mass (excluding locomotives).

Older wagons fitted with grade control valves shall not exceed 50% of the train mass (excluding locomotives) and the grade control valves shall be placed in the 'IP' position.

Vehicles without load compensation are to operate in the 'EX' position unless the mass of the vehicle is 20 tonne or more, in which case the grade control valve is to be placed in the 'IP' position.

ECP braked trains are exempt from requiring grade control valves or fixed exhaust chokes (as required for pneumatic only brake systems).

3.3. Holding a train stationary on a grade

Version 1.1 August 2010

The automatic air brake shall not be relied upon to hold a train stationary on a grade for periods exceeding ten (10) minutes unless the lead locomotive is fitted with a pressure maintaining brake valve.

If the handbrakes are required to hold a freight train with locomotive(s) attached on a grade or freight vehicles with locomotive(s) detached, the minimum number of handbrakes to be applied is as given in Table 10:

Table 10 – Minimum number of handbrakes required to hold a freight train on a grade

Majority of the train on a gradient of	Minimum number of handbrakes
Level to 1 in 100	3 in 10 (30%)
1 in 99 to 1 in 50	5 in 10 (50%)
1 in 49 to 1 in 33	8 in 10 (80%)
1 in 32 to 1 in 25	All (100%)

When the train is on an **ascending** grade, the handbrakes shall always be applied to the vehicles on the **rear** portion of the train. When the train is on a **descending** grade, the handbrakes shall always be applied to the vehicles at the **front** of the train.

On locomotive hauled passenger trains, the handbrakes shall be applied on **all vehicles** before the locomotives are detached.

3.4. Train speed

Version April 2022

3.4.1. Plain track

The speed of any train shall not exceed the maximum allowable speed for the slowest rated locomotive or vehicle in the train consist as specified in Section 10 or 11 and the **MAXIMUM SPEED OF LOCOMOTIVES AND ROLLING STOCK** table in the appropriate **Division pages**, together with any permanent or temporary speed signs displayed for the section of track.

*Note: The maximum speeds of Sydney Trains and NSW TrainLink rolling stock operating on different area/sections of the network are shown in Table 5 and Table 6 of TS TOC.2, under **Passenger train operating conditions** (Section 17).*

For sections not covered by either the Maximum Speed pages or speed signs, the default maximum speed shall be 25km/h on running lines, 13km/h when shunting in yards and maintenance centres, and 8km/h when shunting in covered sections of yards and maintenance centres.

Note: Speed signs posted apply only to the line specified and not to any lines that diverge from the specified line such as loops or sidings; the speed on those will be separately advised.

3.4.2. Turnouts

Trains entering a loop or refuge shall not exceed the applicable speed signs or default turnout speed until the entire train has cleared the turnout. Train shall then adopt train speeds as described in section 3.4.1. For turnouts not covered by speed signs, the default turnout speed shall be 25km/h.

Note: Crossing/turnout speed signs apply only to the turnout(s) and not to any plain track following the turnout(s), the speed of which will be separately advised.

3.5. Operation of freight trains and light locomotives in Sydney Metropolitan area

August 2017

Due to signal braking distance requirements the maximum speed for **all freight trains and light locomotives** operating within the Metropolitan area bounded by Rhodes, Kingswood, Glenfield and Waterfall, is **80 km/h** or **50 km/h** (or lower than 50 km/h on some passenger only lines) as indicated in the **MAXIMUM SPEED OF LOCOMOTIVES AND ROLLING STOCK** table and the **TRAIN OPERATING LENGTH DIAGRAM**.

Freight train “begin” and “end” speed signs are located at the locations detailed in Table 11.

Table 11 – Location of “begin” and “end” speed signs for freight trains

North	Begin 80 speed limit	Up Main at 17.252 km Rhodes
North	End 80 speed limit	Down Main at 17.252 km Rhodes
West	Begin 80 speed limit	Up Main at 51.636 km Kingswood
West	End 80 speed limit	Down Main at 51.636 km Kingswood
South	Begin 80 speed limit	Up Main at 42.75 km at Glenfield
South	End 80 speed limit	Down Main at 42.75 km at Glenfield
Illawarra	Begin 80 speed limit	Down and Up Main at 39.018 km at Waterfall
Illawarra	End 80 speed limit	Down and Up Main at 39.018 km at Waterfall

The boards shown below have yellow reflective numerals on a reflective blue background, as shown in Figure 5.

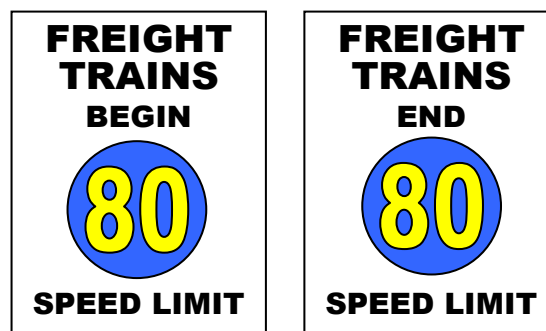


Figure 5 – ‘Begin’ and ‘end’ speed signs for freight trains

Note: These boards indicate the maximum speed in the section and are not considered a speed board (the freight speeds may be less than 80 km/h at the location of the above boards or within the section bound by these boards).

3.6. Operation of locomotives and passenger vehicles not fitted with toilet holding tanks

Version 1.9 April 2013



Locomotives and passenger rolling stock not fitted with toilet holding tanks shall have their toilets locked at all times to prevent use and effluent discharge to track when the vehicle is operating on the TfNSW Metropolitan Heavy Rail network. (Reference: TS 04053 *RSU 100 Series – Minimum Operating Standards for Rolling Stock – General Interface Requirements*, and *Protection of the Environment Operations Act 1997*).

3.7. Track speed signs

Version April 2018

Track speed signs are shown and explained in Table 12.

Table 12 – Track speed signs

Sign type – image	Sign type – description	Applies to
	NORMAL	Locomotive hauled passenger and freight trains Sydney Trains and NSW TrainLink trains (Groups 1, 2, 3, 3a, 4, 5 and 6 – Note 1) All Track Maintenance Vehicles (Note 2) Rail Motors and 620 class diesel trains
	XPT	XPT, Xplorer, Endeavour (Group 6 – Note 1), Hunter (Group 6 – Note 1), OSC (Group 3 – Note 1)
	MULTIPLE UNIT	XPT, Xplorer, Endeavour (Group 6 – Note 1), Hunter (Group 6 – Note 1) Sydney Trains and NSW TrainLink (Groups 1, 2, 3, 3a, 4, and 6 – Note 1),
	NORMAL TURNOUT	Locomotive hauled passenger and freight trains Sydney Trains and NSW TrainLink trains (Groups 1, 2, 3, 3a, 4, 5 and 6 – Note 1) All Track Maintenance Vehicles (Note 2) Rail Motors and 620 class diesel trains Note 3
	XPT TURNOUT	XPT, Xplorer, Endeavour (Group 6 – Note 1), Hunter (Group 6 – Note 1), OSC (Group 3 – Note 1) Note 3
	MULTIPLE UNIT TURNOUT	XPT, Xplorer, Endeavour (Group 6 – Note 1), Hunter (Group 6 – Note 1) Sydney Trains and NSW TrainLink trains (Groups 1, 2, 3, 3a, 4, and 6 – Note 1) Note 3
	GENERAL	Locomotive hauled passenger and freight trains (up to 1500 metres long) All Track Maintenance Vehicles (Note 2) Rail Motors and 620 class diesel trains
	MEDIUM	Sydney Trains and NSW TrainLink trains (Groups 1, 2, 3, 3a, 4, and 6 – Note 1)
	HIGH	XPT, Xplorer, Endeavour (Group 6), Hunter (Group 6) – (Note 1), OSC (Group 3 – Note 1)

A single yellow background speed sign applies to all rail traffic (Refer Sydney Trains Network Rule *NSG 604 Indicators and signs*), however longer freight trains may require speed restrictions. Refer to Section 1.11 *Train operating length diagram* for restrictions.

Note 1: As shown in the Train Operating Conditions Manual Section 10 under Sydney Trains and NSW TrainLink Trains passenger rolling stock.

Note 2: As shown in the Train Operating Conditions Manual, Section 11 (page 269) and Section 12 (page 289).

*Note 3: If there is no speed sign at a turnout, rail traffic shall not travel faster than 25 km/h through the turnout (Sydney Trains Network Rule *NSG 604 Indicators and signs*).*

Drivers and track vehicle operators shall maintain the correct speed until the last vehicle clears the turnout.

3.7.1. General, medium, and high speed sign hierarchy

In multispeed sign areas where general speed signs, medium speed signs and high speed signs are co-located at the same location, the following speed sign hierarchy has been utilised based on infrastructure design principles.

The speed on the general speed signs and medium speed signs are lower than the high speed signs.

Note: This is due to high-speed signs being designed to a higher cant deficiency than general and medium speed signs.

The speed on the general speed signs are lower than medium speed signs.


Note: This is due to rolling stock operating on medium speed signs requiring better braking performance than rolling stock operating on general speed signs such that relevant braking curves for signals design are met.

3.8. Advisory speed signs

December 2012

At particular signals, there may be insufficient sighting distance for trains travelling at track speed to stop within the signalling distance. In these cases, **advisory speed signs** have been positioned approaching these signals. The location of advisory speed signs is listed in the Division Pages. Table 13 gives details of speed signs.

Table 13 – Advisory speed signs

Sign type – image	Sign type – description	Applies to
	ADVISORY SPEED SIGN	Freight and Passenger services (excepting XPT, Xplorer, Endeavour, Hunter and EMU trains)

Drivers are required to regulate the speed of their train at these locations to ensure that before sighting the signal indication, the speed is not in excess of that figure shown on the advisory speed sign applicable to their train. If at any point approaching the signal it is seen to be exhibiting a full clear indication, normal track speed for the train concerned may be resumed.

3.9. WOLO speed restrictions

December 2013

To be read in conjunction with Sydney Trains Network Rule NGE 210 Speed restrictions during very hot weather (WOLO).

During extreme hot weather conditions, there is a risk of track misalignment due to track buckle. To reduce the risks involved, the speed of trains for all lines within the affected area shall be

reduced when high temperatures are indicated for that area. This is accomplished by introducing WOLO conditions.

When WOLO conditions are in force the speed of any train shall not exceed the appropriate WOLO speed specified in Table 14, Table 16 and Table 15.

Table 14 – Maximum WOLO speeds during hot weather – Passenger trains (all types) and light locomotives

Ruling Train Speed*	WOLO Speed
100 km/h or more	90 km/h
95 km/h	85 km/h
90 km/h	80 km/h
85 km/h	75 km/h
80 km/h	70 km/h
75 km/h	65 km/h
70 km/h or less	Allowable track speed but not exceeding 60 km/h

** The ruling train speed shall be the allowable track speed or the allowable vehicle speed, as specified in the DIVISION PAGES, whichever is the lesser.*

Table 15 – Maximum WOLO speeds during hot weather – Freight trains containing all loaded or one or more empty# vehicles above 80 km/h[%]

Ruling Train Speed*	WOLO Speed
90 km/h or more	80 km/h
85 km/h	75 km/h
80 km/h	70 km/h
75 km/h	65 km/h
70 km/h or less	Allowable track speed but not exceeding 60 km/h

** The ruling train speed shall be the allowable track speed or the allowable vehicle speed, as specified in the DIVISION PAGES, whichever is the lesser.*

For the purpose of this rule, a loaded vehicle is one with a gross mass of 30 tonnes or more.

% For the purpose of this rule, the empty vehicles shall have an allowable empty vehicle speed exceeding 80 km/h.

Table 16 – Maximum WOLO speeds during hot weather – Freight trains containing one or more empty# vehicles at 80 km/h or less[%]

Ruling Train Speed*	WOLO Speed
80 km/h or less	Allowable track speed but not exceeding 50 km/h

** The ruling train speed shall be the allowable track speed or the allowable vehicle speed, as specified in the DIVISION PAGES, whichever is the lesser.*

For the purpose of this rule, a loaded vehicle is one with a gross mass of 30 tonnes or more.

% For the purpose of this rule, the empty vehicles shall have an allowable empty vehicle speed of 80 km/h or less.

3.9.1. WOLO speed restrictions – WOLO warning sign areas

Version April 2015

When WOLO conditions are in force, WOLO warning signs are displayed in the areas specified in Table 17 and Table 18.

Table 17 – Display areas of WOLO warning signs during WOLO conditions – Down Direction Movements

Location	Lines
Sydney Terminal Departure Road	All Down Tracks
Central Electric Platforms 16, 17, 18, 19, 22, 23 & 25	All Down Tracks
Erskineville	Down Main
Sutherland	Down Main
Waterfall	All Down Tracks
Thirroul	Down Main
Wollongong	Down Main
Dapto	Down Main
Kiama	All Down Tracks
Lidcombe	All Down Tracks
Glenfield	Down Main
Revesby	Down Main
Blacktown	Down Branch
Penrith	All Down Tracks
Mt Victoria	Down Main
Bankstown	Down Bankstown
Hornsby	All Down Tracks
Gosford	Down Main
Maintenance Centre departure Roads at Hornsby, Mortdale and Flemington	All Down Tracks

Note – Enfield North (Down Main and Down Goods) and Enfield South (Up Goods), are no longer listed, refer to ARTC for details regarding WOLO warning sign areas for the Goods Line and Enfield.

Table 18 – Display areas of WOLO warning signs during WOLO conditions – Up Direction Movements

Location	Lines
Bomaderry	Up Main
Dapto	Up Main
Unanderra	Up Main
Port Kembla	Up Main

Location	Lines
Wollongong	Up Main
Waterfall	All Up Track
Hurstville	All Up Tracks
Cronulla	All Up Tracks
Leppington	All Up Tracks
Campbelltown	Up Main
East Hills	Up Main
Revesby	Up Main
Liverpool	Up Main
Lidcombe	Up Suburban (for Bankstown Line)
Bankstown	Up Bankstown
Marrickville	Up Bankstown
Lithgow	Up Main
Mt Victoria	Up Main
Katoomba	Up Main
Springwood	Up Main
Penrith	Up Main
Richmond	Up Main
Blacktown	All Up Tracks
Hamilton	Up Main
Gosford	Up Main
Hornsby	Up North Shore Tracks
Maintenance Centre departure Roads at Hornsby, Mortdale and Flemington	All Up Tracks

Note – Enfield North (Down Main and Down Goods) and Enfield South (Up Goods), are no longer listed, refer to ARTC for details regarding WOLO warning sign areas for the Goods Line and Enfield.

3.10. Stabling a train on a running line or in a shunting neck when authorised

Version December 2020

Trains or vehicles shall not be stabled on any running line or in a shunting neck unless authority is given by the Rail Operations Centre or, in the case of an emergency, by the train controller for the area concerned.

Authorised locations for stabling of trains are listed in the appropriate division pages.

3.11. Emergency equipment

Version December 2022

Specific emergency equipment shall be carried on locomotives and multiple train units.

3.11.1. Emergency equipment – Locomotive emergency equipment

Locomotive operators shall carry the following safety equipment which includes but is not limited to:

- Railway Track Signals (minimum of 24)
- a sealed first aid box
- two red flags and one green flag
- a two-way radio
- a towing chain
- a continuity tester (as required)
- a spare EOTM (and white disc as required)
- spare 25 mm and 32 mm train air brake coupling hoses
- chocks (minimum of four)
- three approved track circuit shorting clips
- fire extinguisher
- appropriate PPE
- torch / lamp

Operators shall have procedures in place for defective vehicle management, identifying required spares and tools that are to be carried on the train, that are appropriate to the type of train operation.

3.11.2. Emergency equipment – Multiple Unit trains emergency equipment

Multiple unit trains shall carry the following emergency equipment:

- Emergency equipment box containing:
 - three approved track circuit shorting clips
 - two red flags and one green flag
 - one canister of Railway Track Signals except when operating within the TfNSW Metropolitan Heavy Rail Network, refer to document scope for network bounds. For Multiple Unit trains operating in other networks outside of the TfNSW Metropolitan Heavy Rail Network, such as Diesel Multiple Unit Trains including XPT, Railway Track Signals are required.
- a two-way radio
- rope for tying down pantographs

- spare 25 mm and 32 mm train air brake coupling hoses (where required)
- a spare trip hose (where required)
- a ½" x 5/8" and ¾" x 7/8" open ended spanner
- fire extinguisher

3.12. Driver safety systems

December 2012

All locomotives, multiple unit trains, and nominated infrastructure vehicles shall be fitted with driver safety systems as detailed in the TfNSW standard TS 04052 *RSU 000 Series – Minimum operating standards for rolling stock – General Requirements* (in particular TS 04069 *RSU Appendix D – Train (Driver) Safety Systems*).

Section 4

Train marshalling

4. Train marshalling

4.1. Train marshalling

Version 1.1 August 2010

Marshalling involves making up the vehicle consist of a train.

There are a number of marshalling restrictions that apply to freight trains to ensure safe and reliable operation.

Loaded vehicles should be marshalled immediately behind the locomotive(s), where possible.

The position of a vehicle within a train is also determined by the following:

- the draw capacity
- brake equipment type
- main reservoir hoses (where fitted)
- type of vehicle (for example, wooden body)
- vehicle destination
- dangerous goods
- length difference between adjacent vehicles
- independent brake ('B' wagons)

The overall length of a train includes all locomotives whether powering, off line, dead attached or banking.

4.2. Draw capacity

Version 1.1 August 2010

The draw capacity of a vehicle is determined by the following:

- coupler strength
- draftgear capacity
- underframe strength

whichever is the weakest link, and is listed for each vehicle type in Section 10.

4.3. Length restrictions due to brake type

Version 1.1 August 2010

The brakes on a train apply and release due to changes in pressure in the brake pipe. These pressure changes are less definite the further the vehicle is from the locomotive(s). To ensure that the brakes on vehicles operate correctly towards the rear end of a train, operating limits

have been determined based on the brake equipment sensitivity. Less sensitive equipment shall be marshalled towards the front of a train where the pressure change is more prominent.

When a train is being marshalled at its point of origin, remarshalled or has vehicles attached enroute the **brake type** listed in Section 10 shall be checked against Table 19 to ensure these limits are not exceeded. The train length includes all locomotives on the train.

For trains equipped with ECP brakes, all locomotives and all wagons used within the train consist shall have compatible ECP braking systems fitted.

ECP and standard automatic air brake systems shall not be mixed (unless in an emergency and train operated in emergency [emulation] mode – see Section 8.8.3, *Defective air brake – Freight trains – with ECP brakes* (page 143).

Table 19 – Brake type and allowable position in train

Brake type	Allowable vehicle position in train
B1	Any position in the first 900 metres of train
B2 & B3	Any position in the first 1500 metres of train
B4	Any position in train
E1	Any position in train (all locomotives and wagons ECP braked)

4.4. Main reservoir

December 2008

Some vehicles are fitted with a main reservoir pipe and hoses. The main reservoir may be used to recharge the air brake system on the vehicle and/or operate pneumatic equipment such as air-operated doors or a pneumatic discharge system.

On trains containing vehicles with a main reservoir pipe, these vehicles should be marshalled together and coupled to the locomotive(s) or to any other vehicles with main reservoir hoses, which are already attached to the locomotive(s).

Where main reservoir hoses are duplicated at each end of a vehicle, all hoses should be coupled and all coupling cocks opened:

- between locomotives
- between the rear locomotive and the first vehicle
- between the vehicles

On some sections of descending steeply graded track, operating restrictions may apply to the total train length/mass of loaded trains in the case where “two pipe” main reservoir equipped vehicles are not marshalled at the front of the train.

Vehicles that are fitted with a main reservoir pipe are identified in Section 10.

4.5. Trailing tonnage table

Version December 2015

The trailing tonnage table indicates the trailing load permitted to be hauled behind a vehicle according to its draw capacity.

The trailing load is determined from the draw capacity of the vehicle and the ruling grade on the route the train is travelling.

Vehicles with light draw capacity shall be marshalled towards the rear of the train for head end power trains providing it complies with other marshalling restrictions listed below.

Vehicles with light draw capacity in distributed power trains shall be marshalled at an appropriate position subject to its draw capacity providing it complies with other marshalling restrictions listed below.

The tonnages given in Table 20 are inclusive of the mass of the vehicle being assessed.

Draw capacities may sometimes be designated as L for 0.75 MN, M1 for 0.90 MN, M2 for 1.30 MN, H for 1.80 MN, and X for 2.45 MN.

4.6. **Wooden bodied vehicles**

Version 1.1 August 2008

A locomotive hauled train conveying wooden-bodied vehicles at either end of the consist shall be worked as a block train unless both terminal vehicles are steel strengthened or they are unoccupied for the duration of the journey

A self-propelled train containing wooden-bodied vehicles (such as CPH railcars) shall be worked as a block train unless such vehicles are fitted with approved hazard warning lights at each terminal end and approved impact resistant barriers on the front and rear windows.

4.7. **Locomotive hauled passenger cars on freight trains**

Version 1.1 August 2008

Locomotive hauled passenger cars may be marshalled empty anywhere on a freight train, within normal marshalling restrictions, and operated under the same conditions as a freight vehicle.

If a passenger vehicle is the last vehicle on a train, an approved end of train marker shall be fitted to the rear of that vehicle.

4.8. **Test accommodation and crew cars**

Version 1.1 August 2008

Test accommodation vehicles or crew cars may be marshalled anywhere within a train consist as determined by the operator or staff travelling on those vehicle(s) and with agreement of the Asset Management Branch.

4.9. **Vehicles under test**

Version 1.1 August 2008

Vehicles or trains under test shall require the approval of the Asset Management Branch.

4.10. **Dangerous Goods**

August 2021

All vehicles containing dangerous goods shall be labelled in accordance with the provisions of the Australian Dangerous Goods Code (ADG Code).

Shunting of vehicles containing or carrying dangerous goods shall be in accordance with Safeworking Rules.

Separation between dangerous goods on rail wagons and marshalling of rolling stock containing dangerous goods shall comply with the provisions of Division 9.2 and Table 9.3 of the ADG Code and any regulations, provisions or exemptions to that code as approved by the Competent Authority.

A copy of Exemption No EXEM2000/65 issued on 29 January 2001, by the NSW Environment Protection Authority on behalf of the Competent Authorities Panel begins on page 80.

Also shown, are supporting notes that explain the above exemption and its application to train operations on the NSW network

Notes:

1. *This exemption covers acceptable alternate methods of working. Any operator not wishing to use this exemption shall comply with the existing provisions of the Australian Dangerous Goods Code.*

2. *Notwithstanding that permitted under Exemption Parts 6 and 7, it is a requirement that a copy of Dangerous Goods Documentation as specified in Division 11.1 of the ADG Code, including Emergency Information, be readily available, without delay, to Transport for New South Wales, including TDSM Freight, Rail Operations Centre (ROC), Sydney Trains, when requested. Dangerous Goods Documentation shall be retained, or a copy of the documents retained, for at least 3 months after the transport of the dangerous goods finishes (per Dangerous Goods (Road and Rail Transport) Regulation 2014 and 2020 amendment).*

4.11. Dangerous Goods Exemption No. EXEM2000/65 explanatory notes

Version 1.0 May 2005

All vehicles containing dangerous goods shall be labelled in accordance with the provisions of the Australian Dangerous Goods Code (ADG Code).

Exemption Part 1 – Not applicable to train operations.

Exemption Part 2 – When a rail wagon is transporting any quantity of dangerous goods in a freight or bulk container as part of a journey involving the import or export of the dangerous goods by sea, it is permitted for the freight or bulk container to be placarded in accordance with the International Maritime Dangerous Goods Code, provided full details of the dangerous goods involved is included on the train manifest.

Exemption Part 3 – When a rail wagon is transporting any quantity of dangerous goods in a freight container it is permissible to placard only the freight container, provided it be placarded in accordance with the ADG Code and the dangerous goods on the wagon is listed on the train manifest.

NOTE:

In this case, containers carrying dangerous goods are not permitted to be transported in open wagons or in the well of well wagons unless the dangerous goods placard is visible from both sides of the wagon.

Exemption Part 4 – The marshalling of dangerous goods bulk tank wagons, (which do not contain dangerous goods Classes 1, 2.1, 2.3 and 5.2 or dangerous goods of Packing Group I),

is permitted against locomotives, however, on the TfNSW Metropolitan Heavy Rail network, the marshalling of any dangerous goods bulk tank wagons against passenger carrying vehicles, **is not** permitted.

Exemption Part 5 – It is permissible to treat a load as a packaged load for vehicle separation purposes when a rail wagon used for the transport of dangerous goods in bulk, whether as a bulk wagon or when transporting a bulk freight container, is nominally empty but not free from dangerous goods residue. That is, Note (iii) associated with table 9.3 of the ADG Code may be applied, provided the bulk wagon or container is placarded in accordance with the ADG Code and the details of the dangerous goods involved are included on the train manifest.

Exemption Part 6 – When a train is transporting dangerous goods it is permissible for the train **not** to carry dangerous goods shipping documentation in the driver's cab, provided the train manifest contains, for each type of dangerous goods to be transported, the following information. Information shall include the proper shipping name, the Class and any Subsidiary Risk, the UN Number, the Packing Group designator (if any), the aggregate quantity and the wagon number on the train where the dangerous goods is loaded. In addition, provision shall be made for the Train Manifest to be updated when the attachment or detachment of vehicles loaded with dangerous goods occurs and all the dangerous goods information required by Division 11.1 of the ADG Code shall be readily available from a central location provided by the train operator.

Exemption Part 7 – When a train is transporting dangerous goods it is permissible not to carry the dangerous goods emergency information in the driver's cab provided, the initial actions to be taken in the event of a suspected dangerous goods emergency, are incorporated in the train operator's Emergency Safeworking Instructions, carried in the locomotive. Compliance with Exemption Part 6 is also a requirement in this case.

4.11.1. Dangerous Goods Exemption No. EXEM2000/65 explanatory notes – Exemption General Conditions

The above exemptions shall remain in effect until the sixth edition of the ADG Code ceases to have effect in the jurisdiction.

The above exemption is subject to the condition that a copy of Exemption No EXEM2000/65 is available at a central location provided by the train operator, for reference whenever that operator is using a train for the transport of dangerous goods to which this exemption applies.

A copy of Exemption No EXEM2000/65 is to be made available for inspection by an authorised officer at a central location provided by the train operator, whenever that operator is using a train for the transport of dangerous goods to which this exemption applies.

EXEMPTION EXEM2000/65 IS SHOWN OVER THE FOLLOWING FIVE PAGES

Version 1.0 May 2005

4.12. Exemption EXEM2000/65

(1)

EPA reference DG883

EXEMPTION EXEM2000/65

NSW ENVIRONMENT PROTECTION AUTHORITY

NSW ROAD & RAIL TRANSPORT (DANGEROUS GOODS) ACT 1997

In accordance with Section 32 of the Road & Rail Transport (Dangerous Goods) Act 1997, members of the Australasian Railway Association Inc are granted an exemption from certain provisions of the Rail Transport (Dangerous Goods) (NSW) Regulations (the Regulations) with respect to the sixth Edition of the *Australian Code for the Transport of Dangerous Goods by Road and Rail* (the ADG Code).

EXEMPTION Part 1

For this part of the exemption, the relevant provisions are Regulations 4.7, 4.9, 4.10, 4.11 and 4.12 of the Regulations where those Regulations require compliance with subclauses 4.4.3 and 4.8.3 of the ADG Code that refers to the *ARA Rolling Stock Manual* published by the Australasian Railway Association.

This part of the exemption is subject to the condition that a tank that forms part of a rail tank vehicle may be hydraulically tested and visually inspected at intervals prescribed in the:

1. *Railways of Australia Manual of Engineering Standards and Practices* (dated September 1992) until it is superseded by the *National Code of Practice on Railway Rolling Stock* as published from time to time by the Commonwealth Department of Transport and Regional Services; and
2. *National Code of Practice on Railway Rolling Stock* as published from time to time (when it is published).

EXEMPTION Part 2

For this part, the relevant provisions are Regulations 7.7, 7.8 and 7.9 of the Regulations:

Where those Regulations require compliance with Divisions 7.4 and 7.5 of the ADG Code; and

When a rail wagon is transporting any quantity of dangerous goods in a freight or bulk container as part of a journey involving the import or export of the dangerous goods by sea.

This part of the exemption is subject to the conditions that:

1. The freight or bulk container is marked in accordance with the International Maritime Dangerous Goods Code; and
2. Full details of the dangerous goods in the container are included on the train manifest or shipping documentation.

EXEMPTION Part 3

For this part, the relevant provisions are Regulations 7.7, 7.8 and 7.9 of the Regulations:

Where those Regulations require compliance with subclauses 7.7.1, 7.7.7, 7.7.8 and 7.7.9 of the ADG Code with respect to the placarding of rail wagons; and

When a rail wagon is transporting any quantity of dangerous goods in a freight container.

This part of the exemption is subject to the conditions that:

1. The freight container is marked in accordance with the ADG Code; and
2. Details of the dangerous goods on those wagons are included on the train manifest or shipping documentation.

(2)

EPA reference DG883

EXEMPTION EXEM2000/65

NSW ENVIRONMENT PROTECTION AUTHORITY

NSW ROAD & RAIL TRANSPORT (DANGEROUS GOODS) ACT 1997

EXEMPTION Part 4

This part of the exemption applies when:

Regulations 9.13 and 9.14 of the Regulations require compliance with Division 9.2 and Table 9.3 of the ADG Code with respect to the separation of rail wagons; and

A rail tank wagon is transporting dangerous goods in bulk.

This part of the exemption:

1. Applies only to the separation of the rail tank wagon from
 - (a) a locomotive in power,
 - (b) a guard's van; and
 - (c) a vehicle carrying passengers; and
2. Is subject to the conditions that:
 - (a) The rail tank wagon is constructed in accordance with Clause 4.8.3 of the ADG Code (as modified by Part 1 of this Exemption); and
 - (b) The rail tank wagon is not transporting:
 - (1) dangerous goods of Classes 1, 2.1, 2.3 and 5.2, or
 - (2) dangerous goods of Packing Group I.

EXEMPTION Part 5

For this part of the exemption, the relevant provisions are Regulations 9.13 and 9.14 of the Regulations:

Where those Regulations require compliance with Division 9.2 and particularly Table 9.3 of the ADG Code with respect to the separation of rail wagons; and

When a rail wagon is used for the transport of dangerous goods in bulk, whether as a bulk wagon or when transporting a bulk freight container; and

When the wagon or freight container is nominally empty and is not free from dangerous goods.

This part of the exemption is subject to the conditions that:

- (1) The bulk wagon or freight container is marked in accordance with the ADG Code; and
- (2) The bulk wagon or wagon with the freight container is separated as required for a wagon carrying these dangerous goods in packages
- (3) Details of the dangerous goods on those wagons are included on the train manifest or shipping documentation.

EXEMPTION Part 6

For this part of the exemption:

1. The relevant provisions are Regulations 11.3 and 11.4 of the Regulations where those provisions refer to the requirement that the train driver is to have dangerous goods shipping documentation while the train is transporting dangerous goods; and
2. The exemption is subject to the conditions that:
 - (a) The train manifest contains, for each type of dangerous goods to be transported, the proper shipping name, the Class and any Subsidiary Risk, the UN Number, the Packing Group designator (if any), the aggregate quantity and the wagon number on the train where the dangerous goods are loaded; and
 - (b) Provision is made for the Train Manifest to be updated when the attachment or detachment of vehicles loaded with dangerous goods occurs; and
 - (c) All of the information required by Division 11.1, and particularly subclause 11.1.1, of the ADG Code is available from a central location provided by the rail operator, whenever the train is transporting dangerous goods.

(3)

EPA reference DG883

EXEMPTION EXEM2000/65

NSW ENVIRONMENT PROTECTION AUTHORITY

NSW ROAD & RAIL TRANSPORT (DANGEROUS GOODS) ACT 1997

EXEMPTION Part 7

For this part of the exemption:

- 1 The relevant provisions are Regulations 11.7 and 11.8 of the Regulations where those provisions refer to the requirement to have the emergency information in the driver's cab of a train transporting dangerous goods; and
- 2 The exemption is subject to the conditions that:

- (a) Initial actions to be taken in event of a suspected dangerous goods emergency are incorporated in the rail operator's Emergency Safe Working Instructions carried in the cabin of the locomotive; and
- (b) The rail operator has immediate access to all relevant information; and
- (c) Details of the dangerous goods on each wagon in the train are included on the train manifest or shipping documentation.

Exemption general conditions

General conditions relating of this exemption are as follows:

1. The exemption will remain in effect until the sixth edition of the ADG Code ceases to have effect in the jurisdiction; and
2. The exemption is subject to the condition that a copy of this exemption is available at a central location provided by the rail operator, whenever the rail operator is using a train transporting dangerous goods to which this exemption applies; and
3. A copy of this exemption is to be made available for inspection by an authorised officer at a central location provided by the rail operator, whenever a train is transporting dangerous goods in any transport operation to which this exemption applies; and
4. The exemption applies to operations throughout Australia in accordance with a decision of the Competent Authorities Panel on 30 October 2000 pursuant to the provisions of Regulation 15.10(1)I) of the Regulations.

For the purposes of this exemption:

The Rail Transport (Dangerous Goods) (NSW) Regulations are identical (other than with respect to NSW administrative requirements) to the Commonwealth Rail (Dangerous Goods) Rules published in the ADG Code.

"Train manifest" means:

A list of the rolling stock that makes up a train; and

A system that provides information meeting the shipping documentation and emergency information requirements of Chapter 11 of the ADG Code.

LISA CORBYN

Director-General

per ALAN RITCHIE

Manager Dangerous Goods

by delegation

Date: 29 January 2001

Section 5

Loading restrictions

5. Loading restrictions

5.1. General requirements for the safe transit of freight on rail

Version 2.0 April 2009

This section specifies the basic principles and minimum requirements for the safe rail conveyance of freight.

Diagrams 1, 1A, 1B and 2 on page 88 indicates the maximum permissible limits for moveable loads (loose loads) which are not fully enclosed in a solid container, loads that can become displaced, not rigidly attached to the wagon and are subject to inaccurate placing on wagon, secured by means of lashing devices, such as chains/webbing, ropes and so on. In other words, all loads which are not in a fully enclosed container, such as loading on container bases, bolsters and platforms, transiflats, flatracks, railtainers, open wagon and flat wagons.

Any load exceeding the permissible limits of the loading outlines shown in the following diagrams and/or intended for operation outside the allowable corridors is referred to as 'Out-of-Gauge'.

Out of Gauge loads shall not operate on the network without the authorisation of the Asset Management Branch.

All freight shall be sufficiently secured to prevent movement during transit due to train and vehicle dynamic forces.

Vehicles shall be loaded such that they do not exceed loading outlines, axle load limits, or weight distribution restrictions.

Securing devices, loose chains, chain/webbing ends, shall be firmly secured, to guard against the possibility of their working loose, and either falling off or trailing from the wagon enroute.

The selection of the means for securing a load on or in a wagon will depend to a large extent on the type and construction of the load to be carried, and the wagon on or in which the load is to be carried. Clamps, bolts, chains, loadscrews, loadbinders, webbing straps, winches, ratchets, steel straps, USLM Signode type strapping, steel wire rope, twitchstik and rope and cordage made from natural and synthetic fibres are all suitable devices.

Black steel packaging straps or green gerrard superstrap are NOT acceptable as a primary securing system.

The door locking mechanisms on containers and open wagons shall be maintained in good condition and working order and loading personnel shall ensure that all doors are properly and safely secured and locked.

The attention of all Operations and examining staff is specially directed to the necessity for a careful examination of all freight loading consignments in regards to the securing and weight distribution, overloading of wagons, all doors are closed and adherence to the maximum loading gauge dimensions are met in order to prevent serious freight accidents.

If there is any doubt regarding a consignment and the safety there of, it SHALL NOT be despatched.

Loads shall not protrude more than 150 mm over the headstock of any wagon without prior approval being granted by the Asset Management Branch.

The maximum permissible container loading height for various wagons deck heights and rail corridors is shown in the following diagrams.

Enquiries regarding loading and the securing of loads, which exceed the dimensions as shown in the following diagrams shall be directed to the Asset Management Branch.

5.2. Container load distribution and securement

Version 2.1 December 2011

The operator shall ensure that the freight forwarder is aware of the requirement for containers to be loaded such that the load is relatively evenly distributed within the container.

The operator shall place containers on wagons ensuring that the load is relatively evenly distributed between bogies and that the load difference between adjacent bogies on a wagon or multipack deck does not exceed 20 tonnes.

Container securement to wagons shall be by approved twistlock, shotbolt or corner curb fittings.

Note: Every container carrying dangerous goods and loaded on a flat wagon shall have all four (4) securing devices fully engaged and secured before departure from the originating terminal. Other containers carrying general (non-dangerous) goods and loaded on a flat wagon shall have at least three (3) securing devices fully engaged and secured before departure.

The use of open wagons for the conveyance of containers is acceptable but conditional on such wagons being fitted with an approved reliable method of laterally centralising the container.

Where an open wagon is not carrying its full complement of containers, the containers shall be located, secured, and evenly distributed over the bogies.

Open wagons with side doors shall have an operable secure latching system or doors welded shut.

Open wagons with side doors removed shall not operate with a vacant container position.

5.3. Multiple stacking of containers

Version 2.1 December 2011

Double stacking of half height containers is permitted provided the total container height does not exceed the overall height limits specified under **MAXIMUM CONTAINER LOADING DIAGRAMS 2 or 3** herein, whichever diagram is relevant for the proposed route.

5.4. Nested container bases (Transi Flats)

Version 2.1 December 2011

The transport of nested container bases (Transi Flats) on container wagons is subject to the following special conditions:

1. The height above rail level of the container wagon plus nested container bases shall conform to either Diagram 2 or Diagram 3, (depending on the route of operation), as specified in **Section 5, Loading Restrictions**, Pages 88 to 91 of the Train Operating Conditions Manual.

Note: Where gates and/or tarps are included in the loading, note 3 below shall apply.

2. All nested container bases SHALL be secured, at all four corners, to each other, and to the container wagon with twist locks only.
3. Container bases secured with fastenings other than twist locks, and / or loaded with gates and/or tarps SHALL conform to the loose load outline, Diagram 1, **Section 5, Loading Restrictions**, page 88, of the Train Operating Conditions Manual. In this case, the load shall be secured with an approved means of positive location between container bases and attachment to the container wagon.

5.5. Out of gauge loads

Version 2.0 April 2009

Any proposal for an Out-of-Gauge load shall be referred to the Asset Management Branch to determine if it is acceptable for transport by rail.

'Out-of-Gauge' loads will only be considered for transport if they are non-divisible or cannot, within reason, be reduced to within the limits of the loading outline dimensions. Wagons, container bases, bolsters and platforms, transiflats, flatracks, and railtainers loaded 'Out-of-Gauge' with such items as timber, packages of light bulky articles, or loaded 'Out-of-Gauge' only to achieve greater wagon capacity will NOT be acceptable. Such loads shall be reduced to within the loading outline dimensions as shown in Diagram 1.

All Out-of-Gauge loading shall be investigated, pre-planned and programmed on a Special Train Notice (STN), including all the special conditions and requirements issued by the Asset Management Branch.

Final approval and acceptance to transport special and/or Out-of-Gauge loads shall be issued by the Asset Management Branch representative.

This written approval applies to each Special/Out-of-Gauge load on an individual basis regardless of whether an identical or similar load has been previously approved.

It is mandatory that the originating system confirm the acceptability of the Special/Out-of-Gauge train with the receiving system, prior to making any final arrangements regarding its despatch.

This is to ensure that both systems are fully informed and that the special load is accepted by each system, and there being sufficient time to prepare and issue the necessary Special Train

Notices, wires, Circulars and so on, and to make any other operational arrangements necessary.

5.6. Diagrams 1, 1A, 1B and 2

Version 2.0 April 2009

Diagram 1 MAXIMUM LOOSE LOAD OUTLINE

This diagram depicts the dimensional load limit for flat, open and transflat wagons including flat container bases. Unrestricted container loading dimensions is covered in Diagrams 2. Restricted container loading dimensions are covered in Diagram 3. Any load exceeding the dimensions shown are classified 'Out - of - gauge' and may be only conveyed under special conditions as determined by the RailCorp. Loading outline, including lashings, chains and securing equipment. Based on rolling stock dimensions of:

- # maximum 22860mm - length
- # maximum 2970mm - width
- # with 16155 bogie centres

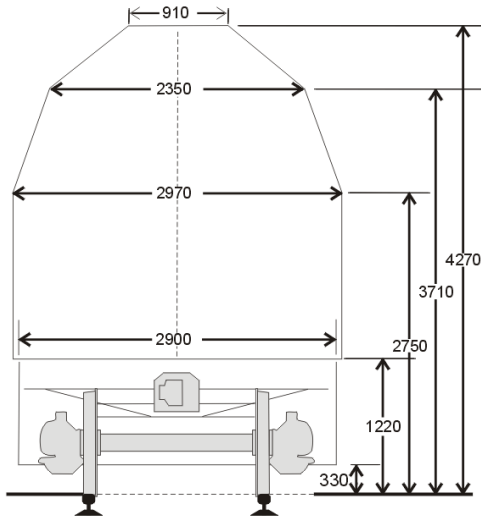


Diagram 1A MAXIMUM LOADING DIMENSION OF MOTOR VEHICLES ON MOTORAIL WAGONS

Car aerials to be in the down position. Vehicles will be permitted to carry roofracks, provided that they are properly secured to the vehicle and the height (including roof rack does exceed the listed dimensions below. Maximum wheel track width is 1830mm measured from extreme outside edge of tyres. Note: 305mm minimum clearance between each chocked car.

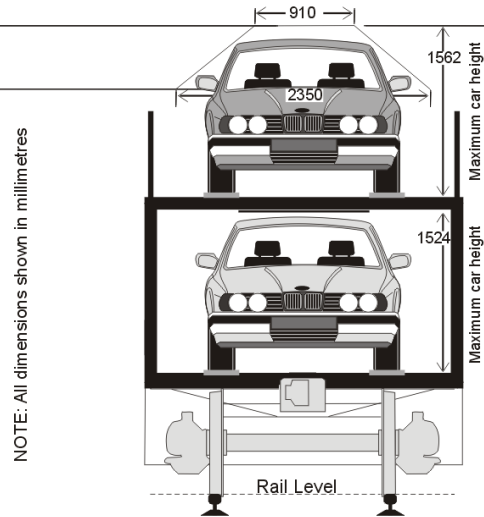


Diagram 1B NARROW NON - ELECTRIC ROLLING STOCK OUTLINE

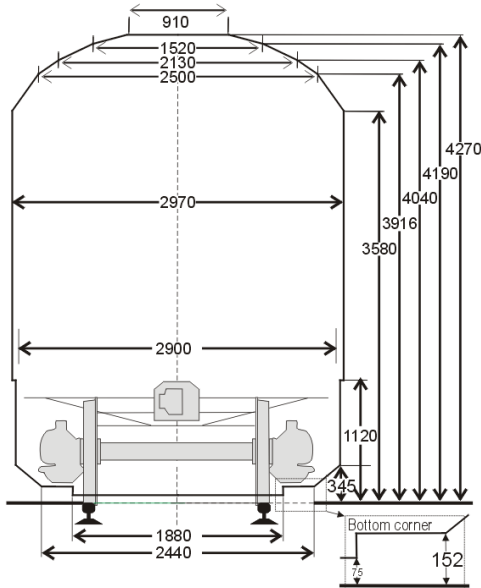


Diagram 2 MAXIMUM CONTAINER LOADING

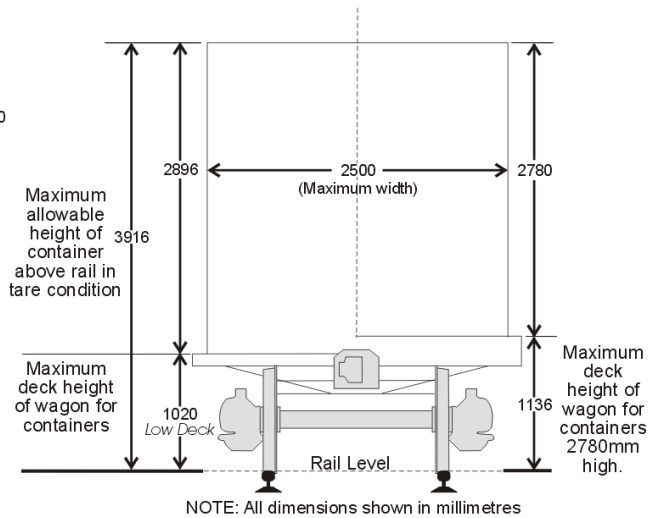


Figure 6 – Diagrams 1, 1A, 1B and 2

5.7. Area of operation for Diagrams 1, 1A, 1B and 2

Version August 2020

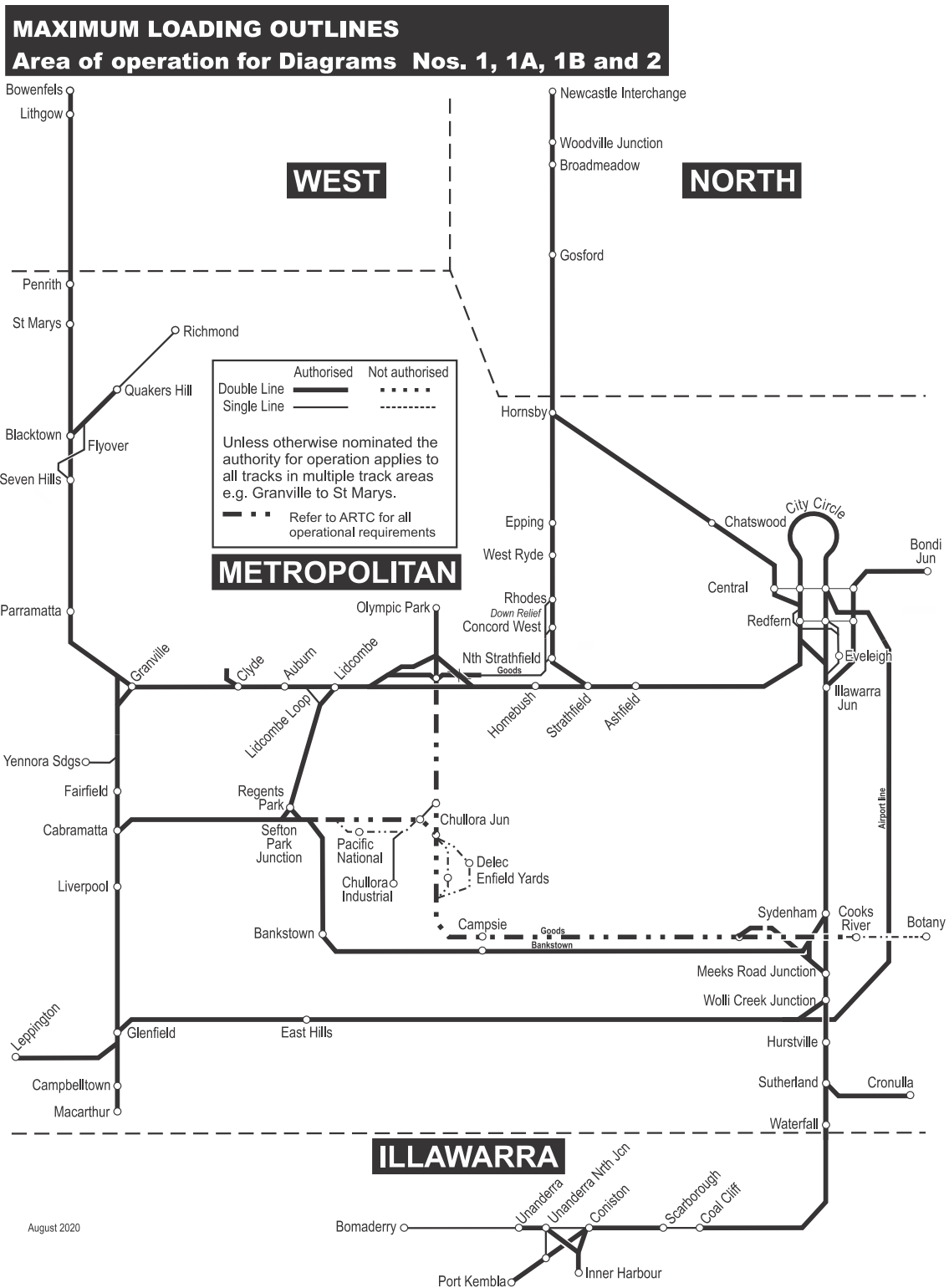


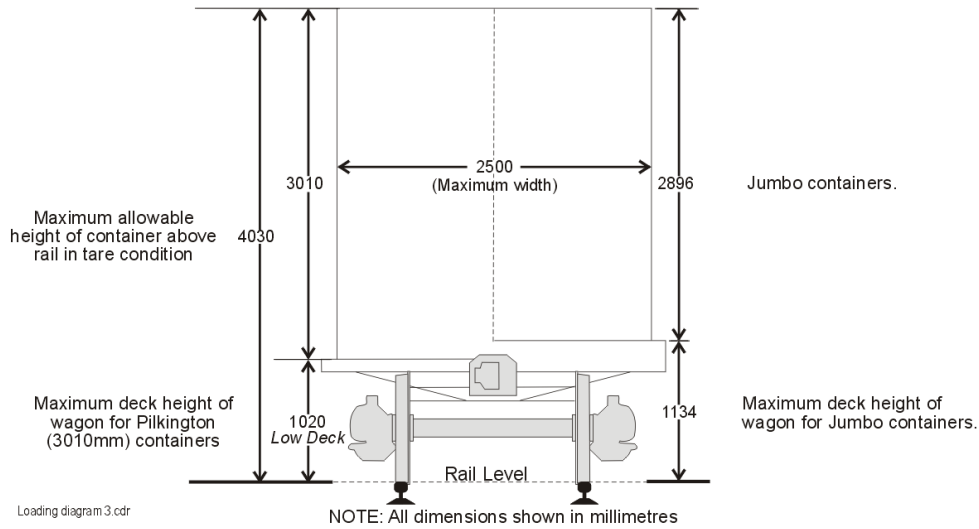
Figure 7 – Area of operation for Diagrams 1, 1A, 1B and 2

5.8. Diagram 3 and Note R10

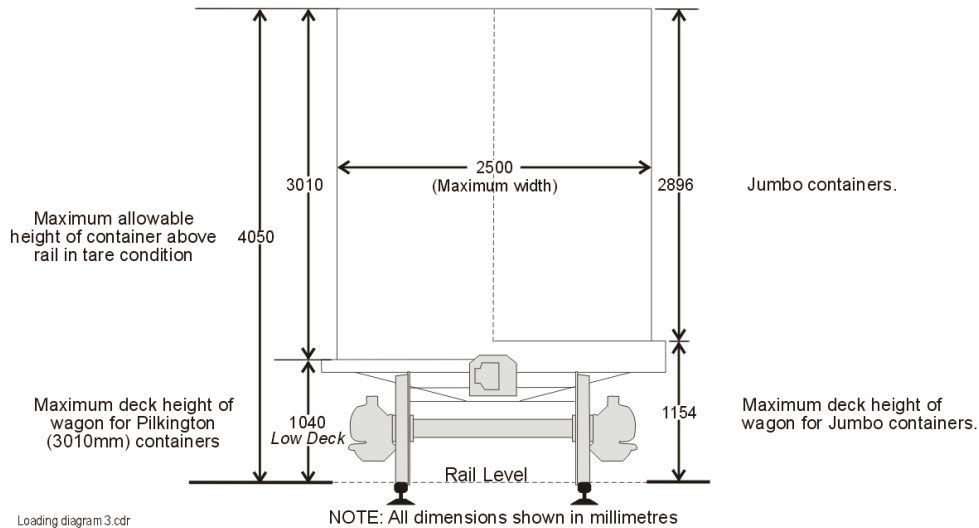
Version 2.0 April 2009

Diagram 3 MAXIMUM CONTAINER LOADING for specified corridors RailCorp

STANDARD CONTAINER HEIGHTS	
Metric	Imperial
2743mm	9' 0"
2896mm	9' 6"
3010mm	9' 10½"
3050mm	10' 0"



R10 Note Diagram



Note: This container loading configuration is only applicable to wagons covered by Note 'R10' as shown in **Section 10 - Locomotive and Rolling Stock Data**

Figure 8 – Diagram 3

Note: R10 is only applicable to container wagons up to a maximum of 3 slots (60 ft wagons), 4 slot containers are not permitted to operate with note R10.

5.9. Area of operation for Diagram 3 and Note R10

Version August 2020

MAXIMUM LOADING OUTLINES Area of operation for Diagram 3 and Note R10

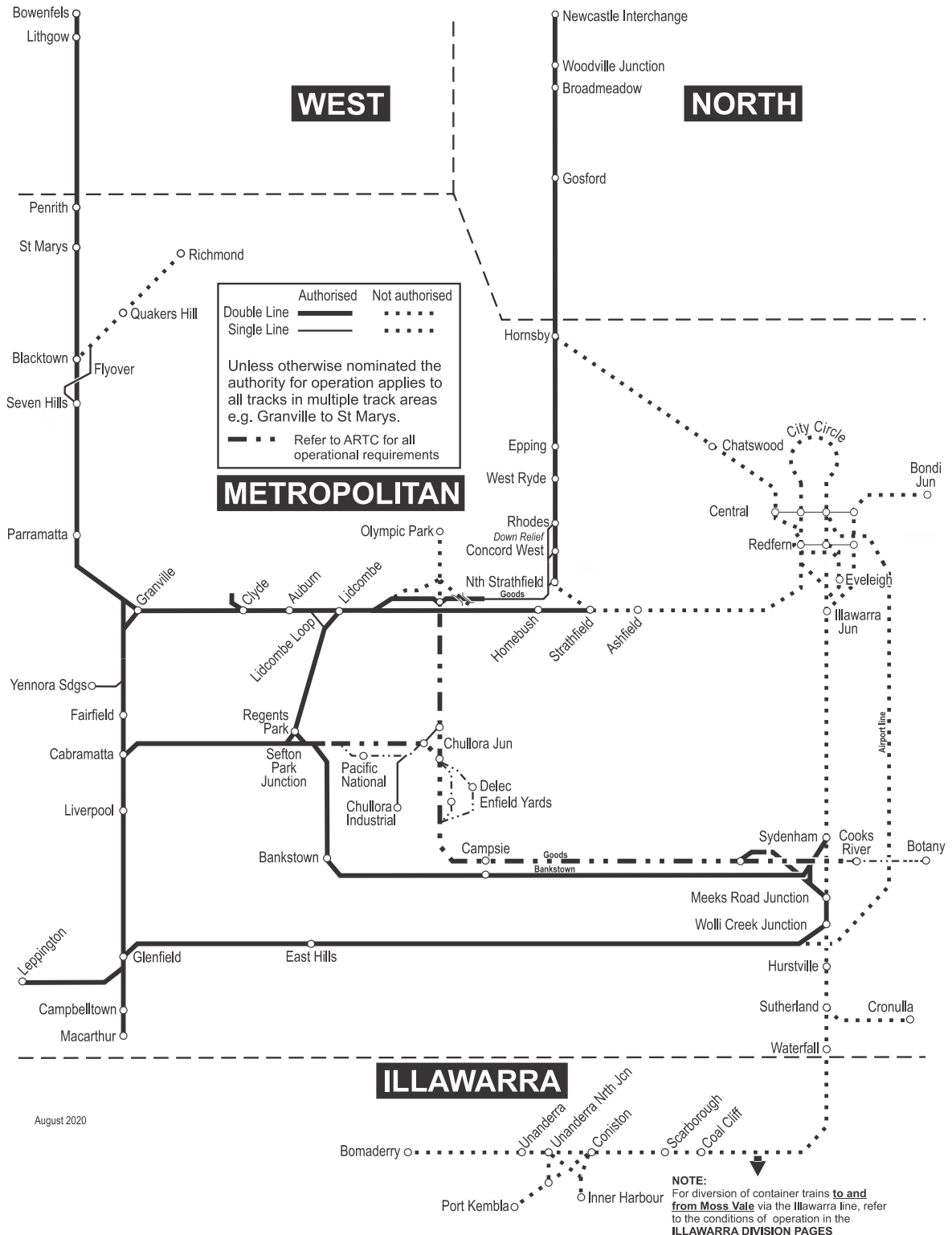


Figure 9 – Area of operation for Diagram 3 and Note R10

Section 6

Train inspection

6. Train inspection

6.1. Train inspection

Version August 2021

Trains and *vehicles* shall be inspected before operating on the TfNSW Metropolitan Heavy Rail network to ensure that they are safe to travel and are fit for purpose.

Vehicles covered by a programmed preventative maintenance (PPM) are permitted to operate for an approved extended period between full train inspections.

6.1.1. Train inspection – Locomotive hauled trains

There are two levels of train inspection for locomotive hauled trains.

One inspection, the **full train inspection**, shall be performed by a *qualified worker*. This inspection includes a **full mechanical inspection**, brake pipe leakage test, air brake inspection and test, brake holding test, and brake pipe continuity test.

The other train inspection, the **general train inspection**, shall be performed by the train crew. This train inspection includes a **general mechanical inspection**, brake pipe leakage test, air brake inspection and test, brake holding test, and brake pipe continuity test.

Freight trains that are to descend grades of 1 in 33 or greater, and are not fitted with fixed exhaust chokes on 80 per cent of the train mass, are required to undergo a HP grade inspection.

A **partial train inspection** shall be carried out after the train consist has been altered in any way, such as changing or attaching *locomotives*, attaching or detaching vehicles, amalgamating trains, attaching assisting locomotives or running locomotives around to the other end of a train.

There shall be a stable air supply, locomotive or ground plant, available for testing to meet the pressure requirements of the *air brake* test.

The last three vehicles on a train shall have operative air brake, *handbrakes* and have passed the brake holding test.

Note: Section 8.8.2 provides further details on inoperable (defective) air brakes in multi-pack vehicles and on vehicles with shared brake equipment.

6.1.2. Train inspection – Multiple unit trains

There are various levels of inspections for *multiple unit trains*: general, pantograph, reservoir, and brake inspections. Multiple unit trains also undergo daily preparation by train crews.

6.2. Full mechanical inspection

Version 1.2 April 2011

As a minimum, a full mechanical inspection includes a visual inspection of each vehicle in respect to the adjustment, condition and/or security of the items (where fitted) detailed in the following sections.

6.2.1. Full mechanical inspection – Brake equipment

The following applies to full mechanical inspection of brake equipment:

- relevant coupling hoses are correctly coupled and appropriate coupling cocks open
- brake block/disc pad thickness
- brake blocks are correctly aligned, that is, not permanently overhanging the edge of the wheel
- brake rigging (levers, rods, pins, cotters, bogie safety loops, and so on) is secure
- all load compensating and grade control equipment is correctly set
- air pipes, pipe fittings, and securing clips
- reservoirs, variable volume device and safety valves
- slack adjusters and fittings
- brake cylinders
- grade control valve, securing brackets and bolts
- release valve and operating chain or wire

6.2.2. Full mechanical inspection – Vehicle equipment

The following applies to full mechanical inspection of vehicle equipment:

- automatic couplers are secured and the difference in height of connected coupler knuckles does not exceed half the depth of the knuckle
- knuckle pins, knuckles, drawgear carrier plates, murray keys, yolks, draftgear, uncoupling rods, and associated brackets
- doors, container securement, trailer hitches and wheel chocks
- securing of loads and loading within gauge
- centre sills, side sills, end sills, and stanchions
- steps, handrails, and ladders
- doors and twistlocks

- gangway beams and diaphragms
- correct centre casting engagement

6.2.3. Full mechanical inspection – Bogie and wheel equipment

The following applies to full mechanical inspection of bogie and wheel equipment:

- wheel profiles and tread condition
- handbrake assemblies and linkages
- bogie springs and damping devices
- side bearers and side bearer clearances
- centre castings
- bogie springs, ride control equipment (that is, friction wedges and other damping devices), and specialised bogie equipment
- roller bearing end caps, seals, backing rings, axle box plugs, adapters and horn stays (con straps)
- loose axle box liners or loose horn cheek wear liners
- trip assembly
- air ride suspension

6.3. General mechanical inspection

Version 1.0 May 2005

As a minimum, a general mechanical inspection includes a visual inspection of each vehicle in respect to the adjustment, condition and/or security of the items (where fitted) detailed in the following sections.

6.3.1. General mechanical inspection – Brake equipment

The following applies for general mechanical inspection of brake equipment:

- relevant coupling hoses are correctly coupled and appropriate coupling cocks open
- brake block/disc pad thickness
- brake blocks are correctly aligned, that is, not permanently overhanging the edge of the wheel
- brake rigging (levers, rods, pins, cotters, bogie safety loops, and so on) is secure
- all load compensating and grade control equipment is correctly set

6.3.2. General mechanical inspection – Vehicle equipment

The following applies for general mechanical inspection of vehicle equipment:

- automatic couplers are secured and the difference in height of connected coupler knuckles does not exceed half the depth of the knuckle
- doors, container securement, trailer hitches, and wheel chocks
- securing of loads and loading within gauge
- centre casting engagement

6.3.3. General mechanical inspection – Bogie and wheel equipment

The following applies for general mechanical inspection of bogie and wheel equipment:

- wheel profiles and tread condition
- side bearer clearance
- handbrake assemblies and linkages
- axle box plugs, bearing end caps, adaptors
- bogie springs and damping devices

6.4. Air brake inspection and tests

Version 1.2 December 2007

Regarding the following items, freight trains shall have the brake pipe fully exhausted. XPT and multiple unit trains are tested with a full service brake application.

The following items shall be checked with the brakes fully applied:

- That the brakes on vehicles (within the limits for allowable cut-outs) are applied, that is, brake cylinder pistons are extended, and brake blocks are against the wheels.
- The brake block thickness is not less than 10 mm at any point and is sufficient till the next scheduled general train inspection.
- All load compensating and grade control equipment (where fitted) are correctly set.

The following items shall be checked with the **brake pipe fully charged**:

- the brakes are released on each vehicle
- handbrakes are released
- repair, if possible, any air leaks

6.5. When is a train inspection required

December 2013

All trains shall be inspected for each trip. However, some trains/vehicles are under a preventative maintenance programme (PPM) and may be allowed to operate for a number of trips without being inspected each trip.

Notes:

Unless a train is under programmed preventative maintenance cycle two consecutive general train inspections are not permitted.

Some trains are permitted to operate for a round trip between general train inspections.

Some trains are permitted to operate for specified periods between general train inspections.

6.5.1. When is a train inspection required – Freight trains

A HP grade inspection is specified in the appropriate area Division pages of the TOC manual, covering trains with grade control valves travelling on specific grades. A HP grade inspection shall be carried out by a qualified worker and may be performed during a **full train inspection**. In this test, the grade control valves are tested to ensure that brake cylinder release is retarded when in the 'IP' position.

6.6. Brake pipe leakage test

Version 1.2 December 2007

The brake pipe leakage test determines whether there are excessive air leaks in the train, which may interfere with the operation of the air brake system and confirms that only one brake valve controls the train brake. With a **full service** or 100 kPa brake pipe reduction and the brake pipe isolated, the maximum allowable leakage in the brake pipe is 35 kPa per minute.

6.7. Brake pipe continuity test

Version 1.1 December 2007

The brake pipe continuity test shall be carried out on a train to prove that the brake pipe air pressure is continuous throughout the train, the driver has control of the brakes on the train, and that only one brake valve isolating cock is open.

6.7.1. Brake pipe continuity test – Locomotive hauled trains

The **full continuity test** is the standard test. This is usually conducted at the rear of the train and is required after a brake holding test has been carried out.

Once the brake pipe has been recharged, the brake pipe pressure at the end of the train shall be greater than 425 kPa.

Where a train is fitted with an *end of train marker* (EOTM) which has the capacity to indicate, in the locomotive cab, the brake pipe pressure at the rear of the train, this device may be used to conduct the continuity test.

Where the brake pipe on a locomotive hauled train has been interfered with, a **modified continuity test** shall be carried to ensure that the brakes apply and release on the three vehicles behind the position where the brake pipe has been interfered with. If one or more of the three vehicles behind the position where the brake pipe was interfered with has inoperative air brakes, then the first three vehicles with operative air brake beyond the point of interference shall be tested.

A **light locomotive continuity test** is required for light multiple locomotive consists to ensure that brake pipe is continuous through the consist and that all brake cylinders are functioning correctly.

6.7.2. Brake pipe continuity test – Multiple Unit trains

A continuity test is carried out after a train has been prepared, after amalgamation or division of trains, and if the *brake pipe continuity* has been affected.

6.8. Brake holding test

Version 1.0 May 2005

The brake holding test only applies to locomotive hauled trains.

The brake holding (retention) test proves that the brakes on the rear three vehicles, and any other vehicles tested, will remain applied for a long enough time period, in the event of a break-away, to allow the train crew to reach these vehicles and to apply the handbrakes, in order to secure the train. The brake holding test shall be conducted with the brake pipe fully exhausted.

The brake holding time is determined by the length of the train. If it is known that additional vehicles will be added to the train, an extended brake holding time takes account of the increased train length with these additional vehicles.

The brake holding test shall be conducted, as a minimum, on the last three vehicles on the train. The brake holding test may also be conducted on the front three vehicles. It is permissible to conduct a brake holding test on more than three vehicles where it is known that some of the vehicles will be detached enroute.

At all times, a valid brake holding test shall apply to the last three vehicles of the train for the entire journey.

For locomotive hauled trains with less than three vehicles, all vehicles shall be tested.

If a rake of three or more vehicles is attached to a freight train enroute, and an extended brake holding test was not carried out, a further brake holding test is required for the longer train length.

The minimum standard brake holding time is ten minutes plus three minutes for every 100 metres (or part thereof) of train length.

Minimum brake holding time tests depending on the length of the train are given in Table 21.

Table 21 – Minimum brake holding time tests depending on length of train

Length of train including locomotives (metres)	Minimum brake holding time (minutes)
Up to 100	13
101 to 200	16
201 to 300	19
301 to 400	22
401 to 500	25
501 to 600	28
601 to 700	31
701 to 800	34
801 to 900	37
901 to 1000	40
1001 to 1100	43
1101 to 1200	46
1201 to 1300	49
1301 to 1400	52
1401 to 1500	55
1501 to 1600	58
1601 to 1700	61
1701 to 1800	64
1801 to 1900	67
1901 to 2000	70
Over 2000	70 plus 3 minutes for every additional 100 metres

If articulated vehicles or permanently coupled vehicles are marshalled at the rear of a freight train, the brake holding test is carried out by observing that all brake cylinders controlled by the rear three control valves are extended.

A brake holding test is not required for vehicles fitted with spring applied parking brakes, such as Trailerrail vehicles and some track maintenance vehicles. These brakes are applied once air pressure is lost and will remain applied indefinitely due to the spring force on the brake cylinder piston.

Where a locomotive is unmanned and is marshalled in the last three vehicles on a train, then it shall be tested for brake holding.

Where driver only trains are employed, ten minutes shall be added to the minimum standard brake holding times.

If one of the last three vehicles on the train fails the brake holding test, the defective vehicle shall be remarshalled and the new last three vehicles brake holding tested.

Up to three additional locomotives may be added to a train without the need for an additional brake holding test.

6.9. Changing or attaching locomotives

December 2013

When locomotives are detached, the time of detachment shall be noted on the train documentation delivered to the outgoing driver, lodged with an operations employee, or placed in the appropriate receptacle provided at certain locations.

After attaching the locomotives, the crew shall check the train inspection certificate to ensure that the last three vehicles (and if appropriate, the front three vehicles) are the same as those listed on the train documentation. The train crew shall ascertain from operations staff the time of detachment and confirmation that the train has not been altered since detachment. Table 22 details the inspections required depending on detachment time.

Table 22 – Inspections required depending on detachment time

Time period	Action
If less than 2 hours has elapsed since the locomotives were detached OR	a brake pipe leakage test, and a modified continuity test shall be carried out.
If more than 2 hours but less than 24 hours has elapsed since the locomotives were detached OR	a visual inspection of each vehicle, a brake pipe leakage test, and a full continuity test shall be carried out.
If more than 24 hours has elapsed since the locomotives were detached	a full or *general train inspection shall be carried out.

** Refer to Section 6.5, When is a train inspection required, regarding consecutive general train inspection.*

When attaching locomotives to a pre-inspected train and the train consist has not changed from that indicated in the train documentation, the inspections required are given in Table 23.

Table 23 – Inspections required depending on previous inspection time

Time period	Action
If the time elapsed since the inspection is less than 24 hours OR	a visual inspection, a brake pipe leakage test, and a full continuity test shall be carried out.
If the time elapsed since the train was inspected is 24 hours or more	a full or *general train inspection shall be carried out.

* Refer to Section 6.5, *When is a train inspection required, regarding consecutive general train inspection.*

6.10. Attaching pre inspected vehicles

December 2013

A rake of pre-inspected vehicles may be attached anywhere within a train consist enroute at an intermediate location (except as provided by regulations for the transport of dangerous goods).

In this case, if the consist of the pre-inspected vehicles has not changed from that indicated in the train documentation and **less than 24 hours** has elapsed since the vehicles were inspected then the rules given in Table 24 apply.

Table 24 – Inspections and tests required when attaching pre-inspected vehicles

Consist	Action
Three or less vehicles are attached in front of the last three vehicles or more than three vehicles are attached in front of the last three vehicles and an extended brake holding test has been carried out then: OR	a visual inspection of each vehicle being attached, a brake pipe leakage test, and a modified continuity test shall be carried out.
More than three vehicles are attached in front of the last three vehicles and an extended brake holding test has NOT been carried out or if any number of vehicles are attached to the train rear of the last three vehicles, then:	a visual inspection of each vehicle being attached, a brake pipe leakage test, a brake holding test, and a full continuity test shall be carried out.

If the consist of the attached vehicles has changed from that indicated in the documentation for the attached vehicles, or the time elapsed since the inspection of the pre-inspected vehicles is 24 hours or more, then a **full or general train inspection** shall be carried out on the attached vehicles.

6.11. Attaching uninspected vehicles

December 2013

One or more rakes of uninspected vehicles may be attached anywhere within a train consist enroute at intermediate locations (except as provided by the regulations for the transport of dangerous goods).

In this case, when the vehicles are attached, the uninspected vehicles shall be given a **general mechanical inspection**.

Table 25 gives the tests required when attaching uninspected vehicles.

Table 25 – Tests required when attaching uninspected vehicles

Consist	Action
Three or less vehicles are attached in front of the last three vehicles then: OR	a brake pipe leakage test, and a modified continuity test shall be carried out.
More than three vehicles are attached in front of the last three vehicles and an extended brake holding test has been carried out then: OR	a brake pipe leakage test, and a modified continuity test shall be carried out.
If more than three vehicles are attached in front of the last three vehicles and an extended brake holding test has NOT been carried out then: OR	a brake pipe leakage test, a brake holding test, and a full continuity test shall be carried out.
If any number of vehicles are attached to the train in rear of the last three vehicles or within the last three vehicles then:	a brake pipe leakage test, a brake holding test, and a full continuity test shall be carried out.

6.12. Attaching or detaching assisting locomotives

December 2013

Table 26 gives rules for which tests are required when attaching or detaching assisting locomotives.

Table 26 – Tests required when attaching or detaching assisting locomotives

Attaching or detaching locomotives	Action
When attaching assisting locomotives to the front of the train then OR	a brake pipe leakage test, and a modified continuity test shall be carried out.
When detaching assisting locomotives from the train OR	restore the brake pipe pressure, and apply and release the brakes at least twice to overcome any overcharge. No further inspection is required.
When attaching assisting (bank) locomotives to the rear of the train and the brake pipe is connected then: OR	a brake pipe leakage test, and a full continuity test shall be carried out.
When employing assisting (bank) locomotives at the rear of the train and there is no connection to the brake pipe	No further inspection is required.

6.13. Locomotive run around movements

Version 1.0 May 2005

When locomotives are involved in a *run around* movement and reattached and a brake holding test has been previously carried out on the three vehicles that become the last three vehicles on the train, a modified continuity test shall be carried out.

If the brake holding test has not previously been carried out on the three vehicles that become the last three vehicles on the train, a brake holding test and a modified continuity test shall be carried out.

6.14. Detaching vehicles

Version 1.0 May 2005

Vehicles may be detached from anywhere within a freight train consist enroute at intermediate locations provided that the altered train does not contravene the requirements for the transport of dangerous goods.

The vehicles that become the last three vehicles of the train consist shall have been tested for brake holding.

However, if any of the last three vehicles are detached, and additional vehicles have not had a brake holding test, then a holding test shall be carried out on the vehicles that are now the last vehicles on the train. A full continuity test is then conducted in place of the modified continuity test.

Table 27 gives the tests required when detaching vehicles.

Table 27 – Tests required when detaching vehicles

Detaching vehicles	Action
After detaching vehicles from a locomotive hauled freight train then: OR	a brake pipe leakage test, and a modified continuity test shall be carried out.
After detaching vehicles from a locomotive hauled passenger train then:	a brake pipe leakage test, and a full continuity test shall be carried out.

6.15. Programmed preventative maintenance

December 2013

Programmed preventative maintenance (PPM) is regular vehicle or train maintenance based on a fixed time or distance travelled cycle to ensure that the vehicle will remain fit for purpose for at least the duration of the PPM cycle.

To claim a PPM status for any vehicle type, or group of vehicles, an operator shall demonstrate that there are written maintenance procedures and a maintenance history recording and tracking system in place. This is to ensure that the nominated vehicles receive their due maintenance within the nominated maintenance cycle.

Vehicles that are scheduled for PPM are permitted to operate with consecutive general train inspections.

When a PPM vehicle/train exceeds the PPM period, the train may complete its loading cycle and shall return to its maintenance location to retain its PPM status. It is, however, permissible for a vehicle/train that is outside PPM to continue operation as a non-PPM vehicle/train with the appropriate inspections.

Where vehicles are added to a PPM train, they shall be of the same or better maintenance standard or the train shall operate as a non-PPM train until the PPM standard is restored.

6.15.1. Programmed preventative maintenance – Unit train operation

Unit train operation is a PPM operation where vehicles within the train consist remain unchanged during the PPM period. It is permissible to replace vehicles in the unit with pre-inspected spare vehicles if required.

Unit trains do not require general train inspections within the full train inspection period.

After unloading, but before reloading, unit trains shall be inspected to ensure that the train has no defects which may affect the safe operation of the train and that the door of all vehicles are closed and secured.

Where applicable, immediately after loading and unloading, the train shall be inspected to ensure that manual empty/load” valves and grade control valves are set correctly.

Attaching non-unit vehicles to a unit train. It is permissible to attach non-unit vehicles to a unit train. The non-unit vehicles shall have a full or general train inspection. These vehicles shall be marshalled at the front or rear of an empty unit train or on the rear of a loaded unit train.

Section 7

Train numbering

7. Train numbering

Version December 2023

7.1. Train numbering

TfNSW is the owner of the train numbering framework (naming convention and range allocation to operators) in the TfNSW metropolitan heavy rail network. Both TfNSW and Sydney Trains are responsible for the application of train numbers under the framework to operators in the SWTT, DOT and DWTT.

Freight trains will retain their original number for the entire journey even when travelling in the Up or Down direction. Train numbers will be either direction-based or origin-based primarily reflecting the operations district of origin and destination.

Through Running – **Through running** is where a train changes between an *up and down* direction during its journey from origin to final destination but retains its unique train number. 'UP' or 'DN' shall be added to the train number during *verbal and written communication* to highlight the changed circumstance, to indicate the train is travelling in a direction opposite to the traditional 'odd – down, even-up' system.

Through running intrastate freight services will be allocated an even number when commencing an UP journey and an odd number when commencing a DOWN journey.

Examples of train numbering for through running are given in Table 28.

Table 28 – Examples of train numbering

Train number	Journey
BB27'UP' BB27	Port Kembla to Meeks Road Junction Meeks Road Junction to Baal Bone
TB435 'UP' TB434 'DN'	Kooragang to Teralba Colliery Teralba Colliery to Port Waratah
4922 4922 'DN'	Morandoo to Meeks Rd Junction Meeks Rd Junction to Port Kembla

The letters **DN** and **UP** do not apply and are not used when the following occurs:

- an **odd** numbered train is travelling in the traditional **down** direction away from Sydney
- when an **even** numbered train is travelling in the traditional **up** direction towards Sydney

Odds and Evens – The current system of odd for down and even for up trains will still apply for trains that are not through running. Exceptions to odd for down and even for up are covered by the 'UP' or 'DN' indicators.

Note: Coal services are indicated by Odd numbers for empty services and Even numbers for loaded services.

7.2. Passenger trains

See also: Table 39 – Train numbering for Sydney Trains and NSW TrainLink trains – Metropolitan – Live complex shunting movements (page 114)

Passenger train numbering uses a convention of **AANN**. The convention is explained in Table 29, Table 30, Table 31 and Table 32.

Table 29 – Train numbering for passenger trains – 1st character

AANN – 1st character	Direction
S - - -	indicates South
W - - -	indicates West
N - - -	indicates North
C - - -	indicates Illawarra
H - - -	indicates Suburban area (Bounded by Berowra, Emu Plains, Macarthur, Helensburgh)

Table 30 – Train numbering for passenger trains – 2nd character

AANN – 2nd character	Train type or motive power
- E - -	Trains hauled by Electric locomotives within the electrified area
- L - -	Trains hauled throughout by diesel locomotives
- N - -	Endeavour Trains
- P - -	Explorer Trains
- R - -	Diesel Multiple Unit trains and Rail Motors
- T - -	XPT Trains

Table 31 – Train numbering for passenger trains – 3rd character

AANN – 3rd Character	Area	Trains operating between the areas of
S – 1 –	South	Sydney and Goulburn
S – 2 –	South	Sydney and south of Goulburn
S – 3 –	South	Sydney and Canberra
S – 4 –	South	Branches south of Goulburn
N – 1 –	North	Sydney and Broadmeadow
N – 2 –	North	Broadmeadow & Armidale
N – 3 –	North	Broadmeadow & North Coast
N – 4 –	North	Broadmeadow & Moree
W – 1 –	West	Sydney and Orange
W – 2 –	West	Sydney and Dubbo/Cobar
W – 3 –	West	Sydney and Parkes
W – 4 –	West	Sydney and Broken Hill
C – 1 –	Illawarra	Sydney and Wollongong
C – 2 –	Illawarra	Sydney and Moss Vale via Wollongong
C – 3 –	Illawarra	Sydney and south of Wollongong

AANN – 3rd Character	Area	Trains operating between the areas of
H - - - (3 rd character arbitrary)	Suburban area	(Bounded by Berowra, Emu Plains, Macarthur, Helensburgh)

Table 32 – Train numbering for passenger trains – 4th character

AANN – 4th Character	Train direction
0, 2, 4, 6, 8 (even numbers)	Up trains
1, 3, 5, 7, 9 (odd numbers)	Down trains

7.3. Sydney Trains and NSW TrainLink trains

Suburban electric trains and diesel, Intercity electric and diesel trains operating within the area bounded by Newcastle Interchange, Springwood, Macarthur, Port Kembla, and Kiama are indicated by a combination of up to three numbers and letters that denote the type of train and composition.

A list indicating the allotted run numbers for the various set types on each sector will be shown in the front pages of Sydney Trains Working Timetable pages.

The train numbering is given in Table 33, Table 34, Table 35, Table 37 and Table 38.

Table 33 – Train numbering for Sydney Trains and NSW TrainLink trains – North

North numbers	Train type	Description
N000/N099	Intercity (V Set)	Additional trains operating at locations between Sydney and Newcastle Interchange (for use in Special Train Notices)
N100/N199	Intercity (V Set)	Trains operating from Sydney, Hornsby or Gosford to Newcastle Interchange or vice versa
N200/N299	Intercity (V Set)	Trains operating between Sydney and Wyong and intermediate stations
200/299	# Oscar	Medium width electric trains operating between Sydney or Central and Gosford, Wyong or Newcastle Interchange
N300/399	Intercity (V Set)	Shunting trips at locations between Berowra and Broadmeadow
N400/N489	# Mariyung (D Set)	10 car passenger Mariyung trains (4 car leading) operating at locations between Sydney and Newcastle Interchange. Generally operating towards Sydney (Up direction)
A400/A499	# Mariyung (D Set)	10 car passenger or empty Mariyung trains (4 car leading) operating at locations between Sydney and Newcastle Interchange. Generally operating towards Sydney (Up direction) for use in Special Train Notices
N490/N499	# Mariyung (D Set)	10 car passenger Mariyung trains (4 car leading) operating at locations between Sydney and Newcastle Interchange. Generally operating towards Sydney (Up direction) for use in day of operation transpositions
N500/N599	# Waratah (A Set), # Oscar (H Set)	Medium width Trial Trip trains operating between Sydney and Newcastle Interchange
N600/N689	# Mariyung (D Set)	10 car passenger Mariyung trains (6 car leading) operating at locations between Sydney and Newcastle Interchange. Generally operating away from Sydney (Down direction)

North numbers	Train type	Description
A600/A699	# Mariyung (D Set)	10 car passenger or empty Mariyung trains (6 car Leading) operating at locations between Sydney and Newcastle Interchange. Generally operating away from Sydney (Down direction) for use in Special Train Notices
N690/N699	# Mariyung (D Set)	10 car passenger Mariyung trains (6 car leading) operating at locations between Sydney and Newcastle Interchange. Generally operating away from Sydney (Down direction) for use in day of operation transpositions
N700/N799	# Mariyung (D Set)	4 or 6 car passenger Mariyung trains operating at locations between Sydney and Newcastle Interchange
N800/N899	# Mariyung (D Set)	8 car passenger Mariyung trains operating at locations between Sydney and Newcastle Interchange
N900/N999	Intercity (V Set)	Trains operating between Newcastle Interchange-Broadmeadow or Broadmeadow Decant Siding/Maintenance Centre
V300/V399	Diesel (S.P.)	Shunting trips operating at locations between Newcastle Interchange, Broadmeadow and ARTC locations
V400/V499	Diesel (S.P.)	Empty trips operating between Hamilton or Broadmeadow MC and ARTC locations
V600/V699	Diesel (S.P.)	Passenger trains operating between Newcastle Interchange and Muswellbrook or Scone
V700/V799	Diesel (S.P.)	Passenger trains operating between Newcastle and Maitland or Telarah
V800/V899	Diesel (S.P.)	Empty trips operating between Broadmeadow Maintenance Centre and Newcastle Interchange
V900/V999	Diesel (S.P.)	Diesel trains operating between Newcastle Interchange and Dungog
Y400/Y489	Mariyung (D set)	Empty 10 car Mariyung (4 car Leading) Trains. Generally operating at locations between Sydney and Newcastle Interchange, towards Sydney (Up direction)
Y490/Y499	Mariyung (D set)	Empty 10 car Mariyung (4 car Leading) Trains. Generally operating at locations between Sydney and Newcastle Interchange, towards Sydney (Up direction) for use in day of operation transpositions.
Y600/Y689	Mariyung (D set)	Empty 10 car Mariyung (6 car Leading) Trains. Generally operating between Sydney and Newcastle Interchange, away from Sydney (Down direction)
Y690/Y699	Mariyung (D set)	Empty 10 car Mariyung (6 car Leading) Trains. Generally operating between Sydney and Newcastle Interchange, away from Sydney (Down direction) for use in day of operation transpositions
Y700/Y799	Mariyung (D set)	Empty 4 or 6 car Mariyung Trains. Generally operating at locations between Sydney and Newcastle Interchange.
Y800/Y899	Mariyung (D set)	Empty 8 car Mariyung Trains. Generally operating at locations between Sydney and Newcastle Interchange.
NN01/NN99	Diesel (S.P.)	Empty trains operating between Sydney and Broadmeadow Maintenance Centre
NM--	MTP Vehicle	Vehicle performing Mechanised Track Patrols (may operate under Block Working Conditions)
NH01/NH99	Any	Additional trains between Sydney and Newcastle Interchange – Private Hire

To comply with instructions contained in Network Local Appendix NLA 312 Gosford 'Narrow track clearances'.

Note: train types with (S.P.) designation denotes 'self propelled'.

Table 34 – Train numbering for Sydney Trains and NSW TrainLink trains – South

South numbers	Train type	Description
SN01/SN99	Endeavour	Endeavour trains operating between Sydney and Goulburn
SN-0/SN-9	Endeavour	Shunting trips at locations between Moss Vale and Goulburn
RC--	Road Coach	Bus operating between Moss Vale and Bundanoon or Moss Vale and Goulburn

Note: train types with (S.P.) designation denotes 'self propelled'.

Table 35 – Train numbering for Sydney Trains and NSW TrainLink trains – West

West numbers	Train type	Description
W000/W099	Intercity (V set)	Additional trains operating at locations between Sydney-Lithgow (for use in Special Train Notices)
200/299	Oscar (H set)	Medium width electric trains operating between Sydney or Central and Springwood
W300/W399	Intercity (V set)	Shunting trips at locations between Emu Plains and Lithgow
W400/W489	Mariyung (D set)	10 car passenger Mariyung trains (4 car leading) operating at locations between Sydney and Lithgow. Generally operating towards Sydney (Up direction)
G400/G499	Mariyung (D set)	10 car passenger or empty Mariyung trains (4 car leading) operating at locations between Sydney and Lithgow. Generally operating towards Sydney (Up direction) for use in Special Train Notices
W490/W499	Mariyung (D set)	10 car passenger Mariyung trains (4 car leading) operating at locations between Sydney and Lithgow. Generally operating towards Sydney (Up direction) for use in day of operation transpositions
W500/W599	Intercity (V set)	Trains operating between Sydney and Lithgow
W600/W689	Mariyung (D set)	10 car passenger Mariyung trains (6 car leading) operating at locations between Sydney and Lithgow. Generally operating away from Sydney (Down direction)
G600/G699	Mariyung (D set)	10 car passenger or empty Mariyung trains (6 car leading) operating at locations between Sydney and Lithgow. Generally operating away from Sydney (Down direction) for use Special Train Notices
W690/W699	Mariyung (D set)	10 car passenger Mariyung trains (6 car leading) operating at locations between Sydney and Lithgow. Generally operating away from Sydney (Down direction) for use in day of operation transpositions
600/699	Waratah (A set)	Trains operating between Sydney or Central and Springwood
W700/W799	Mariyung (D set)	4 or 6 car passenger Mariyung trains operating at locations between Sydney and Lithgow
W800/W899	Mariyung (D set)	8 car passenger Mariyung trains operating at locations between Sydney and Lithgow
R400/R489	Mariyung (D set)	Empty 10 car Mariyung trains (4 Car Leading). Generally operating at locations between Sydney and Lithgow, towards Sydney (Up direction).

West numbers	Train type	Description
R490/R499	Mariyung (D set)	Empty 10 car Mariyung trains (4 Car Leading). Generally operating at locations between Sydney and Lithgow, towards Sydney (Up direction) – for use in Day of Operation transpositions.
R600/R689	Mariyung (D set)	Empty 10 car Mariyung trains (6 Car Leading). Generally operating at locations between Sydney and Lithgow, away from Sydney (Down direction).
R690/R699	Mariyung (D set)	Empty 10 car Mariyung trains (6 Car Leading). Generally operating at locations between Sydney and Lithgow, away from Sydney (Down direction) – for use in Day of Operation transpositions.
R700/R799	Mariyung (D set)	Empty 4 or 6 car Mariyung trains. Generally operating at locations between Sydney and Lithgow.
R800/R899	Mariyung (D set)	Empty 8 car Mariyung trains. Generally operating at locations between Sydney and Lithgow.
WN01/WN99	Endeavour	Trains operating between Sydney and Bathurst
WM--	MTP vehicle	Vehicle performing Mechanised Track Patrols (may operate under Block Working Conditions)
WH01/WH99	Any	Additional trains between Sydney and Lithgow – private hire

Table 36 – Train numbering for Sydney Trains and NSW TrainLink trains – Illawarra

Illawarra numbers	Train type	Description
C000/C099	Intercity (V set), Oscar (H set)	Additional trains operating at locations between Sydney Terminal/Illawarra Junction-Kiama/Port Kembla (for use in Special Train Notices)
C100/C199	Oscar (H set)	Trains operating between Sydney Terminal / Illawarra Junction and Kiama
C300/C399	Oscar (H set), Suburban	Trains operating between Sydney Terminal / Illawarra Junction and Wollongong / Port Kembla
300/399	Oscar (H set), Suburban	Trains operating between Bondi Junction / Martin Place and Wollongong / Port Kembla
C400/C489	Mariyung (D set)	10 car passenger Mariyung trains (4 car leading) operating at locations between Sydney Terminal and Wollongong / Port Kembla / Kiama. Generally operating towards Sydney (Up direction)
P400/P499	Mariyung (D set)	10 car passenger or empty Mariyung trains (4 car leading) operating at locations between Sydney Terminal and Wollongong / Port Kembla / Kiama. Generally operating towards Sydney (Up direction) – for use in Special Train Notices
C490/C499	Mariyung (D set)	10 car passenger Mariyung trains (4 car leading) 10 car NIF trains (4 car leading) operating at locations between Sydney Terminal and Wollongong / Port Kembla / Kiama. Generally operating towards Sydney (Up direction) for use in day of operation transpositions
400/499	Oscar (H set)	Trains operating between Bondi Junction / Martin Place and Kiama
C600/C689	Mariyung (D set)	10 car passenger Mariyung trains (6 car leading) operating at locations between Sydney Terminal and Wollongong / Port Kembla / Kiama. Generally operating away from Sydney (Down direction)

Illawarra numbers	Train type	Description
P600/P699	Mariyung (D set)	10 car passenger or empty Mariyung trains (6 car leading) operating at locations between Sydney Terminal and Wollongong / Port Kembla / Kiama. Generally operating away from Sydney (Down direction) for use in Special Train Notices
C690/C699	Mariyung (D set)	10 car passenger Mariyung trains (6 car leading) operating at locations between Sydney Terminal and Wollongong / Port Kembla / Kiama. Generally operating away from Sydney (Down direction) for use in day of operation transpositions
C700/C799	Mariyung (D set)	4 or 6 Car passenger Mariyung trains operating at locations between Sydney Terminal and Wollongong / Illawarra Junction and Wollongong / Port Kembla / Kiama
C800/C899	Mariyung (D set)	8 Car passenger Mariyung trains operating at locations between Sydney Terminal and Wollongong / Illawarra Junction and Wollongong / Port Kembla / Kiama
K300/K399	Oscar (H set), Suburban	Trains operating between Coalcliff and Port Kembla
K400/K499	Oscar (H set)	Trains operating between Coalcliff and Kiama
K700/K799	Oscar (H set), Suburban	Shunting trips at locations between Coalcliff and Pt Kembla/Kiama.
S400/S489	Mariyung (D set)	Empty 10 car Mariyung trains (4 Car Leading). Generally operating at locations between Sydney and Wollongong / Port Kembla / Kiama, towards Sydney (Up direction).
S490/S499	Mariyung (D set)	Empty 10 car Mariyung trains (4 Car Leading). Generally operating at locations between Sydney and Wollongong / Port Kembla / Kiama, towards Sydney (Up direction) – for use in Day of Operation transpositions.
S600/S689	Mariyung (D set)	Empty 10 car Mariyung trains (6 Car Leading). Generally operating at locations between Sydney and Wollongong / Port Kembla / Kiama, away from Sydney (Down direction).
S690/S699	Mariyung (D set)	Empty 10 car Mariyung trains (6 Car Leading). Generally operating at locations between Sydney and Wollongong / Port Kembla / Kiama, away from Sydney (Down direction) – for use in Day of Operation transpositions.
S700/S799	Mariyung (D set)	Empty 4 or 6 car Mariyung trains. Generally operating at locations between Sydney and Wollongong / Port Kembla / Kiama.
S800/S899	Mariyung (D set)	Empty 8 car Mariyung trains. Generally operating at locations between Sydney and Wollongong / Port Kembla / Kiama.
KN01/KN99	Endeavour	Trains operating between Wollongong/Port Kembla and Bomaderry
KN-1/KN-9	Endeavour	Trains operating between Berry and Berry Stock Sidings exclusively
CN01/CN99	Endeavour	Trains operating between Xplorer Centre or Sydney and Wollongong, Port Kembla or Nowra
RC--	Road Coach	Bus operating between Kiama and Bomaderry (Nowra)
M67-	Road rail vehicle	Hi Rail vehicle performing Track Inspections (operates under Block Working Conditions)

Illawarra numbers	Train type	Description
CM--	MTP vehicle	Vehicle performing Mechanised Track Patrols (may operate under Block Working Conditions)
CH01/CH99	Any	Additional trains between Sydney and Pt Kembla/Kiama-private hire

Table 37 – Train numbering for Sydney Trains and NSW TrainLink trains – Metropolitan – Olympic Park – Special event trains

Metropolitan numbers	Numbers	Description
SXXX	e.g. S29A	e.g. for Central / Sydney – Olympic Park – Central / Sydney
BXXX	e.g. B29A	e.g. for Blacktown – Olympic Park – Blacktown
LXXX	e.g. L29A	e.g. for Lidcombe – Olympic Park – Lidcombe

Table 38 – Train numbering for Sydney Trains and NSW TrainLink trains – Metropolitan – Intercity and self propelled Diesel car movements

Metropolitan numbers	Train type	Description
H100/H199 (North)	Intercity (V set)	Trains operating between Metropolitan area locations e.g. Sydney and Flemington Maintenance Centre
H200/H299 (North)	Intercity (V set)	Trains operating between Metropolitan area locations e.g. Sydney and Flemington Maintenance Centre
H300/H399 (Illa)	Oscar (H set)	Trains operating between Metropolitan area locations e.g. Sydney and Flemington or Mortdale Maintenance Centre
H400/H499 (Illa)	Oscar (H set)	Trains operating between Metropolitan area locations e.g. Sydney and Flemington or Mortdale Maintenance Centre
H500/H599 (West)	Intercity (V set)	Trains operating between Metropolitan area locations e.g. Sydney and Flemington Maintenance Centre
H700/H799	Intercity (V set), Oscar (H set)	Shunting trips within Metropolitan area locations
H800/H899	Suburban	Trains operating between Metropolitan area locations e.g. Sydney and Hornsby Maintenance Centre
Y900/Y999	Mariyung (D set)	Empty RGR (Reliability Growth Runs) Mariyung Trains operating between Sydney and Metropolitan or Outer Metropolitan area locations
HN01/HN99	Diesel (S.P.)	Empty trains operating between Metropolitan area locations
HH01/HH99	Any	Trains operating between Metropolitan area locations – private Hire
HM--	MTP vehicle	Vehicle performing Mechanised Track Patrols (may operate under Block Working Conditions)

Table 39 – Train numbering for Sydney Trains and NSW TrainLink trains – Metropolitan – Live complex shunting movements

Network numbers	Train type	Description
SX00/SX99	Any	Live complex shunting movements require the use of distinct and standardised train numbers (for example the movement of trains between Auburn Maintenance Centre and relief lines that require operational staff to distinguish shunts from through movements)

Table 40 – Train numbering for Sydney Trains and NSW TrainLink trains – Metropolitan

Network numbers	Train type	Description
XM00/XM99	MTP	Vehicle performing Mechanised Track Patrols (may operate under Block Working Conditions), ad-hoc operations on the Metropolitan Heavy Rail Network (in support of the transition to the Digital System Program – DSP)

7.4. Passenger trains – heritage operator tours (HOT)

Heritage trains will retain their original number for the entire journey even when travelling in the Up or Down direction.

Heritage trains numbering uses a convention of **NANN**. This convention is explained in Table 41, Table 42, Table 43 and Table 44.

Table 41 – Train numbering for passenger trains – heritage operator tours – 1st character

NANN – 1st character	Operator
4 - - -	Lithgow State Mine Railway
5 - - -	3801 Limited
6 - - -	NSW Rail Transport Museum
7 - - -	Rail Motor Society
8 - - -	Lachlan Valley Railway Cowra
9 - - -	Sydney Rail Services

Table 42 – Train numbering for passenger trains – heritage operator tours – 2nd character

NANN – 2nd character	Train type or motive power
- E - -	# Trains hauled by Electric locomotives within the electrified area
- L - -	Trains hauled by diesel locomotives
- J - -	## Single Unit Diesel Cars
- R - -	### Diesel Multiple Unit trains and (multiple unit) Rail Motors
- S - -	Trains hauled by Steam Locomotives

Train movements comprising mixed locomotives that include ELECTRIC locomotive(s) are to use the letter 'E' to avoid the possibility of electric locomotive being turned onto unwired roads, or sections of track from which the current has been removed. This will apply with the pantographs in the raised or lowered positions.

To operate under block working conditions (refer to Section 2.17 Block working of single unit diesel cars, page 56, for applicable vehicles).

To operate under block working conditions as per Figure 4 – Block working of Diesel Multiple Unit trains (DMU) Section 2.16.2 Diesel Multiple Unit trains (DMU) without Track Circuit Assistors (TCA's).

Table 43 – Train numbering for passenger trains – heritage operator tours – 3rd character

NANN – 3rd character	Applies to
0 to 9	All passenger trains Heritage Operator Tours

Table 44 – Train numbering for passenger trains – heritage operator tours – 4th character

NANN – 4th character (0 to 9)	Direction
0, 2, 4, 6, 8 (even numbers)	Up trains
1, 3, 5, 7, 9 (odd numbers)	Down trains

7.5. Light locomotives – heritage operators

Table 45, Table 46, Table 47 and Table 48 explain the train numbering for light locomotives heritage operators.

Table 45 – Train numbering for light locomotives – heritage operators – 1st character

NANN – 1st character	Operator
4 - - -	Lithgow State Mine Railway
5 - - -	3801 Limited
6 - - -	NSW Rail Transport Museum
7 - - -	Rail Motor Society
8 - - -	Lachlan Valley Railway Cowra
9 - - -	Sydney Rail Services

Table 46 – Train numbering for light locomotives – heritage operators – 2nd character

NANN – 2nd character	Locomotive type
- Z - -	Steam
- D - -	Diesel
- X - -	# Electric

Train movements comprising mixed locomotives that include ELECTRIC locomotive(s) are to use the letter 'E' to avoid the possibility of electric locomotive being turned onto unwired roads, or sections of track from which the current has been removed. This will apply with the pantographs in the raised or lowered positions.

Table 47 – Train numbering for light locomotives – heritage operators – 3rd character

NANN – 3rd character	Applies to
0 to 9	All light locomotives Heritage Operators

Table 48 – Train numbering for light locomotives – heritage operators – 4th character

NANN – 4th character (0 to 9)	Direction
0, 2, 4, 6, 8 (even numbers)	Up trains
1, 3, 5, 7, 9 (odd numbers)	Down trains

7.6. Intrastate trains

Table 49, Table 50, Table 51 and Table 52 explain the train numbering for intrastate trains.

Table 49 – Train numbering for intrastate trains – 1st character

NNNN – 1st character	District where the train commenced (See Train numbering district map on page 134)
1	Sydney
2	Goulburn
3	Junee
4	Newcastle
5	Werris Creek
6	Grafton
7	Merrygoen – Lithgow
8	Orange
9	Illawarra

Table 50 – Train numbering for intrastate trains – 2nd character

NNNN – 2nd character	District where the train will finish its journey (See Train numbering district map on page 134)
1	Sydney
2	Goulburn
3	Junee
4	Newcastle
5	Werris Creek
6	Grafton
7	Lithgow – Merrygoen
8	Orange
9	Illawarra

Table 51 – Train numbering for intrastate trains – 3rd character

NNNN – 3rd character	Operator as allocated by the Track Access Provider	Area	Journey start	Journey finish
1101 to 1119	Sydney Trains – Not to be used	West to Penrith	n/a	n/a
1120 to 1129	Allocated to Freight Operators	West to Penrith	n/a	n/a
1130 to 1139	Allocated to Freight Operators for Kingswood Acoustic Bearing Monitor Services	West to Penrith	n/a	n/a
1140 to 1149	Allocated to Freight Operators for testing purposes to / from Penrith	West to Penrith	n/a	n/a
1150 to 1159	Allocated to Freight Operators for transfer movements to / from St Marys	West to Penrith	n/a	n/a
1160 to 1189	Sydney Trains – Not to be used	West to Penrith	n/a	n/a
1190 to 1193	Allocated to freight operators	West to Penrith	n/a	n/a
1194 to 1195	Sydney Trains – not to be used	West to Penrith	n/a	n/a
1196 to 1199	John Holland	West to Penrith	n/a	n/a
1201 to 1209 2100 to 2108	Sydney Trains Sydney Trains	South to Goulburn	Sydney Goulburn	Goulburn Sydney

NNNN – 3rd character	Operator as allocated by the Track Access Provider	Area	Journey start	Journey finish
1211 to 1219 2110 to 2118	Sydney Trains services (Work trains) Sydney Trains services (Work trains)	South to Goulburn	Sydney Goulburn	Braemar Sydney
1221 to 1239 2120 to 2138	Pacific National Pacific National	South to Goulburn	Sydney Goulburn	Goulburn area Sydney
1241 to 1249 2140 to 2148	Southern Shorthaul Railroad Southern Shorthaul Railroad	South to Goulburn	Sydney Goulburn	Goulburn area Sydney
1251 to 1259 2150 to 2158	Aurizon Aurizon	South to Goulburn	Sydney Goulburn	Goulburn Sydney
1261 to 1269 2160 to 2168	QUBE Logistics Rail QUBE Logistics Rail	South to Goulburn	Sydney Goulburn	Goulburn Sydney
1271 to 1279 2170 to 2178	Southern Shorthaul Railroad Southern Shorthaul Railroad	South to Goulburn	Sydney Goulburn	Goulburn Sydney
1281 to 1289 2180 to 2188	Freightliner Australia Freightliner Australia	South to Goulburn	Sydney Goulburn	Goulburn Sydney
1291 to 1293 2190 to 2192	Sydney Rail Services Sydney Rail Services	South to Goulburn	Sydney Goulburn	Goulburn Sydney
1295 2194	Not allocated – Reserved Not allocated – Reserved	South to Goulburn	n/a	n/a
1297 to 1299 2196 to 2198	John Holland John Holland	South to Goulburn	Sydney Goulburn	Goulburn Sydney
1301 to 1319 3100 to 3118	Not allocated – Reserved Not allocated – Reserved	South beyond Goulburn	n/a	n/a
1321 to 1339 3120 to 3138	Pacific National Pacific National	South beyond Goulburn	Sydney South	South Sydney
1341 to 1349 3140 to 3148	Southern Shorthaul Railroad Southern Shorthaul Railroad	South beyond Goulburn	Sydney South	South Sydney
1351 to 1355 3150 to 3154	Genesee Wyoming Australia Genesee Wyoming Australia	South beyond Goulburn	Sydney South	South Sydney
1357 to 1359 3156 to 3158	AWR / ARG AWR / ARG	South beyond Goulburn	Sydney South	South Sydney
1361 to 1369 3160 to 3168	QUBE Logistics Rail QUBE Logistics Rail	South beyond Goulburn	Sydney South	South Sydney
1371 to 1379 3170 to 3178	Southern Shorthaul Railroad Southern Shorthaul Railroad	South beyond Goulburn	Sydney South	South Sydney
1381 to 1389 3180 to 3188	Freightliner Australia Freightliner Australia	South beyond Goulburn	Sydney South	South Sydney
1391 to 1393 3190 to 3192	Sydney Rail Services Sydney Rail Services	South beyond Goulburn	Sydney South	South Sydney
1395 3194	Not allocated – Reserved Not allocated – Reserved	South beyond Goulburn	n/a	n/a
1397 to 1399 3196 to 3198	John Holland John Holland	South beyond Goulburn	Sydney South	South Sydney
1401 to 1409 4100 to 4108	Sydney Trains Sydney Trains	North to Broadmeadow / Port Waratah	Sydney Newcastle	Newcastle Sydney
1411 to 1419 4112 to 4118	QUBE Logistics Rail QUBE Logistics Rail	North to Broadmeadow / Port Waratah	Sydney Newcastle	Newcastle Sydney
1421 to 1439 4120 to 4138	Pacific National Pacific National	North to Broadmeadow / Port Waratah	Sydney Newcastle	Newcastle Sydney
1441 to 1449 4140 to 4148	Southern Shorthaul Railroad Southern Shorthaul Railroad	North to Broadmeadow / Port Waratah	Sydney Newcastle	Newcastle Sydney
1451 to 1459 4150 to 4158	Aurizon Aurizon	North to Broadmeadow / Port Waratah	Sydney Newcastle	Newcastle Sydney

NNN – 3rd character	Operator as allocated by the Track Access Provider	Area	Journey start	Journey finish
1461 to 1469 4160 to 4168	QUBE Logistics Rail QUBE Logistics Rail	North to Broadmeadow / Port Waratah	Sydney Newcastle	Newcastle Sydney
1471 to 1473 4170 to 4172	Genesee Wyoming Australia Genesee Wyoming Australia	North to Broadmeadow / Port Waratah	Sydney Newcastle	Newcastle Sydney
1475 to 1479 4174 to 4178	Southern Shorthaul Railroad Southern Shorthaul Railroad	North to Broadmeadow / Port Waratah	Sydney Newcastle	Newcastle Sydney
1481 to 1489 4180 to 4188	Freightliner Australia Freightliner Australia	North to Broadmeadow / Port Waratah	Sydney Newcastle	Newcastle Sydney
1491 to 1493 4190 to 4192	Sydney Rail Services Sydney Rail Services	North to Broadmeadow / Port Waratah	Sydney Newcastle	Newcastle Sydney
1495 4194	Not allocated – Reserved Not allocated – Reserved	North to Broadmeadow / Port Waratah	n/a	n/a
1497 to 1499 4196 to 4198	John Holland John Holland	North to Broadmeadow / Port Waratah	Sydney Newcastle	Newcastle Sydney
1501 to 1509 5100 to 5108	Sydney Trains Sydney Trains	North West	Sydney North West	North West Sydney
1511 to 1519 5110 to 5118	QUBE Logistics Rail QUBE Logistics Rail	North West	Sydney North West	North West Sydney
1521 to 1539 5120 to 5138	Pacific National Pacific National	North West	Sydney North West	North West Sydney
1541 to 1549 5140 to 5148	Southern Shorthaul Railroad Southern Shorthaul Railroad	North West	Sydney North West	North West Sydney
1551 to 1559 5150 to 5158	Not allocated – Reserved Not allocated – Reserved	North West	n/a	n/a
1561 to 1569 5160 to 5168	QUBE Logistics Rail QUBE Logistics Rail	North West	Sydney North West	North West Sydney
1571 to 1579 5170 to 5178	Southern Shorthaul Railroad Southern Shorthaul Railroad	North West	Sydney North West	North West Sydney
1581 to 1589 5180 to 5188	Freightliner Australia Freightliner Australia	North West	Sydney North West	North West Sydney
1591 to 1593 5190 to 5192	Sydney Rail Services Sydney Rail Services	North West	Sydney North West	North West Sydney
1595 5194	Not allocated – Reserved Not allocated – Reserved	North West	n/a	n/a
1597 to 1599 5196 to 5198	John Holland John Holland	North West	Sydney North West	North West Sydney
1601 to 1619 6100 to 6118	Sydney Trains Sydney Trains	North Coast	Sydney North Coast	North Coast Sydney
1621 to 1639 6120 to 6138	Pacific National Pacific National	North Coast	Sydney North Coast	North Coast Sydney
1641 to 1649 6140 to 6148	Southern Shorthaul Railroad Southern Shorthaul Railroad	North Coast	Sydney North Coast	North Coast Sydney
1651 to 1659 6150 to 6158	Aurizon Aurizon	North Coast	Sydney North Coast	North Coast Sydney
1661 to 1669 6160 to 6168	Not allocated – Reserved Not allocated – Reserved	North Coast	n/a	n/a
1671 to 1679 6170 to 6178	Southern Shorthaul Railroad Southern Shorthaul Railroad	North Coast	Sydney North Coast	North Coast Sydney
1681 to 1689 6180 to 6188	Not allocated – Reserved Not allocated – Reserved	North Coast	n/a	n/a
1691 to 1693 6190 to 6192	Sydney Rail Services Sydney Rail Services	North Coast	Sydney North Coast	North Coast Sydney

NNN – 3rd character	Operator as allocated by the Track Access Provider	Area	Journey start	Journey finish
1695 6194	Not allocated – Reserved Not allocated – Reserved	North Coast	n/a	n/a
1697 to 1699 6196 to 6198	John Holland John Holland	North Coast	Sydney North Coast	North Coast Sydney
1701 to 1719 7100 to 7118	Sydney Trains Sydney Trains	Lithgow / Mudgee	Sydney Lithgow/Mudgee	Lithgow/Mudgee Sydney
1721 to 1739 7120 to 7138	Pacific National Pacific National	Lithgow / Mudgee	Sydney Lithgow/Mudgee	Lithgow/Mudgee Sydney
1741 to 1749 7140 to 7148	Southern Shorthaul Railroad Southern Shorthaul Railroad	Lithgow / Mudgee	Sydney Lithgow/Mudgee	Lithgow/Mudgee Sydney
1751 to 1769 7150 to 7168	Not allocated – Reserved Not allocated – Reserved	Lithgow / Mudgee	n/a	n/a
1771 to 1779 7170 to 7178	Southern Shorthaul Railroad Southern Shorthaul Railroad	Lithgow / Mudgee	Sydney Lithgow/Mudgee	Lithgow/Mudgee Sydney
1791 to 1793 7190 to 7192	Sydney Rail Services Sydney Rail Services	Lithgow / Mudgee	Sydney Lithgow/Mudgee	Lithgow/Mudgee Sydney
1795 7194	Not allocated – Reserved Not allocated – Reserved	Lithgow / Mudgee	n/a	n/a
1797 to 1799 7196 to 7198	John Holland John Holland	Lithgow / Mudgee	Sydney Lithgow/Mudgee	Lithgow/Mudgee Sydney
1801 to 1809 8100 to 8108	Sydney Trains Sydney Trains	West beyond Wallerawang	Sydney West	West Sydney
1811 to 1819 8110 to 8118	QUBE Logistics Rail QUBE Logistics Rail	West beyond Wallerawang	Sydney West	West Sydney
1821 to 1839 8120 to 8138	Pacific National Pacific National	West beyond Wallerawang	Sydney West	West Sydney
1841 to 1849 8140 to 8148	Southern Shorthaul Railroad Southern Shorthaul Railroad	West beyond Wallerawang	Sydney West	West Sydney
1851 to 1855 8150 to 8154	Not allocated – Reserved Not allocated – Reserved	West beyond Wallerawang	n/a	n/a
1857 to 1859 8156 to 8158	AWR / ARG AWR / ARG	West beyond Wallerawang	Sydney West	West Sydney
1861 to 1869 8160 to 8168	QUBE Logistics Rail QUBE Logistics Rail	West beyond Wallerawang	Sydney West	West Sydney
1871 to 1879 8170 to 8178	Southern Shorthaul Railroad Southern Shorthaul Railroad	West beyond Wallerawang	Sydney West	West Sydney
1881 to 1889 8180 to 8188	Freightliner Australia Freightliner Australia	West beyond Wallerawang	Sydney West	West Sydney
1891 to 1893 8190 to 8192	Sydney Rail Services Sydney Rail Services	West beyond Wallerawang	Sydney West	West Sydney
1895 8194	Not allocated – Reserved Not allocated – Reserved	West beyond Wallerawang	n/a	n/a
1897 to 1899 8196 to 8198	John Holland John Holland	West beyond Wallerawang	Sydney West	West Sydney
1901 to 1919 9100 to 9118	Sydney Trains Sydney Trains	Illawarra	Sydney Illawarra	Illawarra Sydney
1921 to 1939 9120 to 9138	Pacific National Pacific National	Illawarra	Sydney Illawarra	Illawarra Sydney
1941 to 1949 9140 to 9148	Southern Shorthaul Railroad Southern Shorthaul Railroad	Illawarra	Sydney Illawarra	Illawarra Sydney
1951 to 1959 9150 to 9158	Not allocated – Reserved Not allocated – Reserved	Illawarra	n/a	n/a
1961 to 1969 9160 to 9168	QUBE Logistics Rail QUBE Logistics Rail	Illawarra	Sydney Illawarra	Illawarra Sydney
1971 to 1979 9170 to 9178	Southern Shorthaul Railroad Southern Shorthaul Railroad	Illawarra	Sydney Illawarra	Illawarra Sydney

NNN – 3rd character	Operator as allocated by the Track Access Provider	Area	Journey start	Journey finish
1981 to 1989 9180 to 9188	Freightliner Australia Freightliner Australia	Illawarra	Sydney Illawarra	Illawarra Sydney
1991 to 1993 9190 to 9192	Sydney Rail Services Sydney Rail Services	Illawarra	Sydney Illawarra	Illawarra Sydney
1995 9194	Not allocated – Reserved Not allocated – Reserved	Illawarra	n/a	n/a
1997 to 1999 9196 to 9198	John Holland John Holland	Illawarra	Sydney Illawarra	Illawarra Sydney
4501 to 4559 5400 to 5458	Not allocated – Reserved Not allocated – Reserved	North West	n/a	n/a
4561 to 4569 5460 to 5468	QUBE Logistics Rail QUBE Logistics Rail	North West	Newcastle North West	North West Newcastle
4571 to 4599 5470 to 5498	Not allocated – Reserved Not allocated – Reserved	North West	n/a	n/a
4821 to 4839 8420 to 8438	Pacific National Pacific National	West beyond Wallerawang (via Lithgow)	Newcastle West	West Newcastle
9301 to 9319 3900 to 3918	Sydney Trains Sydney Trains	Illawarra via Unanderra / Moss Vale or via Sydney	Illawarra South	South Illawarra
9801 to 9819 8900 to 8918	Sydney Trains Sydney Trains	Illawarra via Unanderra / Moss Vale or via Sydney	Illawarra West	West Illawarra
9321 to 9339 3920 to 3938	Pacific National Pacific National	Illawarra via Unanderra / Moss Vale or via Sydney	Illawarra South	South Illawarra
9821 to 9839 8920 to 8938	Pacific National Pacific National	Illawarra via Unanderra / Moss Vale or via Sydney	Illawarra West	West Illawarra
9841 to 9849 8940 to 8948	Southern Shorthaul Railroad Southern Shorthaul Railroad	Illawarra via Unanderra / Moss Vale or via Sydney	Illawarra West	West Illawarra
9341 to 9349 3940 to 3948	Southern Shorthaul Railroad Southern Shorthaul Railroad	Illawarra via Unanderra / Moss Vale or via Sydney	Illawarra South	South Illawarra
9351 to 9355 3950 to 3954	Not allocated – Reserved Not allocated – Reserved	Illawarra via Unanderra / Moss Vale or via Sydney	n/a	n/a
9851 to 9855 8950 to 8954	Not allocated – Reserved Not allocated – Reserved	Illawarra via Unanderra / Moss Vale or via Sydney	n/a	n/a
9857 to 9859 8956 to 8958	AWR / ARG AWR / ARG	Illawarra via Unanderra / Moss Vale or via Sydney	Illawarra West	West Illawarra
9357 to 9359 3956 to 3958	AWR / ARG AWR / ARG	Illawarra via Unanderra / Moss Vale or via Sydney	Illawarra South	South Illawarra
9861 to 9869 8960 to 8968	QUBE Logistics Rail QUBE Logistics Rail	Illawarra via Unanderra / Moss Vale or via Sydney	Illawarra West	West Illawarra

NNN – 3rd character	Operator as allocated by the Track Access Provider	Area	Journey start	Journey finish
9361 to 9369 3960 to 3968	QUBE Logistics Rail QUBE Logistics Rail	Illawarra via Unanderra / Moss Vale or via Sydney	Illawarra South	South Illawarra
9871 to 9879 8970 to 8978	Southern Shorthaul Railroad Southern Shorthaul Railroad	Illawarra via Unanderra / Moss Vale or via Sydney	Illawarra West	West Illawarra
9371 to 9379 3970 to 3978	Southern Shorthaul Railroad Southern Shorthaul Railroad	Illawarra via Unanderra / Moss Vale or via Sydney	Illawarra South	South Illawarra
9881 to 9889 8980 to 8988	Not allocated – Reserved Not allocated – Reserved	Illawarra via Unanderra / Moss Vale or via Sydney	n/a	n/a
9381 to 9389 3980 to 3988	Not allocated – Reserved Not allocated – Reserved	Illawarra via Unanderra / Moss Vale or via Sydney	n/a	n/a
9891 to 9893 8990 to 8992	Sydney Rail Services Sydney Rail Services	Illawarra via Unanderra / Moss Vale or via Sydney	Illawarra South	South Illawarra
9391 to 9393 3990 to 3992	Sydney Rail Services Sydney Rail Services	Illawarra via Unanderra / Moss Vale or via Sydney	Illawarra South	South Illawarra
9897 to 9899 8996 to 8998	John Holland John Holland	Illawarra via Unanderra / Moss Vale or via Sydney	Illawarra South	South Illawarra
9397 to 9399 3996 to 3998	John Holland John Holland	Illawarra via Unanderra / Moss Vale or via Sydney	Illawarra South	South Illawarra
9895 8994	Not allocated – Reserved Not allocated – Reserved	Illawarra via Unanderra / Moss Vale or via Sydney	n/a	n/a
9395 3994	Not allocated – Reserved Not allocated – Reserved	Illawarra via Unanderra / Moss Vale or via Sydney	n/a	n/a
9401 to 9459 4900 to 4958	Not allocated – Reserved Not allocated – Reserved	Illawarra	n/a	n/a
9461 to 9469 4960 to 4968	QUBE Logistics Rail QUBE Logistics Rail	Illawarra	Illawarra Newcastle	Newcastle Illawarra
9471 to 9499 4970 to 4998	Not allocated – Reserved Not allocated – Reserved	Illawarra	n/a	n/a

Table 52 – Train numbering for intrastate trains – 4th character

NANN – 4th character	Direction
Even numbers	Up trains
Odd numbers	Down trains

7.7. Spare paths

Train numbering for spare paths is given in Table 53.

Table 53 – Train numbering – spare paths

SWTT reference numbers			
001N to 099N	Sydney Trains spare paths	Sydney	Broadmeadow
001W to 099W	Sydney Trains spare paths	Sydney	Lithgow
001C to 099C	Sydney Trains spare paths	Sydney	Illawarra region
001G to 099G	Sydney Trains spare paths	Sydney	Southern region
T001 to T099	Sydney Trains spare paths	Trip Trains	Metropolitan area
001A to 099A	ARTC spare paths	Interstate Spare Paths	Northern region

(These numbers are to identify paths in the Freight Services SWTT and are not for use by any operator)

7.8. Interstate trains – freight and passenger

Train numbering for interstate trains is given in Table 54, Table 55, Table 56 and Table 57.

Table 54 – Train numbering for interstate trains – 1st character

NAAN – 1 st character	Day of the week the train departs
1	Sunday
2	Monday
3	Tuesday
4	Wednesday
5	Thursday
6	Friday
7	Saturday

Table 55 – Train numbering for interstate trains – 2nd character

NAAN – 2 nd character	The city/location/region where the train commenced
A	Adelaide
B	Brisbane
C	Junee / Cootamundra / Griffith
D	Darwin
F	Mudgee / Dubbo / Cowra
G	Parkes
H	Hunter Valley
J	Victoria North East
K	Victoria North West
L	Alice Springs
M	Melbourne

NAAN – 2nd character	The city/location/region where the train commenced
N	Newcastle
O	Fisherman Islands
P	Perth
Q	Moree
R	Port Pirie
S	Sydney
T	Taree – Murwillumbah
U	Broken Hill
V	Goulburn / Moss Vale / Canberra
W	NSW South Coast
X	Spencer Junction / Port Augusta
Y	Whyalla

Table 56 – Train numbering for interstate trains – 3rd character

NAAN – 3rd character	The city/location/region where the train will finish its journey
A	Adelaide
B	Brisbane
C	Junee / Cootamundra / Griffith
D	Darwin
F	Mudgee / Dubbo / Cowra
G	Parkes
H	Hunter Valley
J	Victoria North East
K	Victoria North West
L	Alice Springs
M	Melbourne
N	Newcastle
O	Fisherman Islands
P	Perth
Q	Moree
R	Port Pirie
S	Sydney
T	Taree – Murwillumbah
V	Goulburn / Moss Vale / Canberra
U	Broken Hill
W	NSW South Coast
X	Spencer Junction / Port Augusta
Y	Whyalla

Table 57 – Train numbering for interstate trains – 4th character

NAAN – 4th character	General guide to the sequential order of departure from originating station
0 – 9	The numeral 8 is to be used for passenger services only

7.9. Coal trains – (South and West) (in conjunction with ARTC)

Note: Also applies to services operating between Inner Harbour and Hunter.

Table 58, Table 59 and Table 60 explain the train numbering for coal trains in the south and west. The 3 tables should be read together in conjunction with one another.

The train numbering of flexible paths (non-operational coal paths published in the Standard Working Timetable for network ad hoc path availability and planning purposes) shall use “- -” as the 1st and 2nd character and a 01 to 99 number as the 3rd and 4th character. An even (odd) 4th character shall be assigned to a loaded (empty) service.

Table 58 – Train numbering for coal trains (South and West) – 1st and 2nd characters

AA_{nn} – 1st and 2nd character	Coal loading point
AR	Airly
BB	Baal Bone
CA	Clarence
CB	Charbon
CG	Cringila BHP
GL	Glenlee Colliery
IH	Inner Harbour
LS	Lidsdale
LG	Lithgow
MC	Metropolitan Colliery
TM	Tahmoor Colliery

Table 59 – Train numbering for coal trains (South and West) – 3rd and 4th characters

AA_{nn} – 3rd and 4th character	Sequential order of daily departure from the originating location
Train numbers between 01 to 20	Allocated to Southern Shorthaul Railroad
Train numbers between 21 to 30	Allocated to Pacific National for prefix IH transfers, Inner Harbour/Thirroul/Inner Harbour or Inner Harbour/Wongawilli/Inner Harbour
Train numbers between 31 to 40	Allocated to Freightliner Australia
Train numbers between 41 to 49	Allocated to Pacific National Flexible, Conditional or ex stow services
Train numbers between 51 to 63	Allocated to Aurizon for Services to / from Inner Harbour and to / from Port Kembla
Train numbers between 64 to 99	Allocated to Pacific National Timetabled / Mandatory services

Table 60 – Train numbering for coal trains (South and West) – 4th character – loaded status

AANN – 4th character	Loaded / empty status
0, 2, 4, 6, 8 (even numbers)	Loaded trains
1, 3, 5, 7, 9 (odd numbers)	Empty trains

7.10. Coal trains – (North) (in conjunction with ARTC)

Table 61, Table 62 and Table 63 explain the numbering for coal trains in the north. The 3 tables should be read together in conjunction with one another.

The train numbering of flexible paths (non-operational coal paths published in the Standard Working Timetable for network ad hoc path availability and planning purposes) shall use “- -” as the 1st and 2nd character and a 001 to 999 number as the 3rd, 4th and 5th character. An even (odd) 5th character shall be assigned to a loaded (empty) service.

Table 61 – Train numbering for coal trains (North) – 1st and 2nd characters

AAANN – 1st and 2nd character	Load/unload point describers	AAANN – 1st and 2nd character	Load/unload point describers
AH	Ashton	MR	Moolarben
AU	Austar	MT	Mt Thorley Bin 2
BC	Bulga Coal	MW	Warkworth Bin 2
BF	Bloomfield	NA	Donaldson
BG	Bengalla	NB	Narrabri
BK	Dartbrook	ND	Newdell
BO	Boggabri	NM	Macquarie Generation
BW	Mt Arthur	NW	Newstan
CW	Camberwell	PW	Port Waratah
DU	Duralie	RB	Muswellbrook
ER	Eraring	RC	Rixs Creek
GD	Gunnedah	RM	Cumnock
HV	Hunter Valley	RV	Ravensworth
JU	Wambo/United	RY	Drayton
JW	Wambo/Jerrys Plains	SD	Southland
KC	Kooragang	SF	Stratford
LD	Liddell	TB	Teralba
MD	BHP Morandoo	UL	Ulan
MO	Mt Owen	VP	Vales Point
MB	Wambo Bin 2	WC	Werris Creek
MG	United Coal Bin 2	WG	Wilpinjong
MK	Bins 1 & Bin 2	WH	Whitehaven
ML	Lemington Bin 2	WK	Warkworth Bin 1
MN	Mangoola	WS	Walsh Point

Table 62 – Train numbering for coal trains (North) – 3rd and 4th characters

AANNN- 3rd and 4th character	Sequential order of daily departure from the originating location (numbers allocated to)
100/200/300 Series	Services from Hunter Terminals to the Hunter Valley and return (ARTC)
400 - 419	One Rail Australia for services operating to/from Newstan/Eraring/Vales Pt
420 - 439	Aurizon for services operating to/from Newstan/Eraring/Vales Pt
440 - 449	Pacific National for services operating to / from Newstan
450 – 469	Southern Shorthaul Railroad for services operating to / from Newstan
470 – 489	Pacific National for services operating to / from Eraring
490 – 499	Pacific National for services operating to / from Vales Point
500 Series	Stratford export services (A.R.T.C.)
600 Series	Duralie services (A.R.T.C.)
700 Series	Macquarie Generation services (A.R.T.C.)
800 – 810	QUBE Logistics Rail for services operating to / from Hunter Valley locations
821 – 850	Pacific National for domestic services operating to Vales Point (loading at Teralba)

Table 63 – Train numbering for coal trains (North) – 5th character

AANNN – 5th character	Loaded / empty status
0, 2, 4, 6, 8 (even numbers)	Loaded trains
1, 3, 5, 7, 9 (odd numbers)	Empty trains

7.11. Light locomotives

A light locomotive can run either alone or in association with a particular train.

Train numbering for light locomotives (in general) is given in Table 64 and Table 65 and in Section 7.11.1 to Section 7.11.4.

Table 64 – Train numbering for light locomotives – 1st character

AADD – 1st character	Locomotive type
D	Diesel locomotive
X	Electric #
Z	Steam (see Section 7.11.3)

Light locomotive movements comprising mixed locomotives that include ELECTRIC locomotive(s) are to use the letter 'X' to avoid the possibility of electric locomotive being turned onto unwired roads, or sections of track from which the current has been removed. This will apply with the pantographs in the raised or lowered positions.

Table 65 – Train numbering for light locomotives – 2nd character

ADDD – 2nd character	Identifies the district that the locomotive originated from or runs in *
1	Sydney
2	Goulburn

ADDD – 2nd character	Identifies the district that the locomotive originated from or runs in *
3	Junee
4	Newcastle
5	Werris Creek
6	Grafton
7	Lithgow – Merrygoen
8	Orange
9	Illawarra

* The 2nd character identifies the district that the locomotive originated from or runs in, see Train numbering district map on page 134.

7.11.1. Light locomotives – Non associated movements

When a light locomotive is not associated with any particular train, the last 3 characters, (following D, X or Z) will be as per the allocation for the Operator concerned as depicted under Section 7.6 Intrastate trains for the area concerned on page 117 of this Section.

7.11.2. Light locomotives – Associated movements

Light locomotive association can happen in any of the following cases:

- when the locomotive having been rostered to work a particular train, is now going to or from that train, the light locomotive uses the last 3 alpha / numeric characters of the train that it is going onto or coming off
- when the locomotive is using a path that has been assigned to a cancelled train, the light locomotive will use the last three alpha / numeric characters of that cancelled train
- when the locomotive is taken off a train to assist another train, the light locomotive movement would retain the last three alpha / numeric characters of the train it came off
- when an unassigned locomotive is sent to assist or to bank/pilot a train, the light locomotive will use the last three alpha / numeric characters of the train it is sent out to assist or bank

7.11.3. Light locomotives – Steam

For light locomotives (steam), refer to Section 7.5 Light locomotives – heritage operators, page 116.

7.11.4. Light locomotives – Illawarra area bounded by Port Kembla / Inner Harbour – non associated movements

These locomotives operate in the area bounded by Port Kembla Inner Harbour, Wollongong, Port Kembla North, Coniston and Unanderra. Light Locomotives falling under this category are allocated the series D921 to D940 inclusive and are not to be used for any other service.

7.12. Light locomotives between Woodville Junction – Cardiff Workshops – Woodville Junction

Train numbering for light locomotives between Woodville Junction and Cardiff Workshops is given in Table 66.

Table 66 – Train numbering – light locomotives between Woodville Junction – Cardiff Workshops – Woodville Junction

Train numbering range	Allocated to
D400 – D409	Sydney Trains
D410 – D419	QUBE Logistics Rail
D420 – D429	Pacific National
D430 – D439	3801 Limited
D440 – D449	QUBE Logistics Rail
D450 – D459	Aurizon
D460 – D469	QUBE Logistics Rail
D470 – D479	Southern Shorthaul Railroad
D480 – D489	Freightliner Australia
D490 – D499	Sydney Rail Services

7.13. Trip trains Sydney area bounded by Botany / Minto / Clyde Yard and Yennora

NOTE: Light locomotives operating in lieu of a Trip Train will have the letter 'D' in lieu of the Trip Train 'T'. For example, T218 operating as a light locomotive will be allocated D218.

Train numbering for trip trains in the Sydney area bounded by Botany / Minto / Clyde Yard and Yennora are given in Table 67.

Table 67 – Train numbering – Trip trains Sydney area bounded by Botany / Minto / Clyde Yard and Yennora

Train numbering range	Allocated to	Details
D100 to D103	Pacific National	Enfield Yard shunter
T104 to T109	Pacific National	
T110 to T113	3801 Ltd	
T114 to T119	Sydney Trains	Spare / Not allocated
T120 to T125	Aurizon	
T126 to T129	Sydney Trains	Spare / Not allocated
T130 to T159	Pacific National	
T160 to T169	Sydney Trains	Spare / Not allocated
T170 to T179	Southern Shorthaul Railroad	
T180 to T194	Sydney Trains Metropolitan transfers	
D195 to D200	Sydney Trains	Loco Testing
D201 to D216	Sydney Trains	Works programmes

Train numbering range	Allocated to	Details
T220 to T229	Freightliner Australia	
T230 to T240	QUBE Logistics Rail	
T241 to T244	Sydney Trains	Spare / Not allocated
T245 to T269	QUBE Logistics Rail	
T270 to T279	Southern Shorthaul Railroad	
T280 to T289	QUBE Logistics Rail	
T290 to T299	Sydney Rail Services	

7.14. Trip trains Newcastle area bounded by Woodville Junction / Broadmeadow / Sulphide Junction

Train numbering for trip trains in the Newcastle area bounded by Woodville Junction / Broadmeadow / Sulphide Junction are given in Table 68.

Table 68 – Train numbering – Trip Trains Newcastle area bounded by Woodville Junction / Broadmeadow / Sulphide Junction

Train numbering range	Allocated to
T400 – T409	Sydney Trains
T410 – T419	QUBE Logistics Rail
T420 – T429	Pacific National
T430 – T439	3801 Limited
T440 – T449	QUBE Logistics Rail
T450 – T459	Aurizon
T460 – T469	QUBE Logistics Rail
T470 – T479	Southern Shorthaul Railroad
T480 – T489	Freightliner Australia
T490 – T499	Sydney Rail Services

7.15. Trip trains Illawarra area bounded by Port Kembla / Inner Harbour

Train numbering for trip in the Illawarra area bounded by Port Kembla / Inner Harbour are given in Table 71.

Table 69 – Train numbering – Trip trains Illawarra bounded by Port Kembla / Inner Harbour

Train numbering range	Allocated to
T900 – T919	Pacific National
T920 – T939	WATCO WA Rail
T940 – T949	QUBE Logistic Rail
T951 – T959	Aurizon

T960 – T969	QUBE Logistic Rail
-------------	--------------------

7.16. Maintenance trains – TfNSW Metropolitan Heavy Rail network area

Train numbering for maintenance trains in the TfNSW Metropolitan Heavy Rail network area are given in Table 70, Table 71 and Table 72.

Table 70 – Train numbering – Maintenance trains – TfNSW Metropolitan Heavy Rail network area – 1st character

ANNN – 1st character	Train type
M	Maintenance train
E	Maintenance train – Electric locomotive hauled

Table 71 – Train numbering – Maintenance trains – TfNSW Metropolitan Heavy Rail network area – 2nd character

ANN – 2nd character	Work district or originating location
- 1 - -	Metropolitan Goods Line
- 2 - -	North Shore, Central to Hornsby.
- 3 - -	West beyond Parramatta
- 4 - -	Illawarra – Redfern to Cronulla, Waterfall and Eastern Suburbs
- 5 - -	South beyond Lidcombe and Granville, Bankstown & East Hills lines
- 6 - -	Illawarra beyond Waterfall
- 7 - -	Suburban, Circular Quay to Parramatta and Carlingford/Sandown
- 8 - -	North beyond North Strathfield Junction
- 9 - -	Spare
- 0 - -	Not used

Table 72 – Train numbering – Maintenance trains – TfNSW Metropolitan Heavy Rail network area – 3rd character

ANN – 3rd character	Specific type of train
- - 1 -	Overhead wiring train
- - 2 -	Metal Ballast
- - 3 -	Metal Ballast
- - 4 -	Material/spoil train
- - 5 -	Material/spoil train
- - 6 -	Material/spoil train
- - 7 -	Track maintenance vehicle, Hi Rails ##
- - 8 -	Track Recording car ##, Profile train, Speno
- - 9 -	Herbicide #
- - 0 -	Sydney Trains Rail sets

To operate under block working conditions when operated by Hi rail vehicle.

To operate under block working conditions unless vehicle has note T3 as per
Section 11 On-track infrastructure maintenance vehicle data (page 269)

Table 73 – Train numbering – Maintenance trains – TfNSW Metropolitan Heavy Rail network area – 4th character

ANNN – 4th character	Character detail
0 – 9	Serial number of the train

7.17. Maintenance trains – ARTC and CRN area

Train numbering for maintenance trains in the ARTC and CRN area are given in this section.

Table 74 – Train numbering – Maintenance trains – ARTC and CRN area – 1st character

NANN – 1st character	Work district for country trains *
1 - - -	Sydney
2 - - -	Goulburn
3 - - -	Junee
4 - - -	Newcastle
5 - - -	Werris Creek
6 - - -	Grafton
7 - - -	Lithgow – Merrygoen
8 - - -	Orange
9 - - -	Illawarra

* See Train numbering district map on page 134.

Table 75 – Train numbering – Maintenance trains – ARTC and CRN area – 2nd character

NANN – 2nd character	Character detail
- M - -	Indicates maintenance train

Table 76 – Train numbering – Maintenance trains – ARTC and CRN area – 3rd character

NANN – 3rd character	The specific type of train
- - 1 -	Not used
- - 2 -	Ballast
- - 3 -	Ballast
- - 4 -	Rail train
- - 5 -	Sleeper train
- - 6 -	Spare
- - 7 -	Track maintenance vehicle / rail grinders ##
- - 8 -	Test vehicles (e.g. Track Recording car ##, Profile train)
- - 9 -	Herbicide #
- - 0 -	Not used

To operate under block working conditions when operated by Hi rail vehicle.

To operate under block working conditions unless vehicle has note T3 as per
Section 11 On-track infrastructure maintenance vehicle data (page 269)

Table 77 – Train numbering – Maintenance trains – ARTC and CRN area – 4th character

NANN – 4th character	Character detail
0 – 9	Serial number of the train

7.18. AK track inspection cars

Train numbering for AK track inspection cars are given in this section.

Table 78 – Train numbering – AK track inspection cars – 1st character

AANN – 1st character	Direction
S - - -	South
W - - -	West
N - - -	North
C - - -	Illawarra
H - - -	Suburban area (Bounded by Berowra, Emu Plains, Macarthur, Helensburgh)

Table 79 – Train numbering – AK track inspection cars – 2nd character

AANN – 2nd character	Train type
- K - -	AK track inspection cars

Table 80 – Train numbering – AK track inspection cars – 3rd character

AANN – 3rd character	Character detail
1 – 9	-

Table 81 – Train numbering – AK track inspection cars – 4th character

AANN – 4th character	Direction
2, 4, 6, 8 (even numbers)	Up trains
1, 3, 5, 7, 9 (odd numbers)	Down trains

7.19. Mechanised track inspection

Train numbering for mechanised track inspection cars are given in this section.

Table 82 – Train numbering – Mechanised track inspection – 1st character

AANN – 1st character	Direction
S - - -	South
W - - -	West
N - - -	North
C - - -	Illawarra

AANN – 1st character	Direction
H - - -	Suburban area (Bounded by Berowra, Emu Plains, Macarthur, Helensburgh)

Table 83 – Train numbering – Mechanised track inspection – 2nd character

AANN – 2nd character	Train type
- M - -	Mechanised track inspection cars

Table 84 – Train numbering – AK track inspection cars – 3rd character

AANN – 3rd character	Character detail
1 – 9	-

Table 85 – Train numbering – Mechanised track inspection – 4th character

AANN – 4th character	Direction
2, 4, 6, 8 (even numbers)	Up trains
1, 3, 5, 7, 9 (odd numbers)	Down trains

7.20. Train numbering district map

Figure 10 shows the train numbering district map.

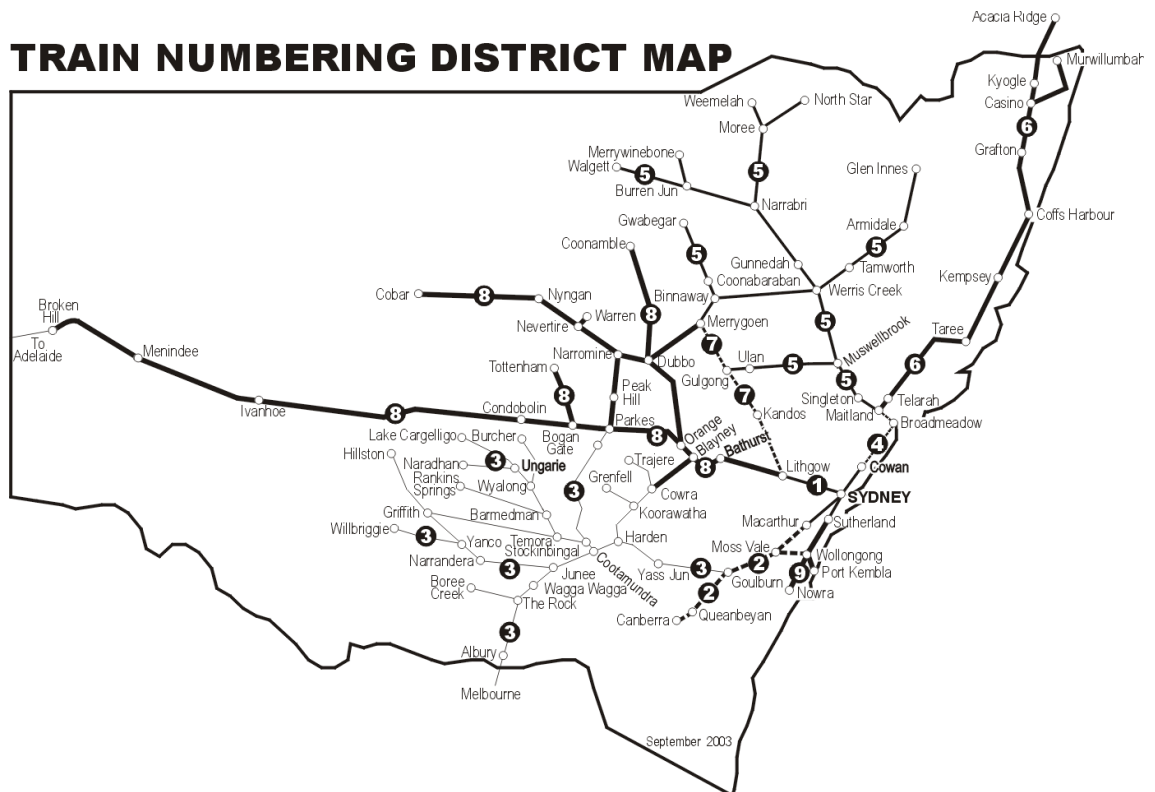


Figure 10 – Train numbering district map

7.21. Digital Systems Program (DSP) Traffic Management System (TMS) train numbering

7.21.1. Traffic Management System non-timetabled train numbers

The following train number range is reserved for the exclusive use of the Digital Systems Program (DSP) Traffic Management System (TMS). No train numbers within the range is available to be used by any other system including SWTT and DWTT.

The reserved number range is a 5-character alpha numeric range: XX000 – XX999

The TMS system will use train numbers in this range to map non-timetabled train numbers that are presented by ATRICS (or any other controlled system) to TMS at a defined controlled border, such as ATRICS-TMS controlled boarder.

7.21.2. Traffic Management System backup outage numbering

The following numbering system will be used exclusively for Traffic Management System (TMS) to provide a heartbeat function to the TLS system and to inform the TLS users of a TMS outage.

These Trip ID's must not be used by any other systems including the SWTT or the DWTT.

The numbering system is defined as a 5-character Trip ID: 'XXX'AA

Where, the first 3 characters are fixed 'XXX', and the last 2 characters are alphabetical or numerical and indexed as required, from XXX00 to XXXZZ.

Section 8
Disabled trains
and
defective vehicles

8. Disabled trains and defective vehicles

Version December 2023

8.1. Disabled trains and defective vehicles

This Section is to be read in conjunction with Sydney Trains Network Rules NTR 414 *Defective vehicles* and NTR 416 *Disabled rail traffic*.

When any train suffers a partial or complete failure such that it cannot complete its journey under its own power, it is classified as a disabled train.

When a vehicle on a train, including a locomotive, becomes defective, the vehicle shall be repaired, made safe to travel, or removed from the train.

8.2. Removing a disabled train

Unless it is an emergency, before an assisting locomotive or train is used to rescue a disabled train, the *Operator's representative* of the assisting and disabled trains shall be consulted to determine if there are any specific operating instructions and/or restrictions that shall be adhered to, to affect safely the rescue of the train. The following instructions/restrictions shall be used as a guide in rescuing some specific train types.

For any disabled train that needs to be assisted by another train or locomotive(s) to clear the section, the Operator's representative shall ensure it is safe to travel before being assisted from a section. If the disabled train is amalgamated with a similar type of train or locomotive(s), normal operating procedures will apply.

Most diesel and medium electric multiple unit trains are fitted with combined multi-function couplers that are incompatible with conventional full size knuckle type automatic couplers. Some vehicles are equipped with emergency couplers to enable them to be coupled to a locomotive or train.

The Operator's representatives shall be consulted regarding coupling of different types of trains.

8.2.1. Removing a disabled train – Disabled self propelled passenger trains

The Operator's representatives shall be consulted before assisting a disabled electric or diesel multiple unit train or vehicle.

The air brake system, where compatible, shall be connected and working throughout the entire train. The driver at the front of the train should have full control of the *automatic air brake* and be in radio contact with the driver of the assisting train or locomotive.

8.2.2. Removing a disabled train – Disabled locomotive hauled freight and passenger trains

If the air brake is compatible, it shall be connected and working throughout the entire train. The driver at the front of the train should have full control of the automatic air brake and be in radio contact with the driver of the assisting train or locomotive.

If a train has been divided, had vehicles detached or remarshalled, a brake pipe continuity test shall be carried out.

If one or more of the last three vehicles have been changed then a brake holding test shall also be carried out. On freight trains, the *end of train marker* (EOTM) shall be relocated to the last vehicle.



WARNING

When coupling to vehicles fitted with buffers, gangway beams, diaphragms, etc., care shall be taken to ensure that there is adequate clearance between these items and brake coupling cocks.

8.3. Assisting with a passenger train

When a train is assisted by a self-propelled passenger train, restrictions will apply depending upon the type of train that is assisting and the load of the disabled train. When emergency couplers are used to enable different types of trains to be coupled together, speed and other restrictions will apply.

The Operator's representatives shall be consulted before assisting a disabled train with an electric or diesel multiple unit train.

When an electric multiple unit train is attempting to assist a disabled train and the disabled train has not moved after applying maximum power for five seconds, the driver shall shut off power and wait two minutes before re-applying power. If, after three attempts, the assisting train is unable to move the disabled train, alternative arrangements shall be made.

An XPT train shall not be used to assist any other train in the rear.

8.4. Assisting a disabled train from the rear

When assisting a disabled train from the rear, refer to Sydney Trains Network Rule NTR 416 *Disabled rail traffic*.

An XPT train shall not be used to assist a disabled train from the rear.

8.4.1. Assisting a disabled train from the rear – Assisting a disabled passenger train from the rear

The Operator's representatives shall be consulted before assisting a disabled electric or diesel multiple unit train from the rear.

Before a **vintage, historical or steam hauled train** is assisted from the rear, such a movement shall be authorised by the Operator and the Track Access Provider.

A disabled **locomotive hauled passenger train** (except XPT power cars) shall only be assisted in the rear to the first suitable location where the train can be remarshalled to allow it to be hauled.

An XPT train shall not be assisted in the rear using an emergency coupler at the rear of the power car.

When assisting a disabled passenger train from the rear with one or more locomotives, or with a locomotive hauled train, refer to the TOC manual **General Instruction Pages, Section 2, Locomotive Operations**, Assisting (banking) locomotives (page 41) for restrictions in vehicle masses.

8.4.2. Assisting a disabled train from the rear – Maximum speed when assisting a disabled train from the rear

When a disabled train is being assisted from the rear and the driver at the front of the train has full control of the automatic air brake of both the assisting and disabled trains, the train may travel at normal speed, providing there are no other restrictions applying to the vehicles on the train and/or emergency couplers are not being used.

When a disabled train is being assisted from the rear and the driver at the front is only able to operate the *emergency cock* at the front of the train, or an emergency coupler is being used to couple the two trains, the maximum speed shall not exceed **25 km/h**.

When a disabled train is being assisted from the rear and the automatic air brake of both the assisting and disabled trains is controlled by the driver of the assisting train only, that is the driver at the front of the train cannot control the air brake or operate the emergency cock, the speed of the train shall not exceed **10 km/h**. There shall be full radio communication between the drivers of both trains. If full radio communication between the drivers of both trains is not available, then the assisting movement **shall not** proceed.

When an electric or diesel multiple unit train is being assisted from the rear by a locomotive hauled train, the speed of the train shall not exceed **25 km/h**.

8.5. Assisting a disabled train from the front

A disabled train may be hauled from the section by attaching the assisting train or locomotive(s) at the front of the disabled train in the direction of travel. The draw strength of any vehicle in the combined train consist shall not be exceeded.

8.5.1. Assisting a disabled train from the front – Hauling a disabled passenger train

Wherever possible, a disabled **vintage, historical or steam hauled train** should be hauled rather than assisted in the rear from a section.

8.5.2. **Assisting a disabled train from the front – Maximum speed when hauling a disabled train**

When a disabled train is being hauled and the driver at the front of the train has full control of the automatic air brake of both the assisting and disabled trains, emergency couplers are not being used **and** when no other restrictions apply to any of the vehicles on the train, the train may travel at normal speed.

8.6. **Using an emergency coupler**

Some train types are not fitted with a conventional knuckle type automatic coupler, but are equipped with an emergency coupler that will enable the train to couple to other types of vehicles with conventional type automatic couplers. Trains requiring emergency couplers include Tangara, Millennium, OSC, Waratah, Waratah Series 2 (SGT), Mariyung (NIF), XPT, Xplorer, Endeavour, Hunter, and other self-propelled diesel trains.

When using an emergency coupler, refer to Sydney Trains Network Rule NTR 416 *Disabled rail traffic*.

The Operator's representatives shall be consulted before assisting a disabled train using an emergency coupler.

For all trains, **except XPT Trains**, when coupled using an emergency coupler, the speed of the train shall not exceed **25 km/h**.

8.6.1. **Using an emergency coupler – XPT Trains**

XPT train consists comprising of up to two power cars and up to seven trailer cars may be locomotive hauled up to the maximum speed authorised for the hauling locomotive, and not exceeding the permissible normal track speed.

The operating conditions specified below shall apply.

XPT trains shall not be assisted from the rear with an emergency coupler.

8.6.2. **Using an emergency coupler – Operating conditions when using emergency couplers**

A suitable locomotive shall be used to haul the consist.

The brake pipe shall be continuous throughout the train.

When using an emergency coupler, the automatic air brake shall be used at all times. The following equipment shall not be used: locomotive independent brake (including independent release), dynamic or regenerative brake, or electro-pneumatic (EP) brake.

Where possible when assisting a disabled multiple unit train, the brake pipe pressure of the locomotive on the assisting train should be reduced to a pressure compatible with that of the disabled train.

Due to weight restrictions and manual handling requirements, the strength of an emergency coupler is limited. The driver of the assisting train shall limit the amount of tractive effort required to move the train in order to minimise impacts or unnecessary force through the emergency coupler.



WARNING:

Care shall be taken when coupling trains with emergency couplers to vehicles that are fitted with buffers, broad buffer beams, or diaphragm plates. These vehicles shall not be coupled together unless there is adequate clearance around the emergency coupler to accommodate coupler swing on tight curves.

When an emergency coupler is used to assist a train in the rear, the train shall only be assisted to the first suitable location where the train can be remarshalled or the vehicle detached.

8.6.3. Using heavy duty transition couplers for electric multiple unit passenger rolling stock (transfer only)

When locomotive hauling EMU type passenger rolling stock, such as Tangara, Millennium, OSC, Waratah, Waratah Series 2 (SGT), Mariyung (NIF) with a heavy duty transition coupler (Scharfenberg adaptor coupler model 2.010.515), for transfer purposes only (out of service and not associated with a disabled train), the 25 km/h speed restriction does not apply and the normal/general speed boards for the hauling locomotive may be observed.

All other requirements for hauling passenger trains with emergency couplers shall be observed.

8.7. Assisting disabled track maintenance vehicles

A locomotive or train may be used to assist a disabled track maintenance vehicle using an approved towing device, emergency coupler, or automatic couplers. A disabled track maintenance vehicle may be assisted in the rear by a locomotive or train fitted with a compatible coupler.

Where possible, the disabled vehicle shall have main reservoir air supply, and have an operable emergency parking brake.

8.8. Defective air brake

This clause is to be read in conjunction with Sydney Trains Network Rule NTR 404 *Using brakes*.

The air brake should be operational on every vehicle of a train. However, whilst in service, it is permissible to cut out a certain number of brakes on a train as detailed below.

The brake pipe shall be continuous throughout the train consist and all intermediate brake pipe coupling cocks open.

The air brake on a vehicle or bogie shall only be cut out where it is not practical to repair the vehicle in situ.

If the brakes are cut-out, the vehicle shall be appropriately identified or ticketed. The Operator shall ensure that train operating personnel and maintenance personnel are informed of any brake cut-outs.

8.8.1. Defective air brake – Locomotive hauled trains

The maximum number of vehicles with inoperative or cut-out air brakes (including locomotives) in a train shall not exceed 1 in 10 vehicles and the total un-braked mass of the train with inoperative brakes or brake cut-outs (including locomotives) shall not exceed 10% of the train hauled mass, whichever is the more restrictive.

The leading locomotive shall have an operative air brake on at least one bogie. If the air brake on one bogie of a locomotive is cut-out, then the un-braked mass of that vehicle is half the locomotive mass.

If a train suffers inoperative brakes or requires cutting-out of brakes during the course of a journey, this can be accommodated up to the above limiting figures.

If the inoperative brakes or brake cut-outs exceeds 1 in 10 vehicles or 10% mass, the train speed shall be reduced by 10 km/h from the normal operating speeds until the destination, at which point brakes shall be corrected to provide the required number of vehicles with operable brakes.

If the train is identified with inoperable brakes or brake cut-outs exceeding 1 in 6.67 vehicles or 15% mass, whichever is the more restrictive, the speed will be reduced by 10km/h from the normal operating speeds and the speed not to exceed a maximum of 50 km/h until the next available siding, road, or loop, at which point brakes shall be corrected to provide the required number of vehicles with operable brakes.

It is recommended trains do not begin journeys with more than 5% brakes inoperative or cut-out to allow for defective brakes during the course of a journey. Trains shall not begin any journeys with greater than 10% of brakes inoperative or cut-out.

Vehicles with inoperative or cut-out air brakes shall be repaired as soon as practicable. In practice, vehicles with inoperative brakes shall be corrected at the next scheduled maintenance opportunity, in accordance with the operator's maintenance plan, after identification (or advice from TfNSW). If the brakes are not corrected at the next scheduled maintenance opportunity the vehicles should be removed from service.

8.8.2. Defective air brake – Freight trains

For multi-pack vehicles, the number of cut-out vehicles is equal to the number of vehicles/platforms/decks that is controlled from the inoperative or cut-out triple valve.

For example: A 5-pack articulated vehicle has two triple valves. Each triple valve controls the brakes on three bogies, that is, 2½ platforms. If one triple valve is cut-out, this is counted as two and a half vehicles with brake cut-outs.

On vehicles with shared brake equipment, that is, Master or slave combination, if the triple valve is cut-out on the master vehicle this will count as two vehicles with brake cut-outs.

A freight train should be marshalled such that a vehicle with an operative air brake is placed on each side of an un-braked vehicle where an un-braked vehicle shall not be one of the last three vehicles on the train.

If the brakes on one of the last three vehicles on the train is found to be inoperative or has to be cut-out enroute, the train may continue at a maximum speed of 50 km/h to the first suitable location where the train shall be remarshalled, the defective vehicle repaired or detached. In addition, if the vehicle with defective brakes is the last vehicle on the train, an emergency towing chain shall be attached between the last and second last vehicles.

8.8.3. Defective air brake – Freight trains – with ECP brakes

All ECP braked trains shall be operated in the 'run' or 'normal' operating mode when travelling across the Rail Network

An 'emulation' mode may be possible in the event of ECP brake system failure, due to failures on the locomotive or wagon, or when changing the locomotive to a non ECP locomotive, the brake system may operate in the 'emulation' mode (having graduated application and direct release). The 'emulation' mode is to be used as an emergency recovery only and limited to a maximum speed of 30 km/h. Note, that the 'emulation' mode is limited by battery life. If in doubt, the train is assumed to have a defective air brake system (emergency brakes only).

Any vehicles or platforms with defective ECP brake systems are assumed to have a defective air brake and trains containing these are to be restricted in the same manner as pneumatically braked trains

8.8.4. Defective air brake – Locomotive hauled passenger trains

A locomotive hauled passenger train shall not leave a maintenance centre or depot with any air brake inoperative or brakes cut out.

If a defect occurs on the last vehicle of a passenger train and the vehicle is conveying passengers, the passengers shall be relocated to other cars, and a qualified worker shall travel in the last vehicle, and be prepared to apply the handbrake or spring parking brake. The train may travel up to a maximum speed of 25 km/h to the first suitable location where the train shall be remarshalled or the defective vehicle repaired or detached.

If the brakes on one of the second or third last vehicle on the train is found to be inoperative or has to be cut-out enroute, the train may continue at a maximum speed of 50 km/h to the first suitable location where the train shall be remarshalled, the defective vehicle repaired or detached.

If the last vehicle is a freight vehicle, an emergency towing chain shall be attached between the last and second last vehicles and the train proceed at a speed not exceeding 50 km/h.

8.8.5. Defective air brake – Diesel multiple unit and XPT type trains

A diesel multiple unit or XPT train shall not leave a maintenance centre with any air brake inoperative.

If a brake fault occurs enroute, a train may continue in service at normal speed provided not more than one bogie in eight bogies is cut-out and no two bogies on either end car are cut out.

Operating restrictions for diesel multiple unit and XPT type trains with defective air brakes are given in Table 86.

Table 86 – Defective air brake – Diesel multiple unit and XPT type trains

Number of bogies cut-out	Operating restrictions
One bogie in eight (12.5%) or less	No restriction, operate normally
More than one bogie in eight (12.5%), but no more than one bogie in four (25%)	Maximum speed of 80 km/h
More than one bogie in four (25%), but not more than three bogies in eight (38%)	The train shall be worked out of service at a speed not exceeding 25 km/h
More than three bogies in eight (38%)	the train shall be considered as disabled, and shall not be moved until it has been attached to another train or locomotive
Both bogies on a terminal car of the train consist are cut out.	The train shall be considered as disabled, and shall not be moved until it has been attached to another train or locomotive

Note: For the purposes of calculating brake cut-outs, an XPT power car bogie will be treated as being equivalent to two (2) trailer car bogies.

For example, an XPT train consisting of two power cars and five trailer cars would count as having four power car bogies (equal to eight (8) trailer car bogies) plus ten trailer car bogies. The total equivalent bogies would be eighteen bogies.

One power car bogie and one trailer car bogie cut out would count as 3 equivalent bogies, that is 3 in 18 or (17%). This train may continue in service at 80 km/h.

If one power car bogie and four trailer car bogies are cut out (2x1 plus 4 = 6 out of 18 bogies = 33%), the train shall be worked out of service at a speed not exceeding 25 km/h.

If a failure of the electro-pneumatic brake system occurs, and the defect cannot be repaired, the EP brake shall be switched off and the automatic air brake (XPT, Xplorer, Endeavour, or Hunter) or straight air brake (other diesel multiple unit trains) used to control the train.

If a failure also occurs in the straight air brake system and the defect cannot be repaired (diesel multiple unit trains), the train shall be worked out of service at a maximum speed of 25 km/h using the brake pipe emergency cock as an emergency brake.

8.8.6. Defective air brake – Electric multiple unit trains

An electric multiple unit train shall not leave a maintenance centre with any air brake inoperative.

If a brake fault occurs enroute, a train may continue in service at normal speed provided not more than one bogie in eight bogies is cut-out and no two bogies on either end car are cut out.

Operating restrictions for electric multiple unit trains with defective air brakes are given in Table 87.

Table 87 – Defective air brake – Electric Multiple Unit (EMU) trains

Number of bogies cut-out	Operating restrictions
One bogie in eight (12.5%) or less	No restriction, operate normally
More than one bogie in eight (12.5%), but no more than one bogie in four (25%)	Maximum speed of 80 km/h
More than one bogie in four (25%), but not more than three bogies in eight (38%)	The train shall be worked out of service at a speed not exceeding 25 km/h
More than three bogies in eight (38%)	the train shall be considered as disabled, and shall not be moved until it has been attached to another train or locomotive
Both bogies on a terminal car of the train consist are cut out.	The train shall be considered as disabled, and shall not be moved until it has been attached to another train or locomotive

If a failure of the electro-pneumatic brake system occurs, and the defect cannot be repaired, the EP brake shall be switched off and the automatic air brake used to control the train.

8.8.7. Defective air brake – Braking problems when descending steep grades

Where a driver has difficulty in recharging the brake pipe on a train, the train shall be brought to a stand before releasing the brakes.

Where the vehicles in the train are fitted with grade control valves, these valves shall be placed in the next holding position before proceeding. If valves are in 'EX' they shall be placed in 'IP', if in 'IP' they shall be placed in 'HP'.

If there is any doubt with regard to the braking performance of the train, the train is not to proceed. The train shall be brought to a stand, the handbrakes applied and assistance sought.

8.8.8. Defective air brake – Locomotives

Where a locomotive has an automatic air brake fault that prevents the operation of the automatic air brake throughout the train, the train shall have the handbrakes applied and the defective brake valve shall be cut-out. The train shall be assisted out of the section in accordance with Sydney Trains Network Rule NTR 416 *Disabled rail traffic*.

8.9. Defective brake pipe

Where the brake pipe on a vehicle is broken and brake pipe pressure cannot be maintained for the operation of the automatic air brake, the disabled train shall be removed from the section either with the assistance of another train or by dividing the train. The defective vehicle shall be detached from the train at the first suitable location.

8.9.1. Defective brake pipe – Locomotive hauled freight and passenger trains

When assisting a train with a defective brake pipe from the rear, the adjacent brake pipe *coupling cocks* on the two vehicles either side of the defective vehicle shall be closed. The train shall then be worked at a speed not exceeding **25 km/h** to the first suitable location where the defective vehicle can be detached or repaired.

Where the disabled train is conveying passengers and the defective vehicle cannot be detached, they shall be detrained at the first suitable location.

Where the disabled train is to be divided, the defective vehicle becomes the last vehicle on the train. The brake pipe coupling cock on the rear of the second last vehicle shall be closed and the air brake on the defective vehicle released. An emergency towing chain shall be used between the defective vehicle and the second last vehicle.

Where a disabled passenger train has to be divided, all passengers shall be moved into cars in front of the defective vehicle. A Passenger Train Guard or qualified worker shall travel in the last car and be prepared to apply the internal handbrake or spring parking brake. Effective communication shall be maintained between the qualified worker and the train crew.

8.9.2. Defective brake pipe – Electric or diesel multiple unit trains

Where the defective vehicle is either the leading or rear car, and the hand brake or all spring parking brakes do not operate on that car, then the train is a total failure and shall only be moved with the assistance of a locomotive or another train.

Where the defective vehicle cannot be detached, all passengers shall be detrained at the next suitable location. The train shall then be worked out of service.

This type of train usually has a main reservoir pipe and therefore the train may complete its trip providing the electro-pneumatic (EP) brake is working on the entire train. In the event of an EP brake failure, the driver shall operate the train from the end that will give control of the automatic brake on the greatest number of cars. The Passenger Train Guard or qualified worker shall ride in the end car at the opposite end of the train and be prepared to apply the automatic air brake, handbrake, or spring parking brake when requested by the driver.

The speed of the train shall not exceed **25 km/h**.

Where the disabled train is to be divided, the defective vehicle becomes the last vehicle on the train. The brake pipe coupling cock on the rear of the second last vehicle shall be closed and

the air brake on the defective vehicle released. An emergency towing chain shall be used between the defective vehicle and the second last vehicle.

8.10. Defective main reservoir pipe on passenger trains

Where the defective vehicle is either the leading or rear vehicle and the hand brake or spring parking brake does not operate on that vehicle, then the train is a total failure and shall only be moved with the assistance of a locomotive or another train.

Where the defective vehicle is either the leading or rear vehicle, and has a working handbrake, then the train can continue as normal and be worked out of service.

Vehicle air springs, where fitted, are supplied from the main reservoir pipe. In the event of a main reservoir supply failure, one or more air springs may deflate and may have to be isolated. Refer to Defective air springs (page 147) for operating conditions:

Trains with the complete vehicle main reservoir pipe isolated and with no air in the bogie air springs, but the brake pipe is continuous throughout the train, may travel at a normal speed but in accordance with that permitted for defective air springs.

8.11. Defective air springs

Where an electric or diesel multiple unit train has a defective air spring on one bogie of one or more cars, the train may continue its journey at a speed as specified in the Operator's procedures.

The train shall then be *worked out of service*.

8.12. Defective handbrake or parking brake

This Section is to be read in conjunction with Sydney Trains Network Rule NTR 404 *Using brakes*.

8.12.1. Defective handbrake or parking brake – Electric and diesel multiple unit trains

Where a defective vehicle is a non-terminal car, the train may continue in service until it returns to a maintenance centre.

Where a defective vehicle is a terminal car, and it has one spring parking brake operable, the train may continue in service until it returns to a maintenance centre.

Where a defective vehicle is a terminal car that is not permanently coupled, and does not have a fully operable handbrake or spring parking brake, the train is considered to be a total failure and therefore may only be moved when attached to an assisting locomotive or train.

Where a defective vehicle is a permanently coupled terminal car with no fully operable handbrake or spring parking brake, the train may continue in service until it returns to a maintenance centre.

Where the spring parking brake or automatic air brake on a vehicle is locked on, the vehicle may be dragged clear of the section with the approval of the owner/operator before the brakes are released and isolated.

8.13. Defective wheels

This Section is to be read in conjunction with Sydney Trains Network Rule NTR 412 *Defective running gear*.

Serious damage can occur to the track when wheels of locomotives or vehicles skid or when scale builds up on the wheel due to sticking brakes. Train crews, shunter/examiners and vehicle maintenance staff shall make every effort to ensure that brakes are utilised or maintained correctly.

Refer to the Transport Standard TS 03976 *Wheel Defect Manual* for full details of wheel defects and actions required by the Operator.

The following information has been extracted from TS 03976.

If a locomotive or vehicle with flat spots (*skidded wheels*) or scale (*scaled wheels*) on its wheels is detected in service, depending on the severity of the case, it may be kept marshalled on a train, provided that the wheels have been inspected and certified fit to run by the Operators representative.

The Operator's representative may be the train driver, the Operator's maintenance personnel, or any other person nominated by the Operator as being suitably qualified to assess the situation.

The locomotive or vehicle shall operate in accordance with the instructions below.

8.13.1. Defective wheels – Precautions


When it is suspected that the wheels have flats or there is a build-up of scale on the wheels on any locomotive or vehicle, the train shall be stopped at the first suitable safe location.

All the wheels on the vehicle in question shall be inspected to determine the extent of the wheel skid or the amount of scale build-up. If the length of the wheel skid is not greater than 100 mm, or the scale build-up is less than 15 mm: the train may be driven at a speed not exceeding that specified below to the nearest suitable location, in order to clear the section and the defective locomotive or vehicle detached.

Maximum permissible speeds for scale build up on defective wheels are given in Table 88.

If there is any doubt as to the class of skid or scale condition, the more severe condition shall be reported.

Table 88 – Defective wheels – Permissible speeds for scale build up on wheels

Scale class	Scale height	Maximum speed
3	Surface scale up to 1 mm	Normal operation after checking brakes
4 (i)	Over 1 mm and up to 5 mm	25 km/h only to clear the section
4 (ii)	Over 5 mm and up to 10 mm	15 km/h only to clear the section
4 (iii)	Over 10 mm and up to 15 mm	5 km/h only to clear the section
5	Over 15 mm	 WARNING: The vehicle shall not be moved until it has been examined, the defect adequately rectified and certified fit to travel by a qualified worker

Notes:


The brakes on any vehicle with the exception of a light locomotive or single self-powered vehicle, which has experienced wheel scale build-up, need to be isolated before the vehicle is allowed to travel.

Once a locomotive or vehicle has been removed from the section because of wheel scale the affected wheels need to be de-scaled to at least the equivalent of a class 3 condition before re-entering traffic.

Vehicles having suffered class 4 or 5 scale build-up need to have all wheel treads and flanges checked by a qualified worker for evidence of thermal cracking, before re-entering traffic. If cracks are detected the appropriate action shall be in accordance with the Operator's maintenance procedures.

Maximum permissible speeds for skid length for defective wheels are given in Table 89.

Table 89 – Defective wheels – Permissible speeds for wheel skid length

Skid class	Length of wheel skid	Maximum speed
1	Single skid less than 25 mm	Normal operation after checking brakes
2	Single skid between 25 mm and 40 mm or multiple class 1 skids on the same wheel	Diesel and electric passenger trains: 115 km/h operation Other trains: 80 km/h operation
3	Single skid between 40 mm and 60 mm or multiple class 2 skids on the same wheel	40 km/h only to clear the section
4	Single skid between 60 mm and 100 mm or multiple class 3 skids on the same wheel	25 km/h only to clear the section
5	One or more skids over 100 mm or multiple class 4 skids on the same wheel.	 WARNING: The vehicle shall not be moved until it has been examined, the defect adequately rectified and certified fit to travel by a qualified worker

Notes:

The qualified worker is a qualified mechanical maintenance person attached to an operator's rolling stock maintenance depot/breakdown crew.

The brakes on any vehicle with the exception of a light locomotive or single self-powered vehicle, which has experienced wheel skid flats, shall be isolated before the vehicle is allowed to travel.

Two or more locomotives with class 3 or 4 skids cannot be operated in multiple when being transferred for wheel turning purposes unless all wheels have been adequately repaired to the equivalent of a class 3 (dressed) condition.

Locomotives with class 3 or 4 skids cannot work a train for the purposes of transfer for wheel turning purposes unless all wheels have been adequately repaired to the equivalent of a class 3 (dressed) condition.

Maximum permissible travel distances and speeds after clearing the track section due to wheel skids are given in Table 90.

Table 90 – Defective Wheels – Permissible travel distances and speeds after clearing the track section due to wheel skids

Skid class	Maximum distance	Maximum speed
Class 3 [dressed]	1000 km	80 km/h
Class 4 [welded & dressed]	1000 km	40 km/h
Class 5 [welded & dressed]	1000 km	40 km/h
Class 3	500 km	25 km/h
Class 4 [dressed]	500 km	25 km/h
Class 4	50 km	25 km/h

Notes:

In the case of class 3 and 4 skids the edges of the skid may be dressed by grinding to reduce the severity of the skid to the next lowest category

In the case of Class 4 and 5 skids the flat may be built up by welding and dressed by grinding to reduce the severity to the equivalent of a Class 3 (dressed) skid.

A speed limit of 40 km/h is applicable to Class 4 and 5 weld repaired skids to ensure against wheel fracture in the weld area.

8.13.2. Defective wheels – Thermal cracks

Thermal cracks are usually transverse, across the wheel tread, and, if allowed to grow without corrective action, can develop to the point where the wheel will fracture.

Many shallow thermal cracks can be removed by machining but extra care shall be used to ensure that the crack has been completely eliminated in the operation. If thermal cracks are found on a wheel, then the vehicle's brake system should be checked for evidence of dragging brakes (sticking brakes).



Warning:

If there is the slightest doubt as to the severity of the Thermal Crack, always report the higher classification. (For example, if the defect description falls between a Class 2 and 3 Thermal Crack, then a Class 3 Thermal Crack would be reported).

Maximum permissible speeds for wheels with thermal cracks are given in Table 91.

Table 91 – Permissible speeds for wheels with thermal cracks

Thermal crack class	Crack length & location	Permissible operation
1	Up to 10 mm long on the tread surface within area 30 mm from wheel gauge face and 12 mm from rim face.	Normal operation after checking brakes
2	Between 10 mm and 30 mm long on the tread surface within area 30 mm from wheel gauge face and 12 mm from rim face	Normal operation after checking brakes. Condition of wheels to be monitored.
3	Between 30 mm and 40 mm long on the tread surface within area 30 mm from wheel gauge face and 12 mm from rim face	<p>Locomotives and passenger vehicles: Normal operation after checking brakes. Wheels to be turned within 14 days.</p> <p>Electric multiple unit vehicles: Normal operation after checking brakes. Wheels to be inspected every 14 days.</p> <p>Freight vehicles: Vehicle to be worked out of service for repairs.</p>
4	<p>Over 10 mm long and within 30 mm from the flange face or within 12 mm from the rim face.</p> <p>OR</p> <p>Over 40 mm long on the tread surface within area 30 mm from wheel gauge face and 12 mm from rim face</p>	Vehicle may continue to its scheduled destination and/or transferred to the nearest repair location at a maximum speed of 40 km/h providing the brakes be isolated (passenger and freight) or the use of independent brake kept to an absolute minimum (locomotives).

Notes:

If there is the slightest doubt as to the severity of the thermal crack, always report the highest classification. (For example, if the defect description falls between a Class 2 and Class 3 thermal crack, then a Class 3 crack needs to be reported).

8.14. Defective failed or open plug doors

Passenger rolling stock fitted with plug doors may require restricted operation with doors that are defective or failed in the open position, for the purpose of clearing a section or working out of service. The following section provides requirements and restrictions for these movements. This requirement is in line with TWP 156.

The following Sydney Trains and NSW TrainLink rolling stock are fitted with plug type doors:

- Tangara T Sets
- Millennium M Sets
- OSC H Sets

- Waratah A Sets
- Waratah Series 2 (SGT) B Sets
- Endeavour Diesel Railcars, LE and TE
- Xplorer Diesel Railcars, EA, EB and EC
- Hunter Diesel Railcars, HM and HMT

These passenger cars are fitted with external sliding passenger and/or crew plug doors, which when in the open position, infringe their respective allowable maximum rolling stock outline. Whilst this open door infringement is acceptable when the vehicles are starting or stopping within the confines of a platform, it is not acceptable for normal operation between station stops.

8.14.1. Normal plug door operating conditions

Under normal operating conditions, the following operating rules apply:

- When trains fitted with a crew external sliding plug door, are arriving at a station, the crew door shall remain closed until the train is within the platform and the speed of the train has reduced to walking pace, that is, approximately 5 km/h.
- When trains fitted with crew external sliding plug doors are starting and departing a station, the crew door shall be closed (and kept in the closed position) after the train has travelled 4 cars or the guard's workstation reaches the departure end of the platform, whichever occurs first.
- When trains fitted with passenger external sliding plug doors are in motion, the passenger doors shall remain closed.
- When operating within the Olympic Park station area with the crew doors in the open position, on either side of the train, the maximum speed through the platforms shall be 10 km/h.

8.14.2. Defective or failed plug door operating conditions

In the event of failed plug type doors, the following operating rules shall therefore apply:

- When any of the above trains are operating on the TfNSW Metropolitan Heavy Rail network, including those authorised to operate in the outer suburban areas beyond Waterfall, Cowan and Emu Plains, or the narrow area beyond Springwood and Kiama, with any passenger or crew doors failed in the open position, the maximum train speed shall be 40 km/h.
- Where the above trains are permitted to operate in the outer suburban areas beyond Waterfall, Cowan and Emu Plains, or the narrow area beyond Springwood and Kiama, and there are two (2) opposing trains approaching each other, each having "near side" passenger or crew doors failed in the open position, the trains shall not cross, except at island platforms. (The "near side" of the train is that side closest to the opposing train).

- When operating within the Olympic Park station area with passenger or crew doors failed in the open position, on either side of the train, the maximum speed through the platforms shall be 10 km/h.

8.15. Bearing and Brake Temperature (BBT) system response to wayside alarms – Hot Bearing Detector (HBD) alarms

When a defective or hot axle bearing is detected by activation of an alarm at one of the wayside Bearing and Brake Temperature (BBT) sites, the actions in the following sections are required.

NOTE:

The system reports the alarmed vehicle position based upon the platform count in the consist with platform one being at the front of the train in the trains direction of travel.

The system reports the alarmed platform axle count based upon axle one of each platform being towards the front of the train in the platforms direction of travel.

The system reports the alarmed platforms side(s) as either left or right side based upon the driver facing the train's direction of travel and the left being his left side. The system reported side is not to be confused with each vehicles numbering and labelling conventions for the sides, which also use left and right in some cases.

Hot Bearing Detector (HBD) alarms include the following severities:

- WARM bearing alarm
- HOT bearing alarm
- EXTREME bearing alarm

If a HBD alarm is determined to be invalid the response can be cancelled by the RIM's delegated rolling stock authority.

8.15.1. Response to Hot Bearing Detector (HBD) alarms – WARM bearing alarm

The following responses apply to passenger trains, freight trains, and infrastructure maintenance machines.

Signaller

Contact the Driver and advise them that they have triggered a **WARM Bearing Alarm**. Direct the driver to proceed at a maximum speed of 25 km/h to the nearest suitable location where the train can be stopped for inspection (the location shall be within 5 km of the BBT site that triggered the alarm). When the train has stopped advise the Driver of the alarms received (type, severity & temperature), the vehicle/platform ID, platform count in the consist, the platform axle count and the side of the train where the alarming axle bearing is located. Also, advise the driver of any other BBT alarms that have been triggered.

Advise Train Control of the alarm and the action taken.

Driver

If an alarm is received by radio communication, slow the train and contact the Signaller, whilst carrying out these actions.

On receipt of the alarm, proceed to a suitable location, as advised by the Signaller for inspection of the suspect axle bearing at a reduced speed not exceeding 25 km/h (shall be within 5 km of the BBT site that triggered the alarm).

The driver shall record the alarm details (HBD, alarm level & temperature), the vehicle/platform ID, platform position in the consist, platform axle count and side details of all reported alarms.

Inspect the suspect axle bearing. If no obvious defect is found, inspect all other axle bearings on the reported side of the vehicle and all axle bearings on the reported side of each adjacent vehicle and advise the Signaller of what has been found.

The Signaller is to advise Train Control of what has been found.

Take action as follows:

- where the axle bearing is overheating but it is still possible to move the vehicle, the train may be moved to clear the section but the speed of the train shall not exceed 25 km/h and the axle bearing shall be inspected at every opportunity (at least every 5 km)
- where the axle bearing is hotter than the other axle bearings and there is no sign of excessive heat, grease leakage or physical damage, conduct a roll by inspection of the suspect axle bearing by moving the train forward while listening for any unusual sounds. If no obvious defects are apparent, the train may proceed at normal speed.

Passenger Train Guard

If it is decided to proceed with an overheating axle bearing do the following:

- move the passengers from the affected car
- position yourself in a location on the train to monitor the affected car and axle bearing
- have the train stopped if it is considered that it is unsafe to continue
- de-train the passengers at the closest platform as directed by train control

8.15.2. Response to Hot Bearing Detector (HBD) alarms – HOT bearing alarm

The following responses apply to passenger trains, freight trains, and infrastructure maintenance machines.

Signaller

Contact the Driver and advise them that they have triggered a **HOT Bearing Alarm**. Direct them to stop the train immediately to inspect the offending axle bearing. When the train has stopped advise the Driver of the alarms received (type, severity & temperature), the vehicle/platform ID,

platform count in the consist, the platform axle count and the side of the train where the alarming axle bearing is located. Also, advise the driver of any other BBT alarms that have been triggered.



Warning:

No other train is permitted to pass the defective train, on an adjacent line, until the defective train has come to a stand and is confirmed that the adjacent line(s) are not obstructed.

Inspection of the adjacent lines can be conducted by the alarm train crew, other rail staff, or adjacent trains proceeding at restricted speed.

Advise Train Control of the alarm and the action taken.

Driver

On receipt of the alarm, immediately stop the train and inspect the suspect axle bearing. If no obvious defect is found, inspect all other axle bearings on the reported side of the vehicle and all axle bearings on the reported side of each adjacent vehicle and advise the Signaller of what has been found. The Signaller will advise Train Control of what has been found.

Take action as follows:

- The driver shall record the alarm details (HBD, alarm level & temperature), the vehicle/platform ID, platform count in the consist, platform axle count and side details of all reported alarms.
- If it is not possible to continue the journey due to excessive heat, grease or oil leakage, smoke and/or physical damage, the driver shall not move the train and contact the Signaller to arrange emergency recovery operations, through Train Control.
- Where the axle bearing is overheating but it is still possible to proceed, the vehicle may continue under extreme caution to clear the section only, but shall be removed at the first suitable location. The speed of the train shall not exceed 25 km/h and the axle bearing shall be inspected at every opportunity (at least every 3 km).
- No other train is permitted to pass the defective train, on an adjacent line, until the defective train has come to a stand and it is confirmed that the adjacent lines(s) are not obstructed. Inspection of the adjacent lines can be conducted by the alarm train crew, other rail staff, or adjacent trains proceeding at restricted speed.
- Where the axle bearing is hotter than other axle bearings and there is no sign of excessive heat, grease or oil leakage, smoke, or physical damage, conduct a roll by inspection of the suspect axle bearings by moving the train forward while listening for any unusual sounds. If no obvious defects are apparent, the train may proceed at normal speed.

Passenger Train Guard

If it is decided to proceed with an overheating axle bearing, do the following:

- move the passengers from the affected car
- position yourself in a location on the train to monitor the affected car and axle bearing
- have the train stopped if it is considered that it is unsafe to continue
- detrain the passengers at the closest platform as directed by Train Control

8.15.3. Response to Hot Bearing Detector (HBD) alarms – EXTREME bearing alarm

The following responses apply to passenger trains, freight trains, and infrastructure maintenance machines.

Signaller

Contact the Driver and advise them that they have triggered an **EXTREME Bearing Alarm**. Direct them to stop the train immediately to inspect the offending axle bearing. When the train has stopped advise the Driver of the alarms received (type, severity & temperature), the vehicle/platform ID, platform count in the consist, the platform axle count and the side of the train where the alarming axle bearing is located. Also, advise the driver of any other BBT alarms that have been triggered.



Warning:

No other train is permitted to pass the defective train, on an adjacent line, until the defective train has come to a stand and is confirmed that the adjacent line(s) are not obstructed.

Inspection of the adjacent lines can be conducted by the alarm train crew, other rail staff, or adjacent trains proceeding at restricted speed.

Advise Train Control of the alarm and the action taken.

Driver

On receipt of the alarm, immediately stop the train and inspect the suspect axle bearing. If no obvious defect is found, inspect all other axle bearings on the reported side of the vehicle and all axle bearings on the reported side of each adjacent vehicle and advise the Signaller of what has been found. The Signaller will advise Train Control of what has been found.

Take action as follows:

- The driver shall record the alarm details (HBD, alarm level & temperature), the vehicle/platform ID, platform count in the consist, platform axle count and side details of all reported alarms.
- If it is not possible to continue the journey due to excessive heat, grease or oil leakage, smoke and/or physical damage, the driver shall not move the train and contact the Signaller to arrange emergency recovery operations, through Train Control.

- Where the axle bearing is overheating but it is still possible to proceed, the vehicle may not move unless granted approval from the RIM's delegated rolling stock authority. Preference is for all valid Extreme bearing alarms to be detached as soon as possible or recovered immediately using a pony bogie.
- No other train is permitted to pass the defective train, on an adjacent line, until the defective train has come to a stand and it is confirmed that the adjacent lines(s) are not obstructed. Inspection of the adjacent lines can be conducted by the alarm train crew, other rail staff, or adjacent trains proceeding at restricted speed.

Passenger Train Guard

If granted approval to proceed with an overheating axle bearing, do the following:

- move the passengers from the affected car
- position yourself in a location on the train to monitor the affected car and axle bearing
- have the train stopped if it is considered that it is unsafe to continue
- detrain the passengers at the closest platform as directed by Train Control

8.16. Bearing and Brake Temperature (BBT) system response to wayside alarms – Dragging Equipment Detector (DED) alarms

When dragging equipment is detected by activation of an alarm at one of the wayside Bearing and Brake Temperature (BBT) sites, the actions in the following sections are required.

If a DED alarm is determined to be invalid the response can be cancelled by the RIM's delegated rolling stock authority.

8.16.1. Response to Dragging Equipment Detector (DED) alarms – dragging equipment alarm

The following responses apply to passenger trains, freight trains, and infrastructure maintenance machines.

Signaller

Contact the Driver and advise them that they have triggered a Dragging Equipment Alarm, and direct them to stop and inspect the train immediately. Advise the driver of the Dragging Equipment Alarm(s), the alarming vehicle/platform ID(s), the platform count in the consist, and the platform axle count. Also, advise the driver of any other BBT alarms that have been triggered.

Advise Train Control of the alarm and the action taken.

Driver

On receipt of the alarm or advice from the Signaller, stop the train immediately.

If an alarm is received by radio communication, stop the train and contact the Signaller.

Inspect the alarming vehicle. If no obvious defect is found, inspect each adjacent vehicle to the alarming vehicle and advise the Signaller of what has been found. The Signaller is to advise Train Control of what has been found.

Take action as follows:

- Where dragging equipment is found that can be secured or removed, secure or remove the equipment. Report actions taken to the Signaller, who will advise Train Control, and proceed at normal speed.
- Where no fault is found, report to the Signaller for instruction. The Signaller will seek instruction from Train Control.
- Where dragging equipment is found and cannot be removed or secured, report to the Signaller who will arrange recovery and advise Train Control.

NOTE:

The driver should be looking for items hanging at or below rail level anywhere under or at the ends of the offending vehicle or vehicles either side

If the alarming vehicle is the first or the last vehicle in the train, special attention should be given to brake hoses that may need to be secured in dummy couplings.

8.17. Bearing and Brake Temperature (BBT) system response to wayside alarms – Hot Wheel Detector (HWD) alarms

Where a Hot Wheel is detected by activation of an alarm at one of the wayside Bearing and Brake Temperature (BBT) sites, the actions in the following sections are required.

If a HWD alarm is determined to be invalid the response can be cancelled by the RIM's delegated rolling stock authority.

NOTE:

Hot wheels retain their heat for some considerable time/distance, if the driver has previously received a HWD alarm for the same car/wagon particularly within the last hour, the signaller should confirm with the driver the most recent alarms (that is, getting better or worse), the AEI tags (or platform count in the consist if no tag has been recorded), the platform axle count, side of the train, the approximate wheel temperatures, and what previous corrective action the driver has completed. It is then at the driver's discretion how to proceed with the issue.

The system reports the alarmed platform axle count based upon the platform(s) position in the consist with platform one being at the front of the train in the trains direction of travel.

The system reports the alarmed platform axle count based upon axle one of each platform being towards the front of the train in the platforms direction of travel.

The system reports the alarmed platforms side(s) as either left or right side based upon the driver facing the train's direction of travel and the left being his left side. The system reported side is not to be confused with each vehicles numbering and labelling conventions for the sides, which also use left and right in some cases.

8.17.1. Response to Hot Wheel Detector (HWD) alarms – LOW wheel alarm

The following responses apply to passenger trains, freight trains, and infrastructure maintenance machines.

Signaller

Contact the Driver, advise them that they have triggered a **LOW Wheel Alarm**, and direct them to take action as shown below.

Advise Train Control of the alarm(s) and the action taken.

Driver

If advised by the Signaller or if an alarm is received by WB radio, contact the Signaller, whilst considering these actions:

- On receipt of the alarm(s), or advice from the Signaller, bring the train safely to a stand and make an emergency brake application and then allow the brake system to recharge.
- The driver shall record the alarm details (type, severity, and temperature), the vehicle/platform ID and platform count in the consist, platform axle count, and train side details of all reported alarms.
- The driver is not required to inspect the vehicle(s) unless there are obvious signs of brakes continuing to be dragged after the emergency brake application.
- If repeat low wheel alarms are triggered for the same vehicle(s) on the same journey (that is, the same train number) or within the last hour, the response shall escalate to a Medium wheel alarm and the driver shall inspect the platform(s), axle(s), and side(s) reported in both the initial report and the subsequent report(s).
- The driver is to proceed at normal speed under advice of the Low Wheel Alarm. If no other Wheel Alarms are triggered from other sites during the journey, the offending vehicle(s) should be booked up for a maintenance inspection.

8.17.2. Response to Hot Wheel Detector (HWD) alarms – MEDIUM wheel alarm

The following responses apply to passenger trains, freight trains, and infrastructure maintenance machines.

Signaller

Contact the Driver, advise them that they have triggered a **MEDIUM Wheel Alarm**, and direct them to bring the train safely to a stand and make an emergency brake application and then allow the brake system to recharge. Then direct the driver to proceed at a maximum speed of 50 km/h to the nearest suitable location where the train may be stopped for inspection (shall be within 10 km of the BBT site that triggered the alarm).

When the train has stopped advise the Driver of all the details about the alarms including: alarms (type, severity and temperature), the vehicle/platform ID, platform count in the consist, the platform axle count and the side of the train.

Advise Train Control of the alarm and the action taken.

Driver

If an alarm is received by WB radio, slow the train and contact the Signaller, whilst considering the following actions for all trains other than the passenger train types Millennium (M Sets), OSC (H Sets), Waratah (A and B Sets) and Mariyung (D Sets):

- the driver shall record the alarm details (type, severity, and temperature), the vehicle/platform ID and platform count in the consist, vehicle axle count and train side details of all reported alarms
- prior to the train stopping for inspection, the driver should bring the train to a stand and then make an emergency brake application and then allow the brake system to recharge
- inspect the wheel(s) and associated brake equipment that triggered the alarm
- if no obvious fault is found, inspect all other wheels and associated brake equipment on that vehicle and both adjacent vehicles (on the same side as the reported alarm(s))
- take appropriate action as required under Defective air brake (page 141), Defective handbrake or parking brake (page 147), Defective wheels (page 148) sections of the General Instruction Pages of the TOC Manual
- if no sign of overheating is found, proceed at normal speed

For Millennium (M Sets), OSC (H Sets), Waratah (A and B Sets), and Mariyung (D Sets) passenger train fleets (as they have visibility of the brake status of every car in the consist) consider the following alternate actions:

- stop the train just clear of the nearest suitable passenger train stopping location (station)
- the driver shall record the alarm details (type, severity, and temperature), the vehicle/platform ID and platform count in the consist, vehicle axle count, and train side details of all reported alarms
- ask the guard to inspect the alarm vehicle(s) for sticking brakes from the crew door. See **Passenger Train Guard** for more details.

- while the guard is conducting their inspection investigate the operation of the brakes using the following process:
 - apply the park brakes and release the service brakes
 - check the status of the brakes on the drivers display and ensure that all brake cylinder pressures (BCP) have released to zero
 - if one or more of the brakes are not releasing to zero BCP make an emergency brake application and then recharge brake pipe. Check that all BCPs have now released to zero.
 - apply full service brakes (max brake) and then release the park brakes. Check that all the park brakes have released.
- confer with Passenger Train Guard regarding their inspection findings
- if the brakes are found to be sticking or a locked axle is identified and released the wheel condition of the associated axles need to be inspected before proceeding
- take appropriate action as required under Defective air brake (page 141), Defective handbrake or parking brake (page 147), and Defective wheels (page 148), sections of the General Instruction Pages of the TOC Manual
- if the investigation confirms a valid fault with the train (and it cannot be immediately rectified) and the service needs to be cancelled the train can be moved on to the platform, at a speed not exceeding 25km/h, to detrain the passengers.
- if no sign of overheating is found, proceed at normal speed
- instruct the guard to continue to monitor for evidence of sticking brakes when possible, at station stops for the remainder of the journey or the next hour.

Passenger Train Guard

If the driver requires assistance to conduct an inspection:

- first check from the crew door if smoke can be seen at the alarm location, that is, on the same train side, as the alarm vehicle(s)

Advise findings to driver.

Continue to monitor for evidence of sticking brakes when possible at station stops for the remainder of the journey or the next hour.

8.17.3. Response to Hot Wheel Detector (HWD) alarms – HIGH wheel alarm

The following responses apply to passenger trains, freight trains, and infrastructure maintenance machines.

Signaller

Contact the Driver, advise them that they have triggered a **HIGH Wheel Alarm**, and direct them to stop the train immediately for inspection.

When the train is stopped advise the Driver of all the details about the alarms including: alarms (type, severity, and temperature), the vehicle/platform ID, platform count in the consist, the platform axle count and the side of the train.

Advise Train Control of the alarm and the action taken.

Driver

On receipt of the alarm, or advice from the Signaller, stop the train immediately.

If an alarm is received by radio communication, stop the train and contact the Signaller, whilst considering the following actions:

- the driver shall record the alarm details (type, severity, and temperature), the vehicle/platform ID and platform count in the consist, platform axle count and train side details of all reported alarms
- inspect the wheel(s) and associated brake equipment that triggered the alarm
- if no obvious fault is found, inspect other wheels and associated brake equipment on that platform and both adjacent platforms (on the same side as the reported alarm(s))
- take appropriate action as required under Defective air brake (page 141), Defective handbrake or parking brake (page 147), Defective wheels (page 148) sections of the General Instruction Pages of the TOC Manual
- if no sign of overheating is found, proceed at normal speed

8.18. Dynamic Weighbridge (WB) system response to wayside alarms and alerts – Overloaded platform and bogie alarms and alerts

Where an overloaded platform or bogie is detected by activation of an alarm or alert at one of the wayside dynamic Weighbridge (WB) sites, the actions in the following sections are required.

The WB sites are installed at the following locations:

- Main West - Blackheath – Up Direction (120.470 km)
- Main West – Kingswood – Up Direction (51.582km)
- Main North - Sulphide Junction – Up Direction (153.000 km)
- Main North – Sulphide Junction – Down Direction (153.000 km)
- Main North – Rhodes – Up Direction (16.980km)
- Illawarra – Penshurst – Up Direction (15.836km)
- Main South – Minto – Up Direction (49.166km)

Alarm and alert thresholds for the WB systems are as follows:

Table 92 – Overload alert and alarm thresholds of allowable gross platform mass, gross bogie mass, side to side imbalance, and bogie to bogie imbalance

Alert / Alarm type	LOW Alert	MEDIUM Alert	HIGH Alarm	EXTREME Alarm
Platform overload threshold	3%	7%	11%	20%
Bogie overload threshold	8%	12%	16%	25%
Side to side (STS) imbalance threshold	15%	20%	30%	N/A
Bogie to bogie (BTB) imbalance threshold	19 t	23 t	N/A	N/A

Table Note: The overload thresholds include any WB error. The bogie overload thresholds also include tolerance for dynamic and loading imbalances. Imbalance thresholds are per platform. All thresholds are assessed as equal to or greater than.

The maximum number of alarms and alerts per train shall not exceed 10% of platforms / bogies respectively (excluding locomotives). Any train exceeding this 10% limit shall be treated as at least a MEDIUM alert.

Note: The side to side imbalance for a platform is derived by: $(L-R)/(L+R)$ and expressed as a %.

Where: 'L' is the sum of the weight of wheels on the left of the platform.

'R' is the sum of the weight of wheels on the right of the platform.

Articulated multipack vehicles shall only be analysed for overloads at the bogie level due to load sharing between platforms and the inaccuracies in calculating gross platform mass and side to side imbalance.

8.18.1. Response to dynamic Weighbridge alarms and alerts – LOW alert

There are no operational actions required in response to a LOW alert.

Email advice is sent to the operator of the offending train requesting an internal investigation and appropriate internal corrective actions to prevent a recurrence of the overloading incident.

8.18.2. Response to dynamic Weighbridge alarms and alerts – MEDIUM alert

There are no operational actions required in response to a MEDIUM alert.

Email advice is sent to the operator of the offending train requesting an internal investigation and appropriate internal corrective actions to prevent a recurrence of the overloading incident.

The operator is required to submit an assurance report demonstrating that a thorough review of loading processes, procedures and risks has been undertaken and appropriate corrective action has been taken to prevent a recurrence of the overloading incident. The assurance report shall

be submitted to Transport for NSW and the Rail Infrastructure Manager within 5 business days of the operator being made aware of the Medium alert.

8.18.3. Response to dynamic Weighbridge alarms and alerts – HIGH alert

The HIGH alarm details are sent to the Rail Operations Centre for immediate operational action.

Email advice is also sent to the operator of the offending train.

The train is permitted to **proceed at a maximum speed not exceeding 50 km/h to the designated stopping location** as advised below, where the train must be stopped for corrective action. The train shall not be permitted to move from this location until corrective action has been undertaken, consisting of either correction of the overload within the train consist, or removal of the offending overloaded wagon from the train consist for later corrective action.

After the overloading has been corrected (or sufficiently corrected to allow movement), high severity overloaded wagons shall be inspected by a qualified employee and certified fit for operation before any further movement.

The operator is required to submit an assurance report, including a wagon integrity assessment consisting of a thorough assessment of the wagon and bogies for possible damage as mentioned above, and demonstrating that a thorough review of loading processes, procedures and risks has been undertaken and appropriate corrective action has been taken to prevent a recurrence of the overloading incident. The assurance report shall be submitted to the Transport for NSW and the Rail Infrastructure Manager within 5 business days of the operator being made aware of the High alarm.

8.18.4. Response to dynamic Weighbridge alarms and alerts – EXTREME alert

The EXTREME alarm details are sent to the Rail Operations Centre for immediate operational action.

Email advice is also sent to the operator of the offending train.

The train is permitted to **proceed at a maximum speed not exceeding 25 km/h to the designated stopping location** as advised below, where the train must be stopped for corrective action. The train shall not be permitted to move from this location until removal of the offending overloaded wagon from the train consist for later corrective action. A wagon integrity assessment must also be conducted as described below.

EXTREME overloaded platforms shall be quarantined at the designated stopping location, pending a thorough inspection for damage to bogies including axle bearings, springs and frames, and the wagon underframe, particularly critical high stressed areas which may require some form of non-destructive testing. The results of these inspections shall be included in the assurance report specified below.

The operator is required to submit an assurance report, including a wagon integrity assessment consisting of a thorough assessment of the wagon and bogies for possible damage as mentioned above, and demonstrating that a thorough review of loading processes, procedures and risks has been undertaken and appropriate corrective action has been taken to prevent a recurrence of the overloading incident. The assurance report shall be submitted to Transport for NSW and the Rail Infrastructure Manager before the offending wagon is permitted to be moved from the designated stopping location.

8.18.5. Repeat alarms triggered for the same bogie or platform

Due to the increased number of WB sites on the network a train could pass over more than one site in an overloaded condition and trigger alarms (high or extreme) at each site. The first alarm triggered for each vehicle in a given train (based on its unique train number) shall always be acted on as per the required response. Alarms for the same train, and the associated vehicles, from additional WB sites that are the same severity or less can be disregarded. If a higher severity alarm is triggered due to a bogie or platform mass measurement that has increased by 5% or more than the new alarm must be acted on as per the required response.

The highest severity alert (low or medium) triggered for any given train shall always be acted on as per the required response.

8.18.6. Designated stopping locations

The designated stopping location for each of the WB sites is as follows:

Main West – Blackheath Up WB (120.470km) – Designated stopping location is Katoomba.

Designated stopping location shall be Katoomba Up Refuge (110.324km) for immediate rectification of the overloaded wagon if feasible, or the Katoomba Up Perway siding for detachment of the overloaded wagon, as arranged between the operator, the signaller and the Rail Operations Centre.

Main West – Kingswood Up WB (51.852km) – Designated stopping location is Flemington Goods or Enfield.

Designated stopping location shall be Flemington Goods or Enfield. Prior to the designated stopping location signal S27.4 Auto (43.989km) can be used for immediate inspection of the overloaded wagon. If the inspection determines it is safe to do so, the train can proceed to the designated stopping location (at the specified maximum speed) for detachment of the overloaded wagon, as arranged between the operator, the signaller and the Rail Operations Centre.

Main North – Sulphide Junction Up WB (153.000km) – Designated stopping location is Awaba Up Refuge.

Designated stopping location shall be Awaba Up Refuge (138.000km), where offending overloaded wagons shall be immediately rectified if feasible or detached as arranged between the operator, the signaller and the Rail Operations Centre.

. Note:

1. Awaba Up Refuge length is 494m and may not be long enough to hold all trains, but is intended to place offending overloaded wagons. Some shunting may be required from the Main Line. If shunting isn't possible the train will need to run to Gosford Yard (83.5km) at the restricted speed of 50km/h where the overload can be actioned.

2. Coal trains proceeding to Eraring and Vales Point are permitted to proceed to their destination at the restricted speed of 50 km/h where they are to be unloaded.

Main North – Sulphide Junction Down WB (153.000km) – Designated stopping location is Broadmeadow Yard.

Designated stopping location shall be Broadmeadow Yard (162.000km), where offending overloaded wagons shall be immediately rectified if feasible or detached as arranged between the operator, the signaller and the Rail Operations Centre. If the train has proceeded past Broadmeadow Yard without intervention the Rail Operations Centre shall notify ARTC of the detected overload.

Main North – Rhodes Up WB (16.980km) – Designated stopping location is Flemington Goods or Enfield.

Designated stopping location shall be Flemington Goods or Enfield. Prior to the designated stopping location adjacent to the country end of North Strathfield Station platform can be used for immediate inspection of the overloaded wagon. If the inspection determines it is safe to do so, the train can proceed to the designated stopping location (at the specified maximum speed) for detachment of the overloaded wagon, as arranged between the operator, the signaller and the Rail Operations Centre.

Illawarra – Penshurst Up WB (15.836km) – Designated stopping location is Flemington Goods or Enfield.

Designated stopping location shall be Flemington Goods or Enfield. Prior to the designated stopping location an inspection of the overloaded wagon must be completed prior to the train proceeding on to the Goods Road at Meeks. If the inspection determines it is safe to do so, the train can proceed to the designated stopping location (at the specified maximum speed) for detachment of the overloaded wagon, as arranged between the operator, the signaller and the Rail Operations Centre.

Main South – Minto Up WB (49.166km) – Designated stopping location is Flemington Goods or Enfield.

Designated stopping location shall be Flemington Goods or Enfield. Prior to the designated stopping location signal GF 20 DIST (44.098km) can be used for immediate inspection of the overloaded wagon. Alternate option for the inspection is within the interlocking at Glenfield. If the inspection determines it is safe to do so, the train can proceed to the designated stopping location (at the specified maximum speed) for detachment of the overloaded wagon, as arranged between the operator, the signaller and the Rail Operations Centre.

8.19. Pantograph Condition Monitoring System (PCMS) response to alarms

The Pantograph Condition Monitoring Systems (PCMS) will trigger an alarm in Mechanical Control when a defective pantograph is detected. When these alarms are triggered, Signallers and Drivers shall adhere to the actions in Section 8.19.1.

8.19.1. Response to Pantograph Condition Monitoring System (PCMS) alarm – MEDIUM or HIGH alarm

The following responses apply mainly to electric passenger trains; however they may also apply to other rolling stock that interface with the overhead wire, which may include locomotives and infrastructure maintenance vehicles.

Mechanical Controller

If a medium or high severity alarm is triggered:

- review the PCMS data and images to ensure that the alarm is valid
- assess the severity and type of the alarm/defect to determine whether the train can continue in service or if it needs to stop for inspection
- if train can continue in service make arrangements for the train to be inspected at a suitable location
- if the train needs to be stopped, ask the controlling Signaller to:
 - make arrangements for the train to be stopped for inspection, and
 - tell the driver to contact Mechanical Control
- tell the Train Controller about all the alarm details and any actions to be taken
- when contacted by the driver, advise the driver of the alarm details and any necessary action to be taken



Warning:

If the defect is critical and it is unsafe for the train to continue, the train shall be stopped immediately.

NOTE:

Where ever possible:

- *The train should not travel more than 5 km before being inspected, and*
- *The train should stop at a platform to allow the driver to inspect the pantograph and carry out any remedial action*

Signaller

If instructed to stop the train:

- make arrangements to stop the train at the next suitable location (preferably a platform) where an inspection of the pantograph can occur
- tell the driver to contact Mechanical Control
- keep the Train Controller informed of the situation

Driver

If instructed to stop the train to carry out an inspection:

- reduce the speed of the train to 50 km/h
- stop the train at the next suitable location (preferably a platform) where an inspection of the pantograph in question can occur
- contact Mechanical Control and follow their directions
- keep the Signaller informed of the situation



Warning:

If instructed to lower and isolate a pantograph, the Driver should visually check that pantograph has fully lowered within the roof recess / pantograph well before proceeding

8.20. Defective drawgear

This Section is to be read in conjunction with Sydney Trains Network Rule NTR 412 *Defective running gear*.

Where the coupler or drawgear of a vehicle is found to be defective enroute, an emergency towing chain can be attached between the defective vehicle and the adjacent vehicle/locomotive.

The emergency towing chain shall be at least 16 mm high tensile chain.

If the trailing load behind the towing chain exceeds the maximum allowable trailing load listed below, then the train shall be divided and the defective vehicle hauled as the last vehicle to the first suitable location where it can be detached.

8.20.1. Defective drawgear – Emergency towing chain

An emergency towing chain shall only be used to move a defective vehicle or vehicles where the drawgear is broken or defective and in the case where the last vehicle is defective and the automatic air brakes have been cut out or the handbrake is defective.

The towing chain shall not be used if the trailing load behind the towing chain exceeds the limits in Table 93.

Table 93 – Towing chain load limits

Ruling grade	Maximum trailing load for towing chain
1 in 30	255 tonnes
1 in 33	255 tonnes
1 in 40	265 tonnes
1 in 50	320 tonnes
1 in 60	375 tonnes
1 in 66	400 tonnes
1 in 70	420 tonnes
1 in 75	445 tonnes
1 in 80	465 tonnes
1 in 90	510 tonnes
1 in 100	550 tonnes
1 in 110	590 tonnes
level	1000 tonnes

For ruling grades, refer to TS TOC 1 *General Instructions* (Section 1.4, Section 1.6, and Section 1.8) or TS TOC 2 *Division Pages*.

The maximum speed for a movement where the emergency towing chain is used for broken or defective drawgear is 15 km/h. If the towing chain is only used as the brakes are cut out on the last vehicle on the train, then the train may operate at normal track speed.

8.21. Transferring defective vehicles

This Section is to be read in conjunction with Sydney Trains Network Rule NTR 414 *Defective vehicles*.

8.21.1. Transferring defective vehicles – Vehicles not to be moved

Vehicles with defects such as excessively hot axle bearings or Class 5 wheel skids or Class 5 scale shall not be moved until they have been inspected by a qualified worker and repaired or made safe to move. The qualified worker is a qualified mechanical maintenance person attached to an operator's rolling stock maintenance depot/breakdown crew. In either case, that person shall have rolling stock maintenance experience. A pony bogie may be used to transfer such vehicles.

8.21.2. Transferring defective vehicles – Pony bogies

The correct type of pony bogie shall be used for the vehicle being moved. The Operator is responsible for ensuring that the correct pony bogie is used for the application.

Defective locomotives, or loaded freight vehicles, supported by pony bogies shall be accompanied by a qualified worker, and that qualified worker shall take every opportunity to examine the assembly and bearings. The maximum speed at which the locomotive and loaded freight vehicles are to travel is **15 km/h**, reduced to **8 km/h** over points and crossovers.

Empty freight and empty passenger type vehicles supported by pony bogies can travel unaccompanied and travel at **20 km/h**, reduced to **10 km/h** over points and crossovers.

Section 9
Operation of infrastructure
maintenance vehicles

9. Operation of infrastructure maintenance vehicles

December 2013

9.1. Introduction

Infrastructure maintenance vehicles when operating on rail are used to carry out work on or about the infrastructure.

Infrastructure maintenance vehicles approved to operate on the TfNSW Metropolitan Heavy Rail network are listed in either Section 11 (page 269) or Section 12 (page 289).

Infrastructure maintenance vehicles shall be operated in accordance with Sydney Trains Network Rule NWT 316 *Track vehicles*.

9.2. Types of infrastructure maintenance vehicles

There is a wide variety of types of infrastructure maintenance vehicles. Some vehicles are restricted in operation to certain areas, such as in worksites only and/or, outside the electrified area. These restrictions are identified by exception in Section 11 (page 269), or Section 12 (page 289).

Types of infrastructure maintenance vehicles are described below.

On-track infrastructure maintenance vehicles (refer to Section 11)

On-track vehicles include tampers, ballast regulators, overhead wiring vehicles, rail grinders, tracklayers, ballast cleaners, and so on.

These specialised vehicles are usually rail bound. However, some vehicles can be removed from the track by the use of special take-offs or portable turnouts.

Road-rail vehicles (refer to Section 12 (page 289))

A *road-rail vehicle* is a rubber tyred or crawler tracked road vehicle fitted with retractable rail wheels. These vehicles can be readily placed on or removed from track at suitable locations.

Flat top trolleys and trailers (refer to Section 12 (page 289))

Trolleys are small non-powered vehicles used for conveying tools and equipment along the track. They can be easily removed from the track. A trolley shall not be towed or pushed by other vehicles.

A *trailer* is similar to a trolley but is fitted with a tow bar for connecting to another vehicle.

Quadricycles and trikes (refer to Section 12 (page 289))

Quadricycles and trikes are small self-propelled vehicles used to conveying personnel, tools, or equipment along the track. Some are manually powered, while others have engines. These vehicles can be lifted from the track.

9.3. Emergency equipment

Infrastructure maintenance vehicles shall carry the minimum following emergency equipment:

- working two-way radio communication
- Track Occupancy Authority (TOA) forms (NRF 002)
- Condition Affecting the Network (CAN) forms (NRF 004)
- two red and one green flag
- at least 12 railway track signals
- two multi-coloured hand lamps or torches
- three (3) approved track-circuit shorting clips

Qualified workers operating infrastructure maintenance vehicles shall carry the minimum following emergency equipment:

- watch
- SL key
- one pad of Track Occupancy Authority (TOA) (NRF 002) forms
- one pad of Special Proceed Authority (SPA) (NRF 005) forms

9.4. Speed of infrastructure maintenance vehicles

The maximum permissible speed for on infrastructure maintenance vehicles is listed in Section 11 (page 269) or Section 12 (page 289).

Trolleys shall travel at walking pace.

Some road-rail vehicles have speed restrictions when traversing track fitted with check rails, guard rails, and level crossings. Refer to the notes in Section 11 (page 269) or Section 12 (page 289).

9.5. Lights

When infrastructure maintenance vehicles are on track, an orange flashing light or hazard lights shall be switched on such that they operate when conditions change, such as the following:

- the vehicle brakes are applied
- the horn (whistle) is operated
- the vehicle reverses
- or as otherwise required for safety

Refer to Sydney Trains Network Rule NWT 316 *Track vehicles*.

Trolleys and trailers need not display any lights during daylight. When operating at night, in heavy fog, or in tunnels, suitable front and rear lights (for example, hand lamps) shall be displayed in accordance with Sydney trains Network Rule NTR 406 *Using lights*.

Unless an orange flashing light is fitted to a quadricycle or trike, these vehicles have the same requirements as for trolleys.

9.6. Transfer of on-track infrastructure maintenance vehicles

9.6.1. Transfer of on-track infrastructure maintenance vehicles – Vehicles marshalled in a locomotive hauled train consist

Some on-track infrastructure maintenance vehicles are fitted with automatic couplers and automatic air brakes that will allow them to be coupled to a train and transferred within a train consist. Such vehicles are identified with Note T2 in the *Explanation of notes for on track infrastructure maintenance vehicle data* (page 269).

When an on-track vehicle is marshalled within a train consist, the *draw capacity* for the vehicle shall not exceed that listed in Section 11 (page 269).

The *automatic air brake* shall be connected throughout the train including the on-track vehicle. The vehicle shall be inspected as part of the train consist.

If an infrastructure maintenance vehicle is not fitted with an external *handbrake* or spring parking brake and is marshalled as the last vehicle in the train consist, an operator shall travel in the vehicle at all times. Some infrastructure maintenance vehicles are fitted with a spring parking brake and therefore do not require an operator on board.



Warning

When on-track infrastructure maintenance vehicles that are not approved to operate track circuits are attached to the rear of a train consist, the train shall be operated under block working.

9.6.2. Transfer of on-track infrastructure maintenance vehicles – Vehicles coupled together

Some on track vehicles can be coupled together and operated as a single unit. In this case, the operator in the leading vehicle shall have full control of the air brakes for all vehicles in the consist.

9.7. Infrastructure maintenance vehicles operating track circuits

Some infrastructure maintenance vehicles have been tested for operation of track circuits, and are approved to operate under track signals, and not under block working. These vehicles are

identified with Note T3 in the *Explanation of notes for on track infrastructure maintenance vehicle data* (page 269).

However, these vehicles shall operate under block working when on **“infrequently used lines, loops, or refuges”**

“Infrequently used lines, loops, or refuges” refers to a track circuited line, loop or refuge that has had less than 6 trains (each approximately equivalent to an 8 car passenger set in length) or 5000 tonnes traverse it, at or near line speed, in a 24 hour period.

9.8. Infrastructure maintenance vehicles restricted to operation within worksites

There is a number of infrastructure maintenance vehicles that are restricted to operation only within protected worksites. These vehicles are identified with Note T14 in the TOC General Instruction Pages, Section 11 (page 269) or Section 12 (page 289).

No other vehicles will be permitted to pass these vehicles on any adjacent lines until these vehicles have come to a stand and are confirmed to be clear of the adjacent line by the Possession Officer.

These infrastructure maintenance vehicles are not to travel on rail between worksites.

9.9. Infrastructure maintenance vehicles operating safety

To meet operating safety requirements, infrastructure maintenance vehicles identified with Note T18 in the *Explanation of notes for on track infrastructure maintenance vehicle data* (page 269) of this manual, shall operate in travel mode with a driver safety system incorporating two independent safety features. See Note T18 in Section 11 of this document, and T HR RS 00840 ST (RSU Appendix D) of the TfNSW standard TS 04052 *RSU 000 Series – Minimum operating standards for rolling stock – General Requirements* for details.

Section 10

Locomotive and rolling stock data

10. Locomotive and rolling stock data

Version December 2023

This Section of the TOC Manual lists all rolling stock authorised to operate on the TfNSW Metropolitan Heavy Rail network. To gain listing in this document rolling stock shall comply with the requirements of TS 04052 *RSU 000 Series – Minimum operating standards for rolling stock – General Requirements* or be covered by an appropriate Concession.

A Train Operating Conditions (TOC) Waiver is required for the operation of any vehicle or vehicle type that is authorised, but not listed in this document.

10.1. Explanation of notes for locomotive and rolling stock data

Table 94 – Explanation of notes for locomotive and rolling stock data

Note	Explanation
R1	These vehicles when loaded up to a maximum of 80 tonnes (for 4 axles) gross or 20 tonnes per axle, are restricted to a maximum speed of 80 km/h between the following locations: Sydney Metropolitan area and Woodville Junction Sydney Metropolitan area and Bowenfels Sydney Metropolitan area and Macarthur
R2	Not used.
R3	These vehicles when loaded up to 84 tonnes (for 4 axles) gross or 21 tonnes per axle, shall operate up to a maximum speed of 100km/h .
R4	These vehicles when loaded to a mass exceeding 84 tonnes up to 87 tonnes (for 4 axles) gross, shall operate up to a maximum speed of 80 km/h .
R5	These vehicles when loaded up to 92 tonnes (for 4 axles) gross or 23 tonnes per axle, shall operate at a maximum speed of 80km/h .
R6	Fuel/oil tanks 70 km/h unless stencilled for 80 km/h
R7	Bogie tank wagons – maximum gross mass and length. Individual vehicles may vary. The following NTAf wagons only have a riveted underframe and shall therefore be classified as Low DRAW CAPACITY (0.75) when calculating trailing loads: – Nos. 5193, 5194, 6006, 6010, 6011, 6019, 6034, 6046, 6055, 6063, 6065, 6066, 6069, 6073, 7276.
R8	As these locomotives are not fitted with de-sanding equipment, when operating as single units or as trailing units in multiple unit consists, (in track circuited areas only) the sanding equipment shall be isolated . If adhesion conditions require the use of sand, the sand equipment may be cut in and the train worked under block working conditions until the sand equipment is again isolated. If sand equipment is applied continuously or excessively, Train Control shall be advised immediately and the procedures of <i>NGE 232 Responsibilities of Train Crews and Track Vehicle Crews</i> .
R9	These vehicles comply with the ‘Narrow Square’ Rolling Stock outline in the TfNSW Minimum Operating Standards for Rolling Stock, TS 04052, and are NOT to operate on the following sections of line: Dunmore to Bomaderry, Sutherland to Cronulla, Central to North Sydney, City Circle lines, Erskineville Junction to Bondi Junction, Blacktown to Richmond.
R10	This container wagon can be loaded to a maximum height of 4050 mm above rail and operate within the area of operation assigned to Diagram 3 as outlined in <i>Area of operation for Diagram 3 and Note R10</i> (page 91) in SECTION 5 – Loading Restrictions .
R11	Refer to instructions for <i>Block working of all classes of light locomotives</i> (page 54) in the Sydney Metropolitan area contained in the General Instruction Pages, Section 2 – Locomotives Operations .

Note	Explanation
R12	Refer to instructions for <i>Block working of Diesel Multiple Unit trains (DMU)</i> (page 55) and <i>Block working of single unit diesel cars</i> (page 56) in the Sydney Metropolitan area contained in the General Instruction Pages, Section 2 – Locomotives Operations .
R13	These locomotives are fitted with standard automatic air brake and an ECP brake control.
R14	<p>The following AC traction locomotive types may be marshalled together in any combination with other AC locomotives:</p> <ul style="list-style-type: none"> United Group Ltd – C44Aci, Downer EDI Rail – GT46C-ACe and CRRC Ziyang – SDA1 <p>Where the number of powering C44Aci or GT46C-ACe in the locomotive consist is less than the number of SDA1, a 10% load reduction shall be applied to the sum of the individual full sectional loads</p> <p>AC locomotives may be marshalled together any combination, up to 4 locomotives with the following DC locomotives:</p> <ul style="list-style-type: none"> United Group Ltd – C44Aci: NR, AN and G Downer EDI Rail GT46C-Ace: NR, AN, CLP, CLF, G and X CRRC Ziyang – SDA1: No AC DC mixing permitted <p>A full list of approved AC6 locomotives (United Group Ltd – C44aci and Downer EDI Rail – GT46C-Ace) is summarised in Table 8 – Approved locomotives grouped into load categories – locomotive type AC in Section 2.14.</p> <p>For mixing involving locomotives with CLP, CLF, G and X class locomotives, the load shall be reduced by 20% if an AC locomotive is leading and the trailing load is more than 80% of the sum of the individual locomotive's full sectional load. If a DC locomotive is leading, no load reductions apply. All on-board locomotive alarms shall be train-lined and the train shall cease operation and seek recovery if any sustained and excessive wheelslip is detected in any locomotive enroute.</p> <p>For mixing involving AC locomotives with NR and AN class locomotives, the maximum allowable trailing loads are published in the relevant Division Pages (for example, North Division Pages). These published maximum allowable trailing loads are lower than the summation of individual locomotives' full sectional loads. A DC locomotive shall be leading the consist and all on-board locomotive alarms shall be train-lined.</p> <p>When three locomotives are marshalled at the front of a train and are powering there is a risk of track buckling due to compressive reactive forces in the rail immediately behind the last powering locomotive. To minimise this risk, an unloaded vehicle or empty platform in the case of intermodal vehicles shall not be marshalled in this position when the trailing load exceeds 70% of the maximum full sectional load.</p> <p>Dynamic Braking for an individual operating locomotive shall only be used within the operating range of current DC locomotives: 230 kN max from 16 km/h to 45 km/h and reducing linearly to zero at speeds below 16 km/h.</p>

10.1.1. Notes on freight vehicle brake type

Brake types are categorised as B1, B2, B3, B4, and E1. Refer to Section 4.3 Train marshalling – Length restrictions due to brake type.

Vehicles fitted with main reservoir pipes are categorised as either •• or •□.

•• indicates that the vehicle is fitted with a 'two pipe' air brake system where the main reservoir air recharges the air brake system.

•□ indicates that the vehicle is fitted with a main reservoir pipe but it does not recharge the air brake system but is used to operate equipment such as air operated hopper doors. This vehicle can be marshalled anywhere in a two pipe train but is not categorised as a 'two pipe' vehicle.

For marshalling restrictions due to main reservoir, refer to Section 4.3 Train marshalling – Length restrictions due to brake type.

10.2. 3801 Limited

10.2.1. 3801 Limited – Locomotives

Table 95 – 3801 Limited – Locomotives

Code	Load category	Description	Max speed (Km/h)	Live Weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
44	L12	Diesel	115	108	17.8	0.90	1800	Ex SRA Loco	R11
45	L12	Diesel	115	112	17.9	0.90	1800	Ex SRA Loco 4501	R11
48	L13	Diesel	100	75.2	14.8	0.90	900	Ex SRA Loco	R11
49	L13	Diesel	100	81	15.4	0.90	900	Ex SRA Loco	R11
SMR18		Steam Loco	60	82	13.3	0.90		Max speed 60 km/h both directions	R11
X	L9	Diesel	115	118	18.4	1.80	2000	X54	R11

10.2.2. 3801 Limited – Passenger rolling stock

Table 96 – 3801 Limited – Passenger rolling stock

Code	Description	Max speed (km/h)	Max loaded mass (t)	Passenger capacity	Length over coupling faces (m)	Draw capacity (MN)	Remarks
ABN	Crew car	115	44	-	20.3	0.50	No 2194
CAM	Twinette Sleeper (Composite)	115	48	10 / 18	22.7	0.25	No. 502 (ex TAM 502) 10 berths, 18 sitting
CPJ	Lounge	115	48	55	22.7	0.30	No 924 End protection fitted. Wooden body
EHG	Guard/Crew	115	30	-	12.4	0.50	No 2409 Guards compartment
FN	Economy	115	41	78	20.3	0.30	No 2193
FNR	Buffet	115	43	24	20.3	0.50	No 2185
FRN	Buffet	115	43	24	20.3	0.50	No 2186
MBR	Economy	115	42	24	20.4	0.30	No 2078 Buffet car
MFA	Passenger	115	50	84	22.7	0.30	No 2714 wooden body
MFS	Economy	115	40	70	20.4	0.30	Nos 2028,2096,2121,2145
SBN	First	115	44	42	20.3	0.50	No 2195
SFN	Economy	115	41	64	20.3	0.50	No 2182
XFS	Economy	115	40	64	20.4	0.30	Nos 2015

10.2.3. 3801 Limited – Freight rolling stock

Table 97 – 3801 Limited – Freight rolling stock

Code	Description	Class	Max gross Mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
L229	Water Gin 80km/h when fully loaded or empty 22750 litres	D	42.5	20.1	12.0	0.50	B1	
L1186	Water Gin	C	55.0	22.5	15.0	0.50	B1	
NHWF	Ballast wagon Nos 745, 799, 1169	C	61.0	20.0	11.8	0.75	B1	

10.3. Aurizon

10.3.1. Aurizon – Locomotives

Table 98– Aurizon locomotives

Code	Load category	Description	Max Speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
22	L10	Diesel	115	110	18.4	1.80	2000	Ex Pacific National 422 class	R11
31	L5	Diesel	100	137	20.2	1.80	3000	Ex L class.	R11
32	L9	Diesel	100	118	21.4	2.25	3190		R11, a, b
422	L10	Diesel	115	110	18.4	1.80	2000	Ex SRA 42202, 42206	R11
5000	N/A	AC Diesel	40/50	172	22.0	4.45	N/A		R9, R11, c, d, e, f, g
5020	N/A	AC Diesel	40/50	172	22.0	4.45	N/A		R9, R11, c, d, e, f, g
5020	N/A	AC Diesel	40/50	176	22.0	4.45	N/A		R9, R11, h, i, j, k
6000	AC6	AC Diesel	115 60	134 139	22.0	2.25	4500	C44aci	R9,R11, R13,R14 R9,R11, R13,R14, I
6020	AC6	AC Diesel	115 60	134 139	22.0	2.25	4500	C44aci	R9, R11, R14 R9, R11, R14, I
830	L13	Diesel	100	71.4	14.8	0.90	900		R11
ACB	AC6	AC Diesel	115 60	134 139	22.0	2.40	4500	C44aci (ACB-4405-4406)	R11, R14 R11, R14, I

Code	Load category	Description	Max Speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
ACC	AC6	AC Diesel	115 60	134 139	22.0	2.40	4500	C44aci	R9, R11, R14 R9, R11, R14, I
ACD	AC6	AC Diesel	115 60	134 139	22.0	2.40	4500	C44aci (ACD-6046-6055)	R11, R14 R11, R14, I
CF	AC6	AC Diesel	115 60	134 139	22.0	2.25	4500	C44aci (CF4401, CF4409)	R9, R11, R14 R9, R11, R14, I
DC	L10	Diesel	115	110	18.4	1.80	2000	Ex Pacific National 422 class	R11
G	L4	Diesel	115	128	19.8	1.80	3000		R11
GWB	AC6	AC Diesel	115	134	22.0	2.25	4500	GT46C-Ace G2 (GWB-101-106)	R11, R14
LQ / LZ	L5	Diesel	100	134	20.2	1.80	3000	Ex L/31 class. Fuel tanks only to be filled to 10,000 litres	R11

Notes for 32 Class:

- a. *When marshalled in multiple unit operation, this locomotive is limited to a maximum of 3 locomotives in any locomotive consist.*
- b. *This locomotive has the driver's position on the right hand side and will require two drivers for operation. Alternatively, operation with a driver and a second person is permitted if the second person is qualified in signal recognition.*

Notes on 5000/5020 Class at 172t:

- c. *5000 and 5020 Class locomotives are not permitted to operate across the network. They may be hauled dead attached from Woodville Junction to Sulphide Junction and return for maintenance purposes.*
- d. *The mass of the 5000/5020 class locomotives shall not exceed 172t when being hauled on the network (this is less than the normal operating mass of the locomotive).*
- e. *A single 5000/5020 class locomotive can be hauled dead attached by 423, 6000 (at 134t), and 32 class locomotives in any combination or order.*
- f. *The maximum speed in general shall not exceed 50km/h, in addition the maximum speed shall be 10km/h below the speed signs down to 5km/h.*

- g. The maximum speed traversing across Broadmeadow subway at 162.807km and Northcott Drive bridge at 160.300km shall not exceed 40 km/h in both directions.

Notes on 5020 Class at 176t:

- h. Restricted self-propelled movement between Cardiff workshop (Sulphide Junction) and Woodville Junction (ARTC boundary) is permitted in the Up and Down directions.
- i. The locomotive shall be moved under its own power and not be hauled by any other locomotive or train. The locomotive shall not haul any other locomotives or wagons.
- j. The maximum speed in general shall not exceed 50km/h on the Up and 40km/h on the Down, in addition the maximum speed shall be 10km/h below the speed signs down to 5km/h.
- k. The maximum speed traversing across Broadmeadow subway at 162.807km and Northcott Drive bridge at 160.300km shall not exceed 40 km/h in both directions.

Notes for 6000, 6020, ACB, ACC, ACD, and CF class:

- l. Operation above 134t up to 139t restricted as per TS TOC 2, Division Pages, North Section Pages.

10.3.2. Aurizon – Freight rolling stock

Table 99 – Aurizon bulk hopper wagons

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
AHGX	Grain Hopper	C	76	21	14.6	1.30	B2	
AGWF	Grain Hopper	C	66.4	20.3	13.9	1.35	•□B3	
QGKF	Grain hopper (Ex VGKM, VAKM)	C	65	16.8	15.1	1.80	B3	
QHAH	* 2 permanently coupled coal wagons (ECP Braked)	G C B	240* 200* Empty	45.6*	33.23*	2.45	E1#	R9,#,\$,++ R9,#,\$,++ R9,#,\$,++
QHAH 51726	* 2 permanently coupled coal wagons (ECP Braked) – slope sheet modification	C B	200* Empty	46.6*	33.23*	2.45	E1#	R9,#,\$,++ R9,#,\$,++
QHAH 51796/ 51797	* 2 permanently coupled coal wagons (ECP Braked) – door liner modification	C B	200* Empty	50.0*	33.23*	2.45	E1#	R9,#,\$,++ R9,#,\$,++
QHBH	* 2 permanently coupled coal wagons (ECP Braked)	G C C	240* 200* Empty	43.6*	33.23*	2.45	E1#	R9, #, ++ R9, #, ++ R9, #, ++

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
QHCH	* 2 permanently coupled coal wagons (ECP Braked)	G F C	224* 190* Empty	45.0*	30.81*	2.45	E1%	% % %

Notes for QHAH/QHBH/QHCH:

These wagons are permitted to operate in ECP mode for a maximum consist of 88 x QHAH/QHBH and 3 x 6000 Class locomotives in a head end power configuration.

\$ These wagons are permitted to operate in ECP and WDP mode with the following consist:

6000 class locomotive (134 t) – 44 x QHAH wagons – 6000 class locomotive (134 t)

When operating in WDP mode, the following applies:

- i. Operation shall be between Metropolitan Colliery and Port Kembla or between Unanderra (ARTC boundary) and Port Kembla
- ii. Operation shall be in synchronous mode only
- iii. There shall be no mixing of empty and loaded (or part loaded) wagons in the consist
- iv. Routine ECP/WDP functionality testing shall be carried out prior to service
- v. Stopping within the confines of tunnels shall be avoided
- vi. The use of dynamic brake when the remote locomotive is idle or 'dead in consist' is not permitted
- vii. The nominal descent speed from Summit Tank to Unanderra and shall not exceed 25 km/h and the train shall be brought to a stand if the train speed exceeds 30 km/h or more than 50% of train brake command (TBC) is required to hold train speed.
- viii. Special consideration shall be given when loading QHAH 51796 and QHAH 51797, due to a different loading profile, to ensure gross mass of the wagon does not exceed the allowable limit of wagon and consist.

++ If doors are detected open, train to be stopped and rectified. These wagons are not to operate with wheel diameters less than 858 mm.

% These wagons are permitted to operate in ECP mode for a maximum consist of 88 x QHCH and 2 x 6000 Class locomotives in a head end power configuration.

Table 100 – Aurizon container wagons

Code	Description	Class	Max Gross Mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
AQIY	Container wagon 40ft (ex KQYY, CQYY)	A	76 84 92	15.6	13.28	2.45	B4	R9,R10 R9,R10,R3 R9,R10,R5
QQAY	Container flat	A	76 80	18.7	19.4	2.5	B3	- R1

Code	Description	Class	Max Gross Mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
QQBY	Container wagon (60 ft 3 slot)	A	76 84 92	20.5	19.3	2.2	B4	R9 R9, R3 R9, R5
QQCY	5 pack articulated Container wagon (12 axles)	A	228 252	57	77.34	2.45	B4	R9,R10 R3,R9,R10
QQDY	5 pack articulated container wagon (12 axles)	A	228 252 276	68.7	77.34	2.2	B4	R10 R10, R3 R10, R5
QQEY	Container flat with electrical cabling for powered containers (Ex AQQY/AEQY)	B	76 80	23	20.1	1.30	B3	R10 R1, R10
QQFY	Containers (Ex RQMY)	A	76 84 92	22	20.1	1.30	B3	R10 R3, R10 R5, R10
QQGY	Container flat (Ex VQCY)	A	76 80	20.0	20.1	1.30	B2	R10 R1,R10
QQJY	Containers (Ex RQKY/RRKY)	A	76 80	22	20.1	1.30	B3	R10 R1, R10
QQKY	Container flat (Ex VQKY)	B	76 80	25	23.7	1.30	B2	- R1
QQLY	5 pack articulated – single centre well (12 axles) (Ex AQLY/RQLY)	A	228 252 276	52	67.4	1.80	B4	R10 R3, R10 R5, R10
QQMY	Containers (Ex RQWW)	A	78 80	25	25.6	1.80	B3	- R1
QQOY	Articulated container (6 axles) (Ex AQEY)	B	112	32	27.6	1.80	B2	
QQPY	Articulated container (6 axles) (Ex AQKY)	B	112	30	25.8	1.80	B2	
QQQY	Container flat (Ex AQQY)	B	76 80	23	20.1	1.30	B3	R10 R1, R10
QQRY	Container flat (ex WQCY/AQCY)	B	76 80	22	20.1	1.30	B3	R10 R1,R10
QQTY	Container flat (Ex VQCY)	A	76 80	20	20.1	1.30	B2	R10 R1,R10
QQWY	Container wagon (well type, 48ft) permanently coupled in pairs *	C	152 184	44.5*	42.5*	2.2	B4	R9 R9, R5
QQXY	Containers (Ex RQXY)	B	76 84 92	25	23.7	1.30	B3	- R3 R5
VQCY	Container flat (Ex RQCY)	A	76 80	20	20.1	1.30	B1	R10 R1, R10
VQKY	Container flat	B	76 80	25	23.7	1.30	B1	- R1

Code	Description	Class	Max Gross Mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
WQCY	Container flat	B	76 80	22	20.1	1.30	B3	R10 R1, R10
WQTY	Container flat	C	76 80	24	20.1	1.30	B3	R10 R1, R10

10.4. Australian Railway Historical Society A.C.T. Division

10.4.1. AHRS – Locomotives

Table 101 – AHRS – Locomotives

Code	Load Category	Description	Max Speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
44	L12	Diesel	115	108	17.8	0.90	1800		R11
48	L13	Diesel	100	75.2	14.8	0.90	900	2250 litres of fuel	R11
73	L14	Diesel	70	50	12.0	0.90	650	Nos 20 & 24 not to lead or run as a single unit	R11

10.4.2. AHRS – Diesel rail cars

Table 102 – AHRS – Diesel rail cars

Code	Description	Max speed (km/h)	Max loaded mass (t)	Passenger capacity	Length over coupling faces (m)	Draw capacity (MN)	Remarks
FP 11	Pay bus (Ex SRA)	80	12		9.3	N/A	Shall operate under block working. Not fitted with couplers.

10.4.3. AHRS – Passenger rolling stock

Table 103 – AHRS – Passenger rolling stock

Code	Description	Max speed (km/h)	Max loaded mass (t)	Passenger capacity	Length over coupling faces (m)	Draw capacity (MN)	Remarks
BAM	Sleeper	115	44	14 Berths	20.3	0.50	Nos 1741,1743
BHM	Sleeper	115	44	14 Berths	20.3	0.50	No 1738 Guards compartment
BI	First	80	25	50	15.5	0.15	No 1127, 1175 Wooden body
HFO	Economy	80	25	36	16.2	0.15	Nos 1111,1276 Wooden body
NAM	Sleeper	115	46	20 Berths	23.4	0.50	No 2335, 2341

Code	Description	Max speed (km/h)	Max loaded mass (t)	Passenger capacity	Length over coupling faces (m)	Draw capacity (MN)	Remarks
TAM	Sleeper	115	50	20 Berths	22.1	0.30	No 906 Wooden body

10.4.4. AHRS – Freight rolling stock

Table 104 – AHRS – Freight rolling stock

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
MHG	Bogie brake van No 11823	A	31	22	12.4	0.90	B1	
NFEF	Bogie flat wagon No. 22313	C	60	20	13.1	0.75	B1	
NOGF	Open wagon No. 5251 (ex L226)	C	72	20	13.1	0.75	B1	
NTAF	Tank wagon Nos 7079	C	76	28	14.55	0.90	B1	
NTAF	Tank wagon Nos 7120	C	76	28	18.1	0.90	B1	
NZWF	Bogie flat wagon No. 12223	C	61	19	13.1	0.75	B2	

10.5. Australian Rail Track Corporation

10.5.1. ARTC – Freight rolling stock

Table 105 – ARTC – Freight rolling stock

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
ADPF	Ballast plough wagon (ex NDPF)	C	33	33	12.5	1.8	B2	
ADSF	Concrete sleepers (ex NDAF)	C	76	18.6	14.6	1.80	B3	
AZRL	Rail transport wagons (Nos. 20897, 20900, 20918, 21054, 21055, 21126, 21227, 21233, 21236 ONLY)	C	63.3	17.3	14.3	1.30	B2	
AZZX	Ballast plough No. 2599	C	33.0	33.0	14.6	1.30	B2	R9
AZZX	Ballast plough Nos. 1,2 and 3	C	37.6	37.6	11.8	1.30	B2	R9
NDAF	Timber sleepers, mechanical unloader	C	76	21	14.6	1.80	B3	
ADFF	Ballast air operated discharge door (ex NDFF)	C	74	20	11.9	1.80	B3	See Below
NDPF	Ballast plough	C	24	24	12.5	1.80	B2	
NDRF	Welded rail	C	67	22	14.6	0.75	B2	
NDRF	Welded rail (numbered 2301 to 2347 only) 8 Permanently coupled rail sets (32 axles)	C	512	152	116.8	0.9	B2	
NDRF	9 Permanently coupled rail sets (36 axles)	C	576	171	131.4	0.9	B2	

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
NHBF	Ballast	C	61	19	12.4	1.80	B3	
NZBF	Ballast plough	C	33	33	11.6	0.75	B2	

OPERATION OF ADFW WAGONS OUTSIDE A WORKSITE WHEN UNEVENLY LOADED:

The ADFW ballast wagons shall not leave a worksite with an excessive load imbalance. This can result in a derailment of the vehicle.

An excessive load imbalance can result when more ballast is discharged from the outer doors on one side of the wagon than that of the other side.

Under exceptional circumstances, the worksite supervisor may arrange for an excessively unbalanced wagon to be taken to the nearest siding for detachment from the train in order to clear the section. In this case, the following operating conditions shall apply:

1. *The unbalanced wagon is not to exceed a maximum speed of 25 km/h.*
2. *The unbalanced wagon shall not pass another unbalanced ADFW wagon (whether stationary or in motion), on parallel lines where the load imbalance causes both wagons to lean towards one another.*
3. *The driver of the train conveying the unbalanced wagon shall be informed of the load imbalance.*
4. *Personnel on or about the track shall remain a safe distance from the unbalanced wagon during its movement, and they shall be warned that there is danger of derailment.*

The unbalanced wagon is not to travel further than the nearest practical location in order to clear the section.

10.6. Australian Wheat Board (AWB Grainflow)

10.6.1. AWB – Freight rolling stock

Table 106 – Australian Wheat Board – Freight rolling stock

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
WGBY	* 2 permanently coupled grain wagons	B	152 168 184	24	*32.6	1.8	●●B4	- R3 R5
WGSY	Grain hopper wagons	B	76 84 92	24	16.5	1.8	●●B4	- R3 R5

10.7. Bradken Resources Pty Ltd

10.7.1. Bradken Resources Pty Ltd – Freight rolling stock

Table 107 – Bradken Resources Pty Ltd – Container wagons

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
KQYY	40 ft container wagon (ex CQYY)	A	76 84 92	16	13.3	2.45	B4	R9,R10 R9,R3,R10 R9,R5,R10

10.8. BlueScope Steel (Pacific National operated)

10.8.1. BlueScope Steel – Locomotives

Table 108 – BlueScope Steel – Locomotives

Code	Load category	Description	Max speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse power	Remarks	Notes
D – 850HP	-	Diesel	30	98	13.1	0.75		@, \$ Nos.D19, 27,28,29, 30	R11
D – 1000HP	-	Diesel	60	89.7	16.7	1.80		#, \$ Nos.D36, D38-D45	R11

@ Locomotives D27, D28 and D29 cannot operate in multiple unit operation.

When locomotives D36, D38, D39, D44 and D45 operate in multiple unit consists, they may only operate together and to a maximum of two locomotives.

\$ Operation of these locomotives is restricted to between Cringila and Port Kembla and between Port Kembla and Enfield.

10.8.2. BlueScope Steel – Freight rolling stock

Table 109 – BlueScope Steel – Freight rolling stock

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
CT	Coiled steel wagons	D	100	23.7	14.5	0.50	B1	%
CW	Coiled steel wagons	D	100	23.4	11.9	0.50	B1	%
JR	Coiled steel wagons	D	100	21.5	13.0	0.50	B1	%
LW	Coiled steel wagons	D	100	23	15.0	0.50	B1	%
RLW	Coiled steel wagons	D	100	24.5	11.7	0.50	B1	%
PT	Plate transfer wagons	C	76 92	21.7	20.1	0.50	B1	- R5

% Operation restricted to between Lysaghts and Port Kembla.

10.9. Boxcar

10.9.1. Boxcar – Freight rolling stock

Table 110 – Boxcar – Container flat wagons

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
PQYY	5 pack articulated well (12 axles)	A	228 252	68	92.1	1.80	B4	- R3

10.10. Boyd Munro

10.10.1. Boyd Munro – Locomotives

Table 111 – Boyd Munro – Locomotives

Code	Load category	Description	Max speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
3112		Steam Loco	80	73	12.2	0.90		Max speed 80 km/h both directions	R11

10.10.2. Boyd Munro – Passenger rolling stock

Table 112 – Boyd Munro – Passenger rolling stock

Code	Description	Max speed (km/h)	Max loaded mass (t)	Passenger capacity	Length over coupling faces (m)	Draw capacity (MN)	Remarks
ABM	Lounge	115	38	32	19.0	0.35	No. 707 Fitted with internal handbrake, air tap and tail lamps.
TA	Priv Sleeper	115	45	6 Berths	21.3	0.50	No. 501 Terra Australis

10.11. Canberra Heritage Railway Restoration Pty Ltd.

10.11.1. Canberra Heritage Railway Restoration Pty Ltd. – Freight rolling stock

Table 113 – Canberra Heritage Railway Restoration Pty Ltd. – Freight rolling stock

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
MHG	Bogie brake van No. 11674	A	31	22	12.4	0.90	B1	

10.12. Capital Region Heritage Rail

10.12.1. Capital Region Heritage Rail – Locomotives

Table 114 – Capital Region Heritage – Locomotives

Code	Load Category	Description	Max Speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
1210		Steam Loco	80*	64	14.7	0.75		*Max speed tender first 25 km/h	R11
3016		Steam Loco	80*	101.5	17.6	0.75		*Max speed tender first 40 km/h	R11

10.12.2. Capital Region Heritage Rail – Diesel rail cars

Table 115 – Capital Region Heritage Rail – Diesel rail cars

Code	Description	Max speed (km/h)	Max loaded mass (t)	Passenger capacity	Length over coupling faces (m)	Draw capacity (MN)	Remarks
CPH27	Rail Motor	80	25	43	13.6	Small Hook	Note R12
CPH37	Rail Motor	80	25	43	13.6	Small Hook	Note R12

10.12.3. Capital Region Heritage Rail – Passenger rolling stock

Table 116 – Capital Region Heritage Rail – Passenger rolling stock

Code	Description	Max speed (km/h)	Max loaded mass (t)	Passenger capacity	Length over coupling faces (m)	Draw capacity (MN)	Remarks
BJ	End Platform car	80	30	30	17.6	0.20	No 897 Wooden body. Non-auto equipped
BVJ	Lounge	80	26	36	17.9	0.20	No 1457 Wooden body
BVS	Lounge / Dance	115	40	-	20.4	0.30	No 2166
FS	Economy	115	40	64	20.4	0.30	Nos 2021,2023,2082,2140
HCX	Composite	80	27.4	28	16.3	0.20	No 632 Wooden body Hook drawgear.
HN	Economy	115	41	52	20.3	0.50	No 2198 Guards compartment
LAN	Sleeper	115	46	20 Berths	23.4	0.50	No 2351, 2372
PHA	Power Van	115	54	-	23.4	0.50	No 2393
RFN	Refreshment	115	44	32E	20.3	0.50	No 1739
SCN	Composite	115	44	12F + 32E	20.3	0.50	No 1740

10.12.4. Capital Region Heritage Rail – Freight rolling stock

Table 117 – Capital Region Heritage Rail – Freight rolling stock

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
NDXF	Sleeper wagon No. 2718	C	74	19	15.0	0.75	B2	
NHWF	Ballast wagon Nos 679D & 773C	C	61	20	11.8	0.75	B1	
PHG	Power Van (No 12720 converted MHG)	A	31	22	12.4	0.90	B1	

10.13. Centennial Coal

10.13.1. Centennial Coal – Locomotives

Table 118 – Centennial Coal – Locomotives

Code	Load category	Description	Max Speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
CEY	AC6	Diesel	115 60	134 139	22.0	2.40	4500	C44aci	R9, R11, R13, R14 R9,R11, R13,R14, a

a. Operation above 134t up to 139t restricted as per TS TOC 2, Division Pages, North Section Pages.

10.13.2. Centennial Coal – Freight rolling stock

Table 119 – Centennial Coal – Freight rolling stock

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
PHGH	*2 permanently coupled coal wagons	B C C	Empty 92 100	*43.6	*32.61	2.45	B4 / E1 #	R9, #, % R9, #, % R9, #, %
PHTH	*2 permanently coupled coal wagons	B C C	Empty 92 100	*43.6	*32.3	2.45	B4 / E1 #	R9, #, % R9, #, % R9, #, %

These wagons are permitted to operate in ECP mode for a maximum consist of 50 x PHTH/PHGH wagons and 3 x CEY class locomotives in head end power configuration only.

% Additional operational notes for PHTH/PHGH wagons:

- a. Normal operation shall be in ECP mode.
- b. When loaded and using automatic air brake mode, all PHTH/PHGH wagons shall operate with the speed restrictions detailed in the following table (speeds

restrictions are not applicable when operating in ECP mode or when operating empty in any brake mode):

Table 120 – PHTH/PHGH Loaded air brake speed restrictions

Section (Line)	Direction	Start	End	Maximum Speed (km/h)
Katoomba – Emu Plains (Main West)	Up	Katoomba Station (109.943 km)	Signal 35.6 (57.300 km)	40* (*35 speed sign at Wentworth Falls to be adhered)
Berowra – Hawkesbury River (Main North)	Down	Signal 28.5 (45.953 km)	Signal HR 155 DM (57.727km)	40
Hurstville – Georges River (Illawarra)	Down	Signal SM 931 DIL / SM 927 DI (14.880 / 14.970 km)	Signal SM 1073 DI / SM 1076 DI (19.630 / 19.859 km)	35
Waterfall – Coal Cliff (Illawarra)	Down	Signal W17 (38.800 km)	Signal WG 678 D (57.560 km)	35
Scarborough – Austinmer (Illawarra)	Down	Signal WG 619 D (62.790 km)	Thirroul Station (68.674 km)	45

10.14. Chumrail Pty Ltd.

10.14.1. Chumrail Pty Ltd. – Locomotives

Table 121 – Chumrail Pty Ltd. – Locomotives

Code	Load Category	Description	Max speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
421	L12	Diesel	115	110	18.9	0.90	1800	Ex SRA 42103, 42105	R11

10.14.2. Chumrail Pty Ltd – Passenger rolling stock

Table 122 – Chumrail Pty Ltd – Passenger rolling stock

Code	Description	Max speed (km/h)	Max loaded mass (t)	Passenger capacity	Length over coupling faces (m)	Draw capacity (MN)	Remarks
BAM	Sleeper	115	44	14 Berths	20.3	0.50	No 2189
BSR	Buffet	115	40	24	20.4	0.30	No 2031
TDS	First Class	115	41	48	21.5	0.50	No 2247

10.15. CIMC Rolling Stock Australia

10.15.1. CIMC Rolling Stock Australia – Freight rolling stock

Table 123 – CIMC Rolling Stock Australia – Freight rolling stock

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
PQRY	5 Pack Articulated container (12 axles)	A	228	60.2	77.0	1.80	B4	R10
		B	252					R10,R3
		C	276					R10,R5
PQEY	2 Pack Articulated container (6 axles)	B	114	31.6	31.2	1.8	B4	-
			126					R3
			138					R5

10.16. Ettamogah Rail Hub

10.16.1. Ettamogah Rail Hub – Freight rolling stock

Table 124 – Ettamogah Rail Hub – Freight rolling stock

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
PQAW	3 pack articulated container (8 axles)	A	152	38	41.2	1.80	B3	R9

10.17. FCL

10.17.1. FCL – Freight rolling stock

Table 125 – FCL – Freight rolling stock

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
PRRY	Skeletal container flat	A	76	18	15.6	1.80	B4	R9,R10
			84					R3, R9,R10
			92					R5,R9,R10
PRXY	5 pack articulated container (12 axles)	A	228 252	60	77	1.80	B4	R9,R10 R3,R9,R10

10.18. Fletcher International Exports Pty Ltd.

10.18.1. Fletcher International Exports Pty Ltd. – Locomotives

Table 126 – Fletcher International Exports Pty Ltd. – Locomotives

Code	Load Category	Description	Max speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
FIE	AC6	Diesel AC	115 60	134 139	22.0	2.25	4500	C44aci FIE 001-004	R11,R14 R11,R14,a

- a. FIE locomotive operation above 134t up to 139t restricted as per TS TOC 2, Division Pages, North Section Pages.

10.18.2. Fletcher International Exports Pty Ltd. – Freight rolling stock

Table 127 – Fletcher International Exports Pty Ltd. – Freight rolling stock

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
FRAY	Container wagon	A	76	19.4	19.4	2.2	●●B4	-
			84					R3
			92					R5
		F	100					-

10.19. FreightLink

10.19.1. FreightLink – Freight rolling stock

Table 128 – FreightLink – Freight rolling stock

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
FQAY	5 pack articulated container (12 axles)	B	228 252 276	62	79	2.5	B4	R10 R3, R10 R5, R10

10.20. Geelong Road Bus Service Pty Ltd

10.20.1. Geelong Road Bus Service Pty Ltd – Passenger rolling stock

Table 129 – Geelong Road Bus Service Pty Ltd – Passenger rolling stock

Code	Description	Max speed (km/h)	Max loaded mass (t)	Passenger capacity	Length over coupling faces (m)	Draw capacity (MN)	Remarks
BAM	Sleeper	115	44	10 Berths	20.3	0.50	Nos 1748

10.21. Gemco Rail

10.21.1. Gemco Rail – Locomotives

Table 130 – Gemco Rail – Locomotives

Code	Load category	Description	Max speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
C	#L4	Diesel	115	134	20.6	1.80	3000	#Fitted with QES-3 traction control system	R11

10.21.2. Gemco Rail – Freight rolling stock

Table 131 – Gemco Rail – Freight rolling stock

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
PQGY	Container Wagon (40ft 2 slot w/WF5 triple valves)	B	76 84 92	17.6	13.5	2.2	B4	R10 R10, R3 R10, R5

10.22. GrainCorp Operations Ltd.

10.22.1. GrainCorp Operations Ltd. – Locomotives

Table 132 – GrainCorp Operations Ltd. – Locomotives

Code	Load category	Description	Max speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
48	L13	Diesel	100	78	14.8	1.80	900	Ex PN 48 class	R11
48200	L13	Diesel	100	78	14.8	1.80	900	Ex PN 48 class (48201-48224)	R11
GPU	L13	Diesel	100	78	14.8	1.80	900	Ex PN 48 class. Cab is non operable. Slave or booster unit only. GPU locomotive to be marshalled behind lead locomotive at all times.	R11

10.22.2. GrainCorp Operations Limited – Freight rolling stock

Table 133 – GrainCorp Operations Limited – Freight rolling Stock

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
NGVF/ GGVF	Grain (Ex NGVF)	C	76	20.5	15.1	1.80	••B4	
NGXH/ GGXH	* 3 permanently coupled grain hoppers	A	228*	26	51.8*	2.45	••B4	-
		F	252*					R3
			276*					R5
			300*					-

10.23. Great Southern Railway

10.23.1. Great Southern Railway – Passenger rolling stock

Table 134 – Great Southern Railway – Passenger rolling stock

Code	Description	Max speed (km/h)	Max loaded mass (t)	Passenger capacity	Length over coupling faces (m)	Draw capacity (MN)	Remarks
ACC	Gold Lounge car	115	49		23.8	0.89	No 223E
AEC	Entertainment car	115	48.7		23.8	0.89	No 222
AFC	Lounge	115	44	53	23.8	0.89	Nos 213,227, 301,305-307,936-939
AG	Passenger	115	49	62	23.8	0.89	Nos 369,372-376
AJ	1 st CI Coach	115	45.9	44	23.8	0.89	Nos 1 – 3
AOB	Lounge	115	45	54 Diners	23.8	0.89	Menindee Lakes Lounge
ARJ	Sleeper	115	49	18 Berths	23.8	0.89	Roomette Nos 242, 243, 272, 282, 941, 945, 973, 984
ARL	Sleeper	115	49	18 Berths	23.8	0.89	Twinnette Nos 246,248-250, 289, 291, 293, 308-310, 324, 326, 920-923, 925, 961-963, 992
ARM	Sleeper	115	49	16 Berths	23.8	0.89	Twinnette Nos 288,947,951-953,987,990
BG	Passenger	115	52	62	23.8	0.89	Nos 368,370,371
BJ	Econ Coach	115	45.4	64	23.9	0.89	Nos 4 – 10
BMC	Passenger	115	49		23.9	0.45	No 2
BRG	Sleeper	115	51.1	10 Berths	23.8	0.89	Roomette Nos 168, 170, 171, 173, 175, 221, 267, 269, 271, 969, 972, 974, 999
BRJ	Sleeper	115	50	32 Berths	23.8	0.89	Roomette Nos 268, 270, 302, 303, 912, 915, 916, 918, 919
CDF	Cafeteria	115	49	54	23.8	0.89	Nos 225,924,928,929,966
CCL	1 st CI Lounge	115	43.0		23.8	0.89	Nos 2 and 3
DF	Diner	115	51	48 Diners	23.8	0.89	Nos 226, 231-233, 294, 304, 927, 930, 934, 964

Code	Description	Max speed (km/h)	Max loaded mass (t)	Passenger capacity	Length over coupling faces (m)	Draw capacity (MN)	Remarks
ER	Staff Car	115	48		23.8	0.89	Nos 207,313,906,909
HGM	Power Van	115	57		23.8	0.89	Nos 205,296-298, 317, 900, 902-904
HM	Brake Van	115	42		23.8	0.89	Nos 255, 256, 311, 312, 318, 901, 957-959
JRB	1 st Roomette	115	47.1	20 Berths	23.8	0.89	Nos 1 and 2
JTB	1 st Twinette	115	47.7	20 Berths	23.8	0.89	Nos 1 – 4
RBJ	Club car	115	46		23.8	0.89	Nos 1 – 3
SSA	Chairmans Car	115	46		23.8	0.89	No 260

10.23.2. Great Southern Railway – Freight rolling stock

Table 135 – Great Southern Railway – Freight rolling stock

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
AMPZ	Motor car carrier	A	34	25	23.1	1.30	B2	
AMRZ	Motor car carrier	A	34	25	23.1	1.30	B2	
AQMZ	Motor car carrier	A	55	21	20.1	1.30	B2	

10.24. Greentrains

10.24.1. Greentrains – Locomotives

Table 136 – Greentrains – Locomotives

Code	Load category	Description	Max speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
45s --	L12	Diesel	115	112	17.9	0.90	1800	Ex SRA 45 class	R11
48s --	L13	Diesel	100	75.2	14.8	1.30	900	Nos 37 Ex SRA 48 class locomotive	R11
49	L13	Diesel	100	81	15.4	0.9	875		R11
600	L12	Diesel	115	112	17.9	0.90	1800	Ex AN locos, same as SRA 45 class	R11
80	L9	Diesel	115	121	19.0	1.80	2000	Ex Pacific National 80 class	R11
D47, D48, D49, D51	L11	Diesel	100	122	17.6	1.80	1950	Ex BHP D class, Ex Westrail K Class 6819 litres fuel	R11

Code	Load category	Description	Max speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
NA 1874	L10	Diesel	90	120	17.9	0.75	2000	Ex Westrail NB class, Fuel 4000 litres	
K	L11	Diesel	100	110	17.64	1.80	1950		R11
T	L13	Diesel	100	69	13.4	1.30	875		R11, a

- a. *These locomotives can be disregarded when calculating the maximum number of locomotives that can be marshalled on the front of a train.*

10.24.2. Greentrains – Freight rolling stock

Table 137 – Greentrains – Container wagons

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
SQKF	Container flat (ex RKQX)	C	76 80	18.2	18.0	0.90	B3	- R1
SQLY	Containers (ex AFSY,RFSY)	B	76 80	22	17.9	1.30	B1	R10 R1, R10
SQMY	Containers (ex RQOY) (Mass reduced SQOY).	B	76 80	22.2	23.7	1.30	B3	- R1, a
SQNY	Containers (ex AFCY)	B	76	19	15.2	1.30	B2	R10
SQOY	Containers (ex RQOY).	B	76 80	24	23.7	1.30	B3	- R1, a

- a. *When these vehicles are loaded in excess of 76 tonnes gross mass, they are not permitted to operate Valley Heights to Katoomba (both directions).*

10.25. Heritage Locomotive Company

10.25.1. Heritage Locomotive Company – Locomotives

Table 138 – Heritage Locomotive Company – Locomotives

Code	Load Category	Description	Max speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
421	L12	Diesel	115	110	18.9	0.90	1800	Road No. 42101	R11

10.26. Junee Railway Workshop

10.26.1. Junee Railway Workshop – Locomotives

Table 139 – Junee Railway Workshop – Locomotives

Code	Load category	Description	Max speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
48	L13	Diesel	100	75.2	14.8	1.8	900	4814, 4816, 4836 Ex SRA locos	R11

10.26.2. Junee Railway Workshop – Freight rolling stock

Table 140 – Junee Railway Workshop – Freight rolling stock

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
EQAX	Container flat.(ex BHP) Wagon No 10	C	76 92	21.7	20.1	0.75	B1	R10 R5, R10
EQAX	Container flat.(ex BHP ex PT wagon)	C	76 92	21.7	20.1	0.75	B1	R10, # R5, R10, #

These vehicles are not fitted with grade control valves or fixed exhaust chokes. If operating LOADED in the Up direction between Katoomba and Valley Heights, these vehicles shall not exceed 20% of the train mass.

No restrictions apply when EMPTY

10.27. Lachlan Valley Railway

10.27.1. Lachlan Valley Railway – Locomotives

Table 141 – Lachlan Valley Railway – Locomotives

Code	Load category	Description	Max speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
3026		Steam Loco	80	101.25	17.6	0.75		Maximum speed tender first 35 km/h	R11
3237		Steam Loco	100	105.5	18.34	0.90		Maximum speed tender first 40 km/h	R11
5367		Steam Loco	60	126.4	18.5	0.90		Maximum speed tender first 35 km/h	R11
5917		Steam Loco	80	154.0	20.6	0.90		Maximum speed tender first 40 km/h	R11
42	L12	Diesel	115	122.0	18.5	0.90	1750	Ex SRA Loco	R11
44	L12	Diesel	115	108	17.8	0.90	1800	Ex SRA Loco	R11
47	L13	Diesel	100	85.3	14.0	1.80	1000	Ex SRA Loco	R11

Code	Load category	Description	Max speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horsepower	Remarks	Notes
49	L13	Diesel	100	81.0	15.4	0.90	875	Ex Patrick (NSW 49 class)	R11

10.27.2. Lachlan Valley Railway – Diesel rail cars

Table 142 – Lachlan Valley Railway – Diesel rail cars

Code	Description	Max speed (km/h)	Max loaded mass (t)	Passenger capacity	Length over coupling faces (m)	Draw capacity (MN)	Remarks	Notes
CPH12	Rail Motor	80	25	43	13.6	Small Hook		R12
CPH24	Rail Motor	80	25	43	13.6	Small Hook		R12
CPH25	Rail Motor	80	25	43	13.6	Small Hook		R12

10.27.3. Lachlan Valley Railway – Passenger rolling stock

Table 143 – Lachlan Valley Railway – Passenger rolling stock

Code	Description	Max speed (km/h)	Max loaded mass (t)	Passenger capacity	Length over coupling faces (m)	Draw capacity (MN)	Remarks
ABS	Dining	115	46		21.5	0.70	No 2304
EAM	Sleeper	115	48	20 Slpr/20 sitt	20.3	0.30	No 1831
FS	Economy	115	40	64	20.4	0.30	Nos 2091, 2029, 2126, 2133
MCE	Corridor car	115	52.9	66	22.7	0.30	No 114
RBS	First	115	41.1	30	19.8	0.30	No 2160
OAH	Twin Sleeper	115	44	20 Berths	20.3	0.5	Ex RDH 2237
OAS	Twin Sleeper	115	44	20 Berths	21.5	0.5	Ex ODS 2261
OSS	Shop / Lounge	115	45	N/A	21.5	0.5	Ex SDS 2271
OAM	Twin Sleeper	115	46	20 Berths	23.4	0.5	Ex NAM 2336, NAM 2329
OAN	Roomette/ Slper	115	46	20 Berths	23.4	0.5	Ex LAN 2378
ORS	Diner	115	46	N/A	21.5	0.5	Ex ABS 2300
OSH	Bar / Lounge	115	44	N/A	20.3	0.5	Ex BHA 2223
OPV	Power Van	115	44	N/A	14.5	0.5	Ex PHV 2402

10.27.4. Lachlan Valley Railway – Freight rolling stock

Table 144 – Lachlan Valley Railway – Freight rolling stock

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
K	No 485 – 4 wheel open wagon	D	36	10.0	7.3		B1	
L	No 168 – 4 wheel open wagon (ex S truck)	D	24	8.0	6.3		B1	
FHG	No 31772 bogie guards van	A	30	24	13.1	0.70	B2	
SWT	No 12 Bogie water gin 31540 litres	C	54	24	14.6		B1	

10.28. Locomotive Demand Power (LDP)

10.28.1. Locomotive Demand Power – Locomotives

Table 145 – Locomotive Demand Power – Locomotives

Code	Load Category	Description	Max speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
LDP	AC6	AC Diesel	115	134	22.0	2.25	4500	Type GT46C-Ace	R11, R14
LDP10	AC6	AC Diesel	115	134	22.0	2.25	4500	Type GT46C-Ace Nos. LDP10 to LDP14	R11, R13, R14

10.29. Macfield Leasing Corp

10.29.1. Macfield Leasing Corp – Freight rolling stock

Table 146 – Macfield Leasing Corp – Hopper wagons

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
PHMY	Stone hopper	B	76 84 92	25.3	12.9	2.2	B3	- R3 R5

10.30. Manildra Flour

10.30.1. Manildra Flour – Locomotives

Table 147 – Manildra Flour – Locomotives

Code	Load Category	Description	Max speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
MM	L13	Diesel	100	81	15.4	0.90	875	Ex SRA Loco 49 class Converted to driver only (yard restricted)	R11
442	L11	Diesel	115	115	18.7	1.8	2000	44208, 44209	R11
73	L14	Diesel	70	50	12.0	0.90	650	Ex SRA Loco	R11

10.30.2. Manildra Flour – Freight rolling stock

Table 148 – Manildra Flour – Freight rolling stock

Code	Description	Class	Max Gross Mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
MBAX	Covered wagon (Ex WBAX)	C	76 80	25	18.0	1.30	B3	- R1
MHGX	Grain hopper (Ex AHGX)	C	76	21	14.6	1.30	B2	
MQRF	Container flat (Ex AQRF)	C	76	21	14.9	1.30	B1	
MGFH	Grain hopper	C E C	Empty 81 100	26.5	17.6	1.80	B4	- # #

When these vehicles are loaded, they are not permitted to use Berry Down Siding.

10.31. Mineral Resources Limited (MRL)

10.31.1. Mineral Resources Limited – Locomotives

Table 149 – Mineral Resources Limited – Locomotives

Code	Load Category	Description	Max speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
MRL	AC6	Diesel Electric AC Traction	115 60	134 139	22	2.25	4500	C44aci	R9,R11, R14 R9,R11, R14,a

a. MRL locomotive operation above 134t up to 139t restricted as per TS TOC 2, Division Pages, North Section Pages.

10.32. Museum of Applied Arts and Sciences

10.32.1. Museum of Applied Arts and Sciences – Locomotives

Table 150 – Museum of Applied Arts and Sciences – Locomotives

Code	Load Category	Description	Max speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
3265		Steam Loco	100	105.5	18.34	0.90		Maximum speed tender first 40 km/h	R11
3830		Steam Loco	115	201	23.3	0.90		Max speed tender first 40 km/h	R11

10.32.2. Museum of Applied Arts and Sciences – Passenger rolling stock

Table 151 – Museum of Applied Arts and Sciences – Passenger rolling stock

Code	Description	Max speed (km/h)	Max loaded mass (t)	Passenger capacity	Length over coupling faces (m)	Draw capacity (MN)	Remarks
GG	Gov. Gen. Car	115	37.2	6 Berths	20.5	0.20	Wooden body restricted service

10.33. National Rail Equipment Co (NREC)

10.33.1. National Rail Equipment Co – Locomotives

Table 152 – National Rail Equipment Co – Locomotives

Code	Load Category	Description	Max speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
1200	L9	Diesel Electric Genset	115	114	19.5	3.5	2400	3 Gensets	R11, a

a. All 3 gensets shall be fitted at all times.

10.34. North West Coach Builders

10.34.1. North West Coach Builders – Passenger rolling stock

Table 153 – North West Coach Builders – Passenger rolling stock

Code	Description	Max speed (km/h)	Max loaded mass (t)	Passenger capacity	Length over coupling faces (m)	Draw capacity (MN)	Remarks
EBS	Passenger first class (ex BS 2076)	115	40.1	42	20.38	0.30	No. 2076

10.35. NSWGR Holdings Pty. Ltd.

10.35.1. NSWGR Holdings Pty Ltd – Passenger rolling stock

Table 154 – NSWGR Holdings Pty Ltd – Passenger rolling stock

Code	Description	Max speed (km/h)	Max loaded mass (t)	Passenger capacity	Length over coupling faces (m)	Draw capacity (MN)	Remarks
LAN	Roomette Sleeper	115	46	20 Berths	23.4	0.50	No. 2323, 2325, 2326, 2344
LAN	Roomette Sleeper w/holding tanks	115	52.9	18 Berths	23.4	0.50	No. 2348, 2372
MHN	Equipment Van	115	46	-	23.4	0.50	No. 2366 (24t capacity)
NAM	Twin Sleeper	115	46	20 Berths	23.4	0.50	No. 2367
NAM	Twin Sleeper w/holding tanks	115	53.9	20 Berths	23.4	0.50	No. 2330, 2335, 2341, 2342, 2367, 2374
OAP	Twin Sleeper	115	46	20 Berths	23.4	0.50	No. 2331 (ex NAM)
PHN	Power Van	115	54	-	23.4	0.50	No. 2381
RMS	Buffet Car	115	46	48	23.4	0.50	No. 2360

10.36. NSW TrainLink

10.36.1. NSW TrainLink – Locomotives

Table 155 – NSW TrainLink – Locomotives

Code	Load Category	Description	Max speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
XP	N/A	Diesel	160	76	17.4	0.299	2000	4500 Litres fuel	

10.36.2. NSW TrainLink – Passenger rolling stock

Table 156 – NSW TrainLink – Passenger rolling stock – Xplorer

Code	Description	Max speed (km/h)	Max loaded mass (t)	Passenger capacity	Length over coupling faces (m)	Draw capacity (MN)	Remarks
EA	Xplorer	145	58	42 1 st	25.3	0.25	Driving car with buffet
EB	Xplorer	145	58	66 Econ	24.7	0.25	Intermediate car
EC	Xplorer	145	57	50 Econ	25.3	0.25	Driving car with booked luggage

Table 157 – NSW TrainLink – Passenger rolling stock – XPT

Code	Description	Max speed (km/h)	Max loaded mass (t)	Passenger capacity	Length over coupling faces (m)	Draw capacity (MN)	Remarks
XAM	XPT Car	160	48.3	18 Berths	24.2	0.25	27 seats day travel, crew compartment
XAMB	XPT Car	160	54.0	18 Berths	24.2	0.25	Car No. 2183 (ex XF car), 27 seats day travel, crew compartment
XFH	XPT Car	160	40.1	52 Econ	24.2	0.25	Crew compartment + booked luggage
XBR	XPT Car	160	43.6	21 Econ	24.2	0.25	Buffet car, wheelchair position
XF	XPT Car	160	41.6	68 Econ	24.2	0.25	
XL	XPT Car	160	39.6	56 1 st	24.2	0.25	

Table 158 – NSW TrainLink – Passenger rolling stock – Double deck intercity cars – Narrow Width Classification (Group 1)

Type of car	Sets	Car numbers	Code	Max speed (km/h)	Tare mass (t)	Length body (mm)	Length coupled (m)	Width (mm)	Seat capacity
Motor	V	8021-8031	DCM	115	61.0	23530	23.9	2928	88
Motor	V	8032-8036	DTM	115	61.0	23530	23.9	2928	88
Motor	V	8020, 8038-8092	DIM	115	59.4	23530	23.9	2928	96
Motor (Chopper control)	V	8093-8138	DJM	115	61.0	23530	23.9	2928	96
Motor (Chopper control)	V	8139-8145	DKM	115	61.7	23485	23.9	2916	96
Ctrl Trailer	V	9031-9036	DTD	115	46.0	23530	23.9	2928	94
# Ctrl Trailer	V	9037-9044	DCT	115	46.0	23530	23.9	2928	94
Trailer	V	9101-9184	DIT	115	44.0/45.6	23232	23.8	2928	112
Trailer	V	9185-9191	DKT	115	44.3	23232	23.8	2916	112

Type of car	Sets	Car numbers	Code	Max speed (km/h)	Tare mass (t)	Length body (mm)	Length coupled (m)	Width (mm)	Seat capacity
Trailer	V	9201-9207	DMT	115	40.0	23514	23.9	2915	92
Trailer	V	9208-9211	DDT	115	40.0	23514	23.9	2915	96
Trailer	V	9212-9215	DFT	115	40.0	23292	23.8	2915	100
Trailer	V	9216	DET	115	43.0	23530	23.9	2928	100
Motor (Chopper control)	Y	8121, 8127, 8128, 8134	DJM	115	61.0	23530	23.9	2928	%
Trailer	Y	9127, 9131	DIT	115	44.0	23232	23.8	2928	%

% No passengers are to be carried in these sets, crew and testing personnel only. To run as 3 car sets.

Not used as driving trailers – some control removed.

Table 159 – NSW TrainLink – Passenger rolling stock – Double deck outer suburban cars – Medium Width Classification (Group 3)

Type of car	Sets	Car numbers	Code	Max speed (km/h)	Tare mass (t)	Length body (mm)	Length coupled (m)	Width (mm)	Seat capacity
Motor Car (UG)	H	5821 – 5826, 5901 – 5949	ON	130	53.5	19570	20.3	3034	118
Motor Car (With toilet) (UG)	H	5871 – 5876, 5951 – 5999	ONL	130	54.1	19570	20.3	3034	110
Trailer Control (UG)	H	6843 – 6854, 6901 – 6999	OD	130	49.2	19570	20.4	3034	102

(UG) United Group Limited Rail

Table 160 – NSW TrainLink – Passenger rolling stock – Mariyung (NIF) Double deck outer suburban cars – Sub-Medium Width Classification (Group 3b)

Type of car	Sets	Car numbers	Code	Max speed (km/h)	Tare mass (t)	Length body (mm)	Length coupled (m)	Width (mm)	Seat capacity
Trailer Driver Car w/ATP (H)	D	9301-9372 9401-9467	DDA	130 #	48.5	19775	20.4	3034	79
Motor Car w/DSAPT toilet (H)	D	8301-8372 8401-8467	DND	130 #	52.0	19570	20.3	3034	80
Motor Car (H)	D	8501-8572 8601-8667	DN	130 #	51.0	19570	20.3	3034	87
Trailer Car (H)	D	9601-9667	DT	130 #	46.1	19570	20.4	3034	86
Motor Car w/toilet (H)	D	8801-8867	DNL	130 #	52.1	19570	20.3	3034	87
Trailer Driver Car (H)	D	9701-9772 9801-9867	DD	130 #	48.3	19775	20.4	3034	79

(H) Hyundai-Rotem Company

Maximum speed limited to 130km/h (for further information refer to TS TOC 2, Division Pages, Section 17, Passenger Train Operating Conditions, Designation or rolling stock and Speed signs – maximum kilometres per hour)

Table 161 – NSW TrainLink – Passenger rolling stock – Endeavour cars – Narrow Width Classification (Group 6)

Type of car	Sets	Car numbers	Code	Max speed (km/h)	Tare mass (t)	Length body (mm)	Length coupled (m)	Width (mm)	Seat capacity
Motor (Toilet) ++	N	2801-2814	TE	145	57.8	24750	25.2	2921	82
Motor (Luggage) ++	N	2851-2864	LE	145	56.6	24750	25.2	2921	95

++ Note R12 applies – see 10.1 Explanation of notes for locomotive and rolling stock data (page 179).

Table 162 – NSW TrainLink – Passenger rolling stock – Hunter cars – Narrow Width Classification (Group 6)

Type of car	Sets	Car numbers	Code	Max speed (km/h)	Tare mass (t)	Length body (mm)	Length coupled (m)	Width (mm)	Seat capacity
Hunter Rail Car ++	J	2701 – 2707	HM	145	61.0	24320	25.2	2930	@ 77
Hunter Rail Car with Toilet ++	J	2751 – 2757	HMT	145	61.5	24320	25.2	2930	@ 69

++ Note R12 applies – see 10.1 Explanation of notes for locomotive and rolling stock data (page 179).

@ Each car has 2 wheel chair spaces.

10.37. Nova Coal Australia

10.37.1. Nova Coal Australia – Freight rolling stock

Table 163 – Nova Coal Australia – Freight rolling stock

Code	Description	Class	Max Gross Mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
PHCH	*7 permanently coupled coal wagons.	G C	840 Empty	23	*109.2	2.45	B4	

10.38. One Rail Australia

10.38.1. One Rail Australia – Locomotives

Table 164 – One Rail Australia – Locomotives

Code	Load category	Description	Max speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
ALF	L6	Diesel	115	128	20.7	1.80	3000		R11
CLF	L6	Diesel	115	128	20.5	1.80	3000		R11
CLP	L6	Diesel	115	132	20.5	1.80	3000		R11
GM(12)	L12	Diesel	115	116.3	18.5	0.90	1800	GM 12 – 47 only	R11
GWA	AC6	AC Diesel	115	134	22.0	2.25	4500	GT46C-Ace	R11,R14
GWU	AC6	AC Diesel	115 60	134 139	22.0	2.25	4500	C44aci (GWU00-GWU015)	R9, R11, R14 R9, R11, R14, a
22	L10	Diesel	115	110	18.4	1.80	2000	Ex Pacific National 422 class	R11
830	L13	Diesel	100	71.4	14.8	0.90	900		R11
900	L13	Diesel	100	71.4	14.8	0.90	900	Ex DA/830 class with lowered short hood	R11

a. GWU locomotive operation above 134t up to 139t restricted as per TS TOC 2, Division Pages, North Section Pages.

10.38.2. One Rail Australia – Freight rolling stock

Table 165 – One Rail Australia – Flat wagons

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
WFDY	Flat	C	76	27	17.4	1.30	B3	

Table 166 – One Rail Australia – Hopper wagons

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
AHAH	Coal Hopper (*permanently coupled in rakes of 4)	B G	Empty 112	22.7	61.43*	2.2	E1#	#
AHGX	Hopper grain	C	76	21	14.6	1.30	B2	
AHHF	Grain hopper	C	76 80 92	26	15.4	1.30	B3	- R1 R5

These wagons are permitted to operate in ECP mode in a head end power consist with 3 x XRN and 96 AHAH wagons or 3 x GWU and 96 AHAH wagons.

Table 167 – One Rail Australia – Steel product wagons

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
AKGX	Bulk Steel	C	76 80	25	17.9	1.30	B3	- R1

Table 168 – One Rail Australia – Louvered vans

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
ALCX	Louvre	C	68	22	14.6	1.30	B1	
ALGX	Louvre	C	64	23	13.1	1.30	B1	
ALHX	Louvre	C	70	25	14.1	1.30	B3	

Table 169 – One Rail Australia – Open wagons

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
AOGF	Open wagon	C	63	18.2	14.0	0.90	B1	#
AOGL	Open wagon	C	63	18.2	14.0	0.90	B1	#
AOLX	Ex AOOX	C	76 80	28	23.7	1.30	B3	- R1
AOMX	Open	C	76 80	31	23.7	1.30	B1	- R1
AOOX	Open	C	76 80	28	23.7	1.30	B3	- R1
WODX	Open	C	76 80	26	18.0	1.30	B3	- R1
WOSF	Open	C	76 80	26	18.0	1.30	B3	- R1
WOSX	Open high sided	C	76 80	26	18.0	1.30	B3	- R1

AOGF and AOGL wagons are not fitted with grade control valves or fixed exhaust chokes. If operating LOADED in the Up direction between Katoomba and Valley Heights, these vehicles shall not exceed 20% of the train mass. No restrictions apply when EMPTY

Table 170 – One Rail Australia – Container wagons

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
AQAY	Container flat	A	76 80 84 92	21.1	20.1	1.45	B3	- R1 R3 R5

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
AQCY	Container flat (ex WQCY)	B	76 80	22	20.1	1.30	B3	R10 R1, R10
AQEY	Articulated container (6 axles)	B	112	32	27.6	1.80	B2	
AQKY	Articulated container (6 axles)	B	112	30	25.8	1.80	B2	
AQOX	Container flat	C	76 80	25	23.7	1.30	B3	- R1
AQQX	Container flat	C	76 80	26	23.7	1.30	B3	- R1
AQQY	Container flat	B	76 80	23	20.1	1.30	B3	R10 R1, R10
AQRF	Container flat	C	76	21	14.9	1.30	B1	
AQRY	Articulated container (6 axles) (ex AQEY)	B	112	32	27.6	1.80	B2	R10
AQSY	Container flat	B	76 80	23	20.1	1.30	B3	R10 R1, R10
PQLY	Container wagon	A	76 84 92	19.3	19.31	2.2	B4	R9,R10 R3,R9,R10 R5,R9,R10
PQNY	Container wagon	A	76 84	16.2	13.37	2.2	B4	R9,R10 R3,R9,R10
PQWY	Container well	B	76 84 92	21.7	19.6	2.2	B3	R9,R10 R3,R9,R10 R5,R9,R10
WQCX	Container flat	C	76 80	23	20.1	1.30	B3	R10 R1, R10
WQCY	Container flat	B	76 80	22	20.1	1.30	B3	R10 R1,R10
WQTY	Container flat	C	76	24	20.1	1.30	B3	R10

Table 171 – One Rail Australia –Well wagons

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
AWWX	Well wagon	C	74	27	19.6	1.30	B3	

Table 172 – One Rail Australia – Sleeper wagons

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
AZCF	Sleepers	C	76 80	20.3	15.2	0.90	B1	- R1
AZCL	Sleepers	C	76 80	20.3	15.2	0.90	B1	- R1

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
RGC	Sleepers	C	76 80	20.3	15.2	0.90	B1	- R1

10.38.3. One Rail Australia – Passenger rolling stock

Table 173 – One Rail Australia – Passenger rolling stock

Code	Description	Max speed (km/h)	Max loaded mass (t)	Passenger capacity	Length over coupling faces (m)	Draw capacity (MN)	Remarks	Notes
JTA	Crew Car	80	51	12	23.9	0.89		R9
JRA	Crew Car	80	52	12	23.9	0.89		R9

10.39. Pacific National

10.39.1. Pacific National – Locomotives

Table 174 – Pacific National – Locomotives

Code	Load category	Description	Max speed (km/h)	Live weight (t)	Length over coupling Faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
48	L13	Diesel	100	75.2	14.8	0.90*	900	4801 – 85 *4801 – 125	R11
48	L13	Diesel	100	78	14.8	1.80**	900	4886 – 165 ** 48126 – 165	R11
80	L9	Diesel	115	121	19.0	1.80	2000		R11
81	L4	Diesel	115	129	21.2	2.20	3000		R11
82	L3	Diesel	115	132	22.0	2.20	3000		R11
830	L13	Diesel	100	71.4	14.8	0.90	900		R11
90	L1	Diesel	80	167	22.0	2.20	4000		R11
92	AC6	AC Diesel	115 60	134 139	22.0	2.25	4500	C44aci	R9, R11, R14 R9, R11, R14, a
93	AC6	AC Diesel	115 60	134 139	22.0	2.25	4500	C44aci (9301-9324)	R9, R11, R14 R9, R11, R14, a
AN	L2	Diesel	115	130	22.0	2.20	4000		R11
BL	L4	Diesel	115	128	20.7	2.20	3000	◆ BL's 26,27,28, 31,33,35.	R8,R11
DL	L5	Diesel	115	121.5	19.7	2.20	3000	◆DL's 38 to 50.	R8
G	L4	Diesel	115	128	19.8	1.80	3000	Nos 511 to 543	R11

Code	Load category	Description	Max speed (km/h)	Live weight (t)	Length over coupling Faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
L	L6	Diesel	100	137	20.2	1.80	3000	13000 Litres fuel Ex WAGR	R11
NR	L2	Diesel	115	132	22.0	2.20	4000		R9,R11
NR	L2	Diesel	115	132	22.0	2.20	4000	ECP Fitted	R9, R11, R13, b, #, %
PL	L13	Diesel	100	75.2	14.8	0.90*	900	Ex 48 class locomotive	R11
T^	L13	Diesel	100	69	13.4	1.30	875		R11
TT	AC6	AC Diesel	115	134	22.0	2.25	4500	TT01 – TT08 GT46C-Ace	R11,R13, R14, \$ R11,R13, R14, a
TT100	AC6	AC Diesel	115	134	22.0	2.25	4500	TT101- TT132 GT46C-Ace	R11,R13, R14, \$ R11,R13, R14, a
X%	**L7 L9	Diesel	115	118	18.4	1.80	2000	** L7 rating for X46, X47 and X51	R8,R11
XRB	L5	Diesel	115	128	18.4	1.80	3000	Non cab slave/booster unit. To be marshalled behind lead locomotive at all times.	
XR2	L5	Diesel	115	128	18.4	1.80	3000		R11
#X100		Diesel Shunter	20	18	6.8				
#X200		Diesel Shunter	50	30	7.4				

^ These locomotives can be disregarded when calculating the maximum number of locomotives that can be marshalled on the front of a train

% Nos 38, 46, 45, 47 and 51 only fitted with de-sanding equipment – exempt from note R8. May operate as a single unit or in multiple unit consists

TOC Waiver authority required for travel over TfNSW Metropolitan Heavy Rail network tracks

◆ These locomotives equipped with de-sanding equipment – exempt from note R8. May operate as single units or in multiple unit consists

a. Operation above 134t restricted as per TS TOC 2, Division Pages, North Division Pages

b. Only locomotives NR 14, 15, 17, 31, 38, 40, 54, 55, 60, 71, 73, 78, 108, 115, 116, and 120 fitted with ECP (note R13)

These locomotives are permitted to operate in ECP mode with the following consist:

2 x NR (R13) Locomotives leading – 44 x RHKY wagons

% These locomotives are permitted to operate in ECP and WDP mode with the following consist:

1 x NR (R13) locomotive – 36 x RHKY wagons – 1 x NR (R13) locomotive

1 x NR (R13) locomotive – 36 x RHKY wagons – 1 x TT/TT100 locomotive

\$ These locomotives are permitted to operate in ECP and WDP mode with the following consist:

1 x NR (R13) locomotive – 36 x RHKY wagons – 1 x TT/TT100 locomotive

1 x TT/TT100 locomotive – 36 x RHKY wagons – 1 x TT/TT100 locomotive

10.39.2. Pacific National – Freight rolling stock

Table 175 – Pacific National – Covered wagons

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
RBFX	Box van	C	76 80	30	23.7	1.30	B3	- R1
VBBX	Covered wagon	C	76 80	22	13.1	0.90	B1	- R1
VBCW	Covered wagon	C	76	35	23.5	1.30	B1	

10.39.3. Pacific National – Coiled steel wagons

Table 176 – Pacific National – Coiled steel wagons

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
NCWF	Coil	C	76	21	13.1	0.75	B3	
NCFE	Jumbo Coil / Container wagon	C	76 92	21.5	20.5	1.80	B3	R10 R5,R10
RCAF	Coil	C	76 80	24	15.1	1.85	B3	- R1
RCAY	Coil (ex VQCX)	A	76 84 88	24.5	20.085	1.30	B1	- R3 R5
RCBF	Jumbo coil steel/scrap steel container wagon	C	76 92	21	15.1	1.85	B3	- R5
RCDX	Coil	C	76 80	23	14.9	1.30	B1	- R1

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
RCEF	Coil (Ex VQOF)	C	76 80	21	14.9	1.30	B2	- R1
RCIX	Coil	C	76 80	22	14.6	0.90	B3	- R1
RCJY	Coil (Ex RQMY)	A	76 84 92	25	20.1	1.30	B3	R10 R3, R10 R5, R10
RCKF	Coil	C	76 80 92	22	12.3	1.80	B3	- R1 R5
RCOF	Coil	C	76 80	20	15.1	1.80	B3	- R1
RCPF	Coil	C	76 80	15	11.0	0.90	B3	- R1
RCQF	Coil	C	76 92	21	15.1	1.85	B3	- R5
RCRX	Coil	C	76 80	25	14.6	0.90	B2	- R1
RCSF	Coil	C	76 92	22	12.3	1.30	B3	- R5
RCWF	Coil	C	76	21	13.1	0.75	B3	

10.39.4. Pacific National – Track maintenance vehicles

Table 177 – Pacific National – Track maintenance vehicles

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
NDHX	Sleeper carrying wagon	C	76 80	20.0	14.6	1.25	B3	- R1
RDSF	Container wagon for transport of sleepers	C	72	21.0	14.6	1.05	B2	
RDTF	Container wagon for transport of sleepers	C	80	21.0	14.6	1.05	B2	R1
RDUF	Container wagon for transport of sleepers (ex RDTF)	C	80	21.0	14.6	1.25	B2	R1

10.39.5. Pacific National – Container flat electric operated

Table 178 – Pacific National – Container flat electric operated

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
VEKX	container flat electric operated	C	76 80	25	23.7	1.30	B2	- R1

10.39.6. Pacific National – Flat wagons

Table 179 – Pacific National – flat wagons

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
VFCX	Flat for pipe/logs (ex VQLX)	C	76	23.7	20.7	1.30	B2	R9
VFHX	Log wagons ex VFNX	C	76 80	25	20.7	1.30	B2	- R1
VFLX	Flat with bulkheads	C	76	26	20.7	1.30	B1	

10.39.7. Pacific National – Grain hoppers

Table 180 – Pacific National – Freight rolling stock – grain hoppers

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
NGDX	Grain	C	73	18.5	14.3	0.90	•□B3	
NGFF	Grain	C	76	22	14.6	0.75	B2	
NGGF	Grain When loaded from 78 up to a maximum of 81 tonnes gross mass Class E speeds will apply.	B E	78 81	21	14.3	1.80	B3	
NGHF	Grain	C	76	17.8	14.4	1.80	••B4	
NGIF	Grain	C	76	19	15.1	0.75	•□B4	
NGKF	Grain When loaded from 78 up to a maximum of 81 tonnes gross mass Class E speeds will apply.	B E	78 81	21.5	14.3	1.80	••B3	
NGLF	Grain	C	73	17	14.3	0.90	B2	
NGMA	Grain	D	68	22	11.9	0.75	B2	
NGMF	Grain	D	68	22	11.9	0.75	B2	
NGNF	Grain	C	73	17	14.3	0.75	B2	
NGOF	Grain	C	73	17	14.3	0.75	B2	

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
NGPF	Grain When loaded from 78 up to a maximum of 81 tonnes gross mass Class E speeds will apply.	B E	78 81	21	14.3	1.80	••B4	
NGRX	Rice	C	73	17	14.3	0.90	B3	
NGUX	Grain	C	76	17	12.3	0.90	B2	
NGVF	Grain	C	76	20.5	15.1	1.80	••B4	
NGWF	Grain	C	76	19	15.1	0.75	•□B2	
NGXH	* 3 permanently coupled grain hoppers	A F	*228 *252 *276 *300	26	*51.8	2.45	••B4	- R3 R5 -
NGYF	Grain (ex NGHF)	C	76	19	14.4	1.80	••B4	
VHAF	Hopper grain	C	76 80	21	14.9	1.30	B3	- R1
VHGF	Hopper grain	C	76	21	14.9	1.30	B2	
VHGX	Hopper Aluminium Nos 1 to 20	C	76	17	14.9	1.30	B2	
VHGY	Hopper grain	C	76 80	21	14.9	1.30	B2	- R1
VHHF	Hopper grain	C	75	23	15.5	1.30	B2	
VHHX	Hopper grain	C	76	23	15.5	1.30	B2	
VHKY	Hopper grain	A	76 84 92	25	15.5	2.60	••B4	- R3 R5
VHLY	Hopper grain (ex VHGY)	A	76 84 92	23.6	14.9	1.30	B2	- R3 R5
VHNY	Hopper grain (ex VHEF)	A	76 84 92	24	15.5	1.30	B3	- R3 R5
VHSF	Hopper sand	C	76	22	13.2	1.30	B2	^
XGAY	Grain Hopper	B	76 84 92	24.4	16.5	2.2	••B3	- R3 R5

^ These vehicles are not fitted with grade control valves or fixed exhaust chokes. If operating LOADED in the Up direction between Katoomba and Valley Heights, these vehicles shall not exceed 20% of the train mass. No restrictions apply when EMPTY

10.39.8. Pacific National – Coal and rock/sand hoppers

Table 181 – Pacific National – Coal and rock/sand hoppers

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
BXLA	Coal wagons curved sided (Ex BHP) (Nos 163, 169 & 172 only)	C D	92 100	22	16.9	0.50	•□B2	R5 a
NHAF	Mineral Nos. 32901-33000	C	76	18	15.1	0.75	B2	
NHAF	Mineral Nos. 33001-33150	C	76	18	14.5	0.75	B2	
NHAY	Mineral No. 33002	B	76	18	14.5	0.75	B2	
NHBH	*3 permanently coupled coal wagons (Ex NHFF/NHSH – fitted with electrical pickups for door activation)	C	*300	23.8	*50.3	2.20	••B3	c
NHCF	Coke	C F	Empty 92 100	23	17.1	1.80	••B3	- R5 -
NHEF	Mineral	C	76	18	15.1	0.90	B2	
NHEH	*4 permanently coupled coal wagons (ECP Brake fitted) Not permitted on grades steeper than 1 in 40 when in the loaded condition.	B G	Empty *480	21.9	*61.5	2.45	E1	
NHFF	*3 permanently coupled coal wagons	C	300	23.8	*50.3	2.20	••B3	c
NHFFH	*3 permanently coupled coal wagons	C F	Empty *276 *300	23	*50.3	2.20	••B3	- R5 -
NHFF	Coal (Ex NGHF – fitted with electrical pickups for door activation)	C	76	17.8	14.4	1.80	••B4	
NHJF	Coal	C	100	25	16.9	2.20	••B3	c
NHKF	Coal	C	100	25	16.9	2.20	••B3	c
NHMH	Coal	C	100	22	16.9	2.20	••B2	c
NHOF	Coke	C	76 80	23	17.1	1.80	••B3	- R1

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
NHPH	*8 permanently coupled coal wagons	C G	Empty *960	23	*129.2	2.20	••B4	
NHQH	*8 permanently coupled coal wagons	C G	Empty *960	23	*129.2	2.20	••B4	
NHQH	*4 permanently coupled coal wagons	C G	Empty *480	23	*64.8	2.20	••B4	
NHRH	*7 permanently coupled coal wagons	B G	Empty *840	23	*113.5	2.45	••B4	
NHSH	*3 permanently coupled coal wagons	C	*300	23.8	*50.3	2.20	••B3	c
NHTF	Coal	C	76	20	15.1	1.80	••B3	
NHTH	Coal	C F	Empty 80 92 100	23	17.1	1.80	••B3	- - R5 -
NHVF	Coal	C F	Empty 92 100	25	16.9	1.80	••B3	- R5 -
NHWH	*4 permanently coupled coal wagons	A G	Empty *480	25.4	*64.2	2.45	••B4	R9 R9
NHYH	*4 permanently coupled coal wagons Not permitted on grades steeper than 1 in 40 when in the loaded condition.	B G	Empty *480	21.9	*61.5	2.45	••B4	
RHCH	* 2 permanently coupled coal wagons	C G	Empty *240	22	*31.3	2.45	••B4	
RHDF	Mineral	C	76 92 100	26.5	14.7	1.30	B2	- R5 b
RHEH	* 3 permanently coupled limestone wagons	C F	*228 *276 *300	21.3	*43.5	2.2	••B4	R9 R5, R9 c, R9
RHFH	* 2 permanently coupled coal wagons	B G	Empty *240	22.4	*32.5	2.45	••B4	
RHGF	Mineral	C	76 92	21.2	14.6	1.10	B2	- R5
RHHH	* 2 permanently coupled coal wagons	A G	Empty *240	25.0	*32.2	2.45	••B4	R9 R9

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
RHIF	Aggregate hopper (ex NGMA)	C	92	20.5	11.9	1.05	B2	R5
RHJH	* 2 permanently coupled coal wagons	C F	Empty *184 *200	23	*33.6	2.2	••B3	- R5 -
RHJF	* 3 permanently coupled mineral hopper wagons (ex NHBH)	C	Empty * 300	24.3	*50.3	2.2	••B4	- -
RHJY	Sand hopper (ex NGMA)	A	76	22	11.9	1.05	•□B2	
RHKY	Mineral hopper (*2 permanently coupled wagons)	B C C	Empty *152 *200	45.4*	27.0*	1.8	# % E1	d d c, d, e

- a. Operation of these wagons loaded to 100 tonnes is restricted to between Unanderra and Wongawilli.
- b. These vehicles are restricted to the areas of operation and operating conditions for G class vehicles when loaded between 92 tonnes gross and 100 tonnes gross.

Notes on RHKY wagons:

These wagons are permitted to operate in ECP mode with the following consist:

2 x NR (R13) Locomotives leading – 44 x RHKY wagons

% These wagons are permitted to operate in ECP and WDP mode with the following consist:

1 x NR (R13) locomotive – 36 x RHKY wagons – 1 x NR (R13) locomotive

1 x NR (R13) locomotive – 36 x RHKY wagons – 1 x TT/TT100 locomotive

1 x TT/TT100 locomotive – 36 x RHKY wagons – 1 x TT/TT100 locomotive

c. Operation restricted to between Macarthur and St Marys via Yennora (Y-link), or Regents Park (Lidcombe loop) or Enfield West (MFN) and Illawarra line (up to Meeks Rd/ARTC boundary) when loaded above 152t (19t axle loads).

d. When operating in WDP mode, the following controls shall be in place:

- i. No dangerous goods to be transported.
- ii. No mixing empty (or partly loaded) and loaded wagons with a train consist unless the empty (or partly loaded) wagons are marshalled in the centre third (position 13 to 24) of the train. All wagons in the front and rear third to be all loaded or all empty.
- iii. WDP operation to be restricted to synchronous operation only, no asynchronous operation permitted.

- iv. Routine ECP/WDP function testing as per normal per trip checks to be in place.
- e. When loaded above 152t (19t axle loads) the following speed restrictions shall be observed on bridges and structures:

Table 182 – RHKY wagon speed restrictions

Line	Location	Location (km)	Structure designation	Structure	Maximum Speed (km/h)
Illawarra	Stanwell Park	56.727	Stanwell Creek Viaduct	Underbridge	40
Illawarra	Kembla Grange	93.161	Mullet Creek	Underbridge	40
Illawarra	Dunmore	110.994	Boral Siding	Underbridge	40
Main West	Auburn	18.605	Auburn Station Access Pedestrian	Subway	40
Main West	Granville	21.863	Parramatta Rd	Underbridge	40
Main West	Parramatta	23.427	Church St	Underbridge	40
Main West	Westmead	24.347	Grade Separation Flyover	Flyover	40
Main West	Seven Hills	33.011	Grade Separation Flyover	Flyover	40
Main South	Carramar	26.161	Prospect Creek	Underbridge	40

10.39.9. Pacific National – Steel product wagons

Table 183 – Pacific National – Steel product wagons

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
RKAF	* 2 permanently coupled long steel wagons	C	*137	23	*29.8	1.30	B2	
RKAX	* 2 permanently coupled Rail pair (8 axles)	C	*152	36.6	*29.2	1.30	B1	^
RKAY	Steel product wagon (ex RKHF)	A	76 84 92	22	15.06	1.8	B3	- R3 R5
RKCX	Merchant bar	C	76 80	23	14.9	1.30	B2/3	- R1
RKBY	Merchant bar (ex RKDF)	A	76 84 92	22	15.1	1.8	B3	- R3 R5
RKCY	Merchant bar	A	78 80	24	15.1	1.85	B3	- R1
RKDF	Merchant bar	C	76 92	22	15.1	1.85	B3	- R5
RKEF	Steel Products wagon (Ex RKEX)	C	76 92	23	15.5	1.80	B2	- R5
RKEX	Slab	C	76 80	22	14.9	1.30	B2	- R1
RKEY	Steel product wagon (ex RKEF)	A	76 84 92	23	15.38	1.8	B2	- R3 R5

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
RKFX	Slab	C	76 80	26	18.0	1.30	B2	- R1
RKGF	Hot billet	C	76 92	20.5	15.1	1.85	B3	- R5
RKGY	Steel products wagon (ex RKGF)	A	76 84 92	20.5	15.06	1.85	B3	- R3 R5
RKHF	Hot billet	C	76 92	22	15.1	1.85	B3	R5
RKIY	Well	A	76 84 92	20	21.8	1.80	B4	- R3 R5
RKJX	Slab steel (Ex RKEX)	C	76 80	22	14.9	1.30	B2	- R1
RKKY	3 unit feedstock (12 axles)	A	228 252 276	51	43.5	1.85	B4	- R3 R5
RKLF	2 unit Rail pair (8 axles)	C	152	40	30.4	1.30	B2	%
RKLX	Coil container	C	76 80	20	14.9	1.30	B1	- R1
RKLY	Coil container	A	78 80	19.5	15.1	1.85	B3	- R1
RKMX	2 slot container	C	76 80	16	14.9	1.30	B3	- R1
RKMY	Coil container wagons (ex RKMx)	A	76 80	16	14.9	1.30	B2	- R1
RKNF	Bulk steel	C	76 80	31	25.9	1.30	B3	- R1
RKNX	Coil container	C	76 80	20	14.9	1.30	B3	- R1
RKOX	Bulk steel	C	76 80	27	23.8	1.30	B3	- R1
RKPF	Plate steel	C	76 92	21	18.6	0.90	B3	- R5
RKQF	Plate	C	76 92	20	18.0	0.90	B3	- R5
RKRF	2 unit Rail pair (8 axles)	C	152	42.4	30.4	1.30	B2	\$
RKSY	3 unit slab (12 axles)	B	228 252 276	38	42.5	1.80	B4	- R3 R5
RKTF	Pipes	C	76 92	28	23,8	1.30	B3	- R5
RKTX	Steel strap	C	76 80	28.2	23.8	1.30	B3	- R1

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
RKUX	Slab	C	76 80	22	14.9	1.30	B1	- R1
RKVV	Plate (tilt bed)	A	76 84 92	25.5	20.8	1.85	B4	R9 R3, R9 R5, R9
RKWY	Structural	A	76 84 92	26	23.8	1.30	B3	- R3 R5
RKXF	Plate	C	76 92	27	23.4	0.90	B2	- R5
RKYY	Plate (tilt bed)	A	76 84 92	23	20.8	1.85	B4	- R3 R5
RKZY	Slab/ coil steel	A	76 84 92	19	14.6	1.80	B4	- R3 R5

^ Each individual wagon of the pair shall have a gross mass not exceeding 76 tonnes. The maximum mass at rail for either the centre bogies in the wagon pair shall not exceed 38 tonnes at rail

% Each individual wagon of the pair shall have a gross mass not exceeding 76 tonnes. The maximum mass at rail for either the centre bogies in the wagon pair shall not exceed 38 tonnes at rail

\$ Each individual wagon of the pair shall have a gross mass not exceeding 76 tonnes. The maximum mass at rail for either the centre bogies in the wagon pair shall not exceed 38 tonnes at rail

10.39.10. Pacific National – Louvered vans

Table 184 – Pacific National – Louvered vans

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
NLDF	Van	C	76 80	28	21.7	1.80	B3	- R1
NLJX	Van	C	76 80	27	18.0	0.90	B3	- R1
NLKY	Van	A	78 80	29	18.0	1.30	B3	- R1
RLEX	Van	C	76 80	26	18.1	1.30	B1	- R1
RLPY	Van	A	78 80	29	18.0	1.30	B3	- R1
RLSY	Van	A	78 80	29	18.0	1.30	B3	- R1

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
RLUY	Van	A	78 80	29	18.0	1.30	B3	- R1
VLCX	Louvre	C	62	22	13.1	0.90	B1	
VLDX	Louvre	C	76	26	16.8	1.30	B1	
VLEX	Louvre	C	76	26	18.1	1.30	B1	
VLNX	Louvre (Newsprint, steel flour)	C	76	33	18.1	1.30	B1	

10.39.11. Pacific National – Automobile carrier

Table 185 – Pacific National – Automobile carrier

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
RMBY	Car carrier	A	40	25	23.1	1.30	B1	
RMNY	Car carrier	A	47	32	23.8	1.30	B3	
VMAP	Car carrier 6 vehicles	A	30	20	17.9	1.30	B1	
VMBY	Car carrier conveys 8 or 10 vehicles	A	40	25	23.1	1.30	B1	

10.39.12. Pacific National – Open wagons

Table 186 – Pacific National – Open wagons

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
NOBF [^]	Without doors	C	76 80	22	15.0	0.75	B3	[^] [^] , R1
NOBX	Open	C	76 80	22	15.0	0.75	B3	- R1
NOCY	Open	A	78 80	28	20.1	1.80	B3	- R1
NOEF	Concentrate	C	74	18	11.0	0.90	B3	
NOFF	Ore	C	76	18	11.0	1.80	B3	
NOHF	Ore	C	72	21	13.1	0.75	B2	
NOPF	Concentrate wagon, no doors ex NOHF	C	72	21	13.1	0.90	B2	
ROBX	Open	C	76 80	23	14.9	1.30	B1	- R1
ROCY	Open	A	78 80	28	20.1	1.80	B3	- R1
ROHF	Open Coil	C	76 92	17	10.3	1.30	B2	- R5

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
ROKX	Open	C	76 80	28	23,7	1.30	B3	- R1
ROOX	Open	C	76 80	28	23.7	1.30	B3	- R1
ROQF	Open	C	76 80	17	10.3	1.30	B3	- R1
ROSX	Open	C	76 80	23	14.9	1.30	B1	- R1
VOBX	Open without ridge cover	C	74	23	14.9	0.90	B1	
VOCX	Open with ridge gear	C	76	23	14.9	0.90	B1	
VOFX	Open	C	76 80	23	14.9	0.90	B1	- R1

^ When conveying containers all possible positions for containers within wagon shall be occupied by either empty or loaded containers that is, 2 m x 6 m or 1 m x 12 m container(s)

10.39.13. Pacific National – Bulk hopper wagons

Table 187 – Pacific National – Bulk hopper wagons

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
NPCF	Cement	C	76	18	15.0	0.90	B3	
NPEF	Cement clinker	C	76	20	15.1	1.80	B3	
NPFH	Limestone	C F	Empty 80 92 100	23	17.1	1.80	••B3	- - R5 -
NPHH	Cement	B C	Empty 100	24	14.5	1.80	••B3	- -
NPIH	Limestone	C F	Empty 80 92 100	27	16.9	1.80	••B3	- - R5 -
NPJH	Limestone	C F	Empty 80 92 100	23	17.1	1.80	••B3	- - R5 -
NPKH	Limestone	C F	Empty 80 92 100	23	17.1	1.80	••B3	- - R5 -
NPPF	Limestone	C	76	18	15.1	0.90	•□B2	

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
NPRF	Cement	B	78 80	20	12.6	1.80	B3	- R1
NPRY	Cement	B	78 80	20	12.6	1.80	B3	- R1
NPSF	Flyash	C	76	18	14.5	0.90	B2	
NPSH	Limestone and aggregate hopper	C F	76 92 100	22.5	13.4	1.80	••B3	- R5 -
NPZH	Limestone	C F	Empty 80 92 100	27	16.9	1.80	••B3	- - R5 -
VPBX	Bulk cement	C	76	26	14.1	1.30	B1	
VPCX	Bulk cement	C	76	26	14.1	1.30	B1	
VPFX	Bulk flour	C	74	29	16.6	1.30	B1	
VPLX	Bulk lime	C	74	29	16.6	1.30	B1	

10.39.14. Pacific National – Container flat wagons

Table 188 – Pacific National – Container flat wagons

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
CQWY	Well wagon (*Permanently coupled in pairs)	A	*152 *168 *184	*44	*42.53	2.2	B4	R9, R10 R3, R9, R10 R5, R9, R10
NQCX	Containers	C	76 80	18	14.6	1.25	B3	R10 R1, R10
NQDX	Containers	C	76 80	27	23.8	0.90	B2	- R1
NQEX	Containers	C	76 80	27	23.8	0.90	B2	- R1
NQFF	Containers	C	76 92	20	20.5	1.80	B3	R10 R5, R10
NQGY	Containers	A	78 80	22	20.1	1.80	B3	R10 R1, R10
NQHX	Concentrate containers	C	76 80	18	14.6	1.25	B3	R10 R1, R10
NQIX	Containers	C	76 80	18	14.6	1.25	B3	R10 R1, R10
NQIY	Containers	A	78 80	20	14.6	1.80	B3	R10 R1, R10
NQJF	Containers	C	76 92	20	20.5	1.80	B3	R10 R5, R10

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
NQKF	Containers	C	76 92	20	20.1	1.80	B3	R10 R5, R10
NQKY	Containers	A	78 80	21	20.6	1.80	B3	R10 R1, R10
NQOF	Containers	C	76 80	19.2	20.1	1.30	B3	R10 R1, R10
NQOX	Containers	C	76 80	21	20.1	1.30	B3	R10 R1, R10
NQOY	Containers	A	78 80	24	20.1	1.30	B3	R10 R1, R10
NQPY	Containers	A	76 80	21	20.1	1.30	B3	R10 R1, R10
NQSY	Containers	A	78 80	22	20.1	1.30	B3	R10 R1, R10
NQTY	Containers (Ex NQYY)	A	78 80	18.6	15.1	1.80	B3	R10 R1, R10
NQVF	Containers	C	76 80	25	23.2	0.90	B2	- R1
NQVX	Containers	C	76 80	25	23.2	0.90	B2	- R1
NQYY	Containers	A	78 80	18.6	15.1	1.80	B3	R10 R1, R10
REIW	Containers w/elec line (ex RQIW)	A	80	18.6	14.6	1.8	B4	R1, R10
RQAY	Containers	A	78 80	22	20.1	1.80	B3	R10 R1, R10
RQBY^	Containers	A	78 80	22	20.1	1.80	B3	^, R10 ^, R1, R10
RQCX	Containers	C	76 80	20	20.1	1.30	B3	R10 R1, R10
RQCY	Containers	A	76 80	20	20.1	1.30	B3	R10 R1, R10
RQDW	Containers	A	76 80	24	25.7	1.30	B3	- R1
RQDY	Containers	A	76 84 92	23	25.7	1.30	B3	- R3 R5
RQEY	2 pack articulated containers (6 axles)	A	114 120	32	27.6	1.80	B2	R10 #, R10
RQFX	Containers	C	76 80	19	20.1	1.30	B2	R10 R1, R10
RQFY	Containers	A	78 80	22	20.1	1.30	B3	R10 R1, R10

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
RQGY	Containers	A	78 80	22	20.1	1.30	B3	R10 R1, R10
RQHY	Containers	A	76 84 92	20	19.3	1.80	B4	R9, R10 R3, R9, R10 R5, R9, R10
RQHY	In line refuelling wagon (RQHY 7027)							\$
RQIW	Containers	A	80	18	14.6	1.80	B4	R1, R10
RQIY	Containers	A	78 80	20	14.6	1.85	B3	R10 R1, R10
RQJW	Containers	A	78 80	27	25.6	1.80	B3	- R1
RQJY	5 pack articulated (12 axles)	A	228 252 276	48	64.5	1.80	B4	R10 R3, R10 R5, R10
RQKY	Containers	A	76 80	22	20.1	1.30	B3	R10 R1, R10
RQLY	5 pack articulated – single centre well (12 axles)	A	228 252 276	52	67.4	1.80	B4	R10 R3, R10 R5, R10
RQMF	Containers	C	76 92	22	20.1	1.30	B3	R10 R5, R10
RQMY	Containers	A	76 84 92	22	20.1	1.30	B3	R10 R3, R10 R5, R10
RQNW	Containers	A	76 80	23	25.7	1.30	B3	- R1
RQPW	Containers	A	78 80	25	25.8	1.30	B3	- R1
RQQY	5 pack articulated (12 axles)	A	228 252 276	56	77.9	1.80	B4	R10 R3, R10 R5, R10
RQRX	Containers	C	76 80	27	23.4	0.90	B2	- R1
RQRY	2 TEU Containers	A	76 84 92	17.4	16.0	1.80	B4	R9, R10 R3, R9, R10 R5, R9, R10
RQSY	Containers	A	78 80	22	20.1	1.30	B3	R10 R1, R10
RQTY	Containers	A	76 84 92	18	20.1	1.60	B2	R10 R3, R10 R5, R10
RQWW	Containers	A	78 80	25	25.6	1.80	B3	- R1
RQWY	5 unit well (20 axles)	A	380	93	91.9	1.80	B4	R9

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
RQYY	5 pack articulated (12 axles)	A	228 252	68	92.1	1.80	B4	- R3
RQZY	5 unit well (20 axles)	A	300	98	106.5	1.80	B4	R9
RRAY	5 pack articulated (12 axles)	A	228	53	73.1	1.80	B4	R10
RRCY	5 unit well (20 axles)	A	380 420	95	94.4	1.80	B4	R9 R3, R9
RRDY	Containers	A	76 84 92	20	20.1	1.60	B2	R10 R3, R10 R5, R10
RREY	Containers	A	76 84 92	18	20.1	2.20	B2	R10 R3, R10 R5, R10
RRFY	3 unit well (12 axles)	A	228	56	55.6	1.80	B4	R9
RRGY	5 pack articulated (12 axles)	A	228	55	73.1	1.80	B4	R10
RRIY	Single unit Well (Ex RQZY platform)	A	76 84	20	21.3	1.80	B4	R9 R3, R9
RRKY	Containers	A	76 80	22	20.1	1.30	B3	R10 R1, R10
RRLX	Containers	C	76 80	16.2	14.9	1.30	B3	R10 R1, R10
RRQY	5 pack articulated container (12 axles)	A	228 252	60	77	1.80	B4	R9, R10 R3, R9, R10
RRRY	5 unit well (20 axles)	A	420	103	106.3	1.80	B4	R3, R9
RRSY	Containers	A	78 80	23.5	20.1	1.30	B3	R10 R1, R10
RRTY	Containers	A	76 84 92	20	20.1	1.60	B2	R10 R3, R10 R5, R10
RRWY	Well	A	76	20	19.4	1.80	B4	R10
RRXY	5 pack bogie well (20 axles)	A	380 420 460	99	94.5	1.80	B4	R9 R3, R9 R5, R9
RRYY	5 pack cartainer (12 axles)	A	200	60	88.1	1.80	B4	R9
RRZY	5 unit bogie well (20 axles)	A	350	102	106.5	1.80	B4	@
VQCX	Container flat	C	76 80	20	20.1	1.30	B1	R10 R1, R10

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
VQCY	Container flat (Ex RQCY)	A	76 80	20	20.1	1.30	B2	R10 R1, R10
VQDW	Container flat	C	76	23	25.7	1.30	B2	
VQGX	Container flat	C	76	25	23.2	1.30	B1	
VQKY	Container flat	B	76 80	25	23.7	1.30	B2	- R1
VQLX	Container flat	C	76	22	20.7	1.30	B2	R10
VQMX	Container flat (Ex VQCX)	C	76 80	20	20.1	1.30	B2	R10 R1, R10
VQOF	Container flat 2 slot (Ex VOBX)	C	76 80	19	14.9	1.3	B2	- R1
VQRF	Container flat rice traffic (Ex VQCX)	C	76 80	20	20.1	1.30	B2	R10 R1, R10
VQTY	Container flat (Ex VQCY)	A	76 80	20	20.1	1.30	B2	R10 R1, R10

^ When fitted with SMORGON container for long reinforcing rod, this vehicle may only be marshalled with a trailing load for 0.90 MN draw capacity. When loaded with normal containers or when empty, the draw capacity may revert to 1.30 (as per NQSY)

This vehicle when loaded from 114 tonnes gross mass (19 tonnes axle load) up to a maximum of 120 tonnes gross mass (20 tonnes axle load) is restricted to a maximum speed of 100 km/h.

\$ In line refuelling wagon:

The In Line refuelling system consists of an ISO tankers, FUEL 4526 – 4528 loaded onto any RQHY wagon. The following conditions will apply:

- The In Line Refuelling wagon shall not be uncoupled from the locomotive consist to which it is attached, unless authorised by the train crew, who will follow special procedures when this is required.

- The in line refuelling system shall only be used to refuel NR, 92 and 93 Class locomotives.

- All other operating conditions for this wagon shall be as published in the TOC Manual for this class of wagon.

@ May operate to a gross mass of up to 420 tonnes. However a maximum speed of 100 km/h shall apply for a gross mass exceeding 380 tonnes, each RRZY vehicle having a gross mass exceeding 350 tonnes shall be treated as being equivalent to one 76 tonne vehicle air brake cut out and thus will be subject to the 10% air brake cut out rule specified in General Instruction Pages – SECTION 8 – Disabled Trains and Defective Vehicles – Defective air brake (page 141).

10.39.15. Pacific National – Tank wagons

Table 189 – Pacific National – Tank wagons

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
NTOF	Oil tanker	C	76	22.6	14.5	0.90	B2	
VTBX	Tank bitumen	C	76	31	14.0	0.90	B1	
VTQX	Tank white spirit	C	76	27	16.4	1.30	B2	

10.39.16. Pacific National – Special purpose vehicles

Table 190 – Pacific National – Special purpose vehicles

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
BTC	Brake Test Car	A	27	27	12.1	1.80	••B3	
L	Sand carrying vehicles Nos 562, 566, 569, 570 and 578	C	76	25.7	11.9	0.75	B2	
DOT	Bogie Tank wagon	C	76	28	18.1	0.75	B1	
NZAF	Flat	C	45	14	13.1	0.75	B2	
NZWF	Wheel sets	C	61	19	13.1	0.75	B2	
NZZA	Special loads, 16 wheels NZZA 530	D	183	60	22.2	0.75	B1	#
NZZA	Special loads, 24 wheels NZZA 600	D	309	99	28.4	0.75	B2	#
RZAY	Relay van	A	50	48	23.9	1.30	B3	
RZBY	Relay van	A	49	47	23.9	1.30	B2	
RZCY	Open	A	78 80	28	20.1	1.80	B3	- R1
RZXY	Wheel sets	A	76 84 92	30	23.7	1.30	B3	- R3 R5

Speed to be governed by loading conditions. Loaded NZZA type wagons shall travel over the UP Main line only between Edgecombe and Zig Zag, and the DOWN Main line through Woy Woy Tunnel.

When two or more NZZA vehicles are marshalled on a train, a bogie flat vehicle of at least 13.7 metres in length shall be marshalled between each NZZA vehicle.

10.39.17. Pacific National – Special purpose (passenger)

Table 191 – Pacific National – Special purpose (passenger)

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
FAM	Crew Accom.	115	49	18 berths	23.8	1.30	B2	No 2389

10.40. Patrick PortLink

10.40.1. Patrick PortLink – Locomotives

Table 192 – Patrick PortLink – Locomotives

Code	Load category	Description	Max speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
18	L10	Diesel	90	120	17.9	0.75	2000	Ex Westrail NB class Fuel 4000 litres	R11
45	L12	Diesel	115	112	17.9	0.90	1800	Ex SRA Loco	R11
103	L12	Diesel	115	112	17.9	0.90	1800	Ex SRA 45 class loco	R11

10.40.2. Patrick Portlink – Freight rolling stock

Table 193 – Patrick – Freight rolling stock

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
PQAY	Container flat	B	76 84	20.3	19.4	2.20	B3	R10 R3, R10
PQZY	Containers (4 slot)	A	76 84 92	22.5	25.7	1.8	B4	- R3 R5

10.41. PHC Rail Pty Ltd

10.41.1. PHC Rail Pty Ltd – Locomotives

Table 194 – PHC Rail Pty Ltd – Locomotives

Code	Load category	Description	Max speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
PHC	AC6	AC Diesel	115 60	134 139	22.0	2.45	4500	C44aci PHC001 and PHC002	R11, R14 R11, R14,a

a. PHC locomotive operation above 134t up to 139t restricted as per TS TOC 2, Division Pages, North Section Pages.

10.42. QUBE Logistics Rail

10.42.1. QUBE Logistics Rail – Locomotives

Table 195 – QUBE Logistics Rail – Locomotives

Code	Load category	Description	Max speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
1100	**L4, L7	Diesel Electric	^115	134	20	2.2	3300	1101 – 1108	R11, ^, **
14	L7	Diesel	115	131	21.0	1.50	3900	Ex Danish MZ locomotive	R11
44	L12	Diesel	115	108	17.8	0.90	1800	Nos 4471 and 4477	R11
44	L12	Diesel	115	108	17.8	0.90	1800	Ex SRA Loco On lease from Hunter Valley Heritage Trust	R11
442	L11	Diesel	115	115	18.7	1.80	2000	Ex SRA 44202	R11
80	L9	Diesel	115	121	19.0	1.80	2000	8030, 8037, 8044	R11
830	L13	Diesel	100	71.4	14.8	0.90	900	852, 864, 872	R11
QBX	AC6	Diesel AC	115	134	22.0	2.3	4000	Type SDA1	R11, R14, a, b
QL	AC6	Diesel AC	115 60	134 139	22.0	2.25	4500	C44ACi (QL001-QL020)	R11, R14 R11, R14, c
RL	L4	Diesel	115	134	20	1.80	4000	RL303, 309, 310	R11

^ 1100 Class locomotives maximum speed limited to 100 km/h for all light locomotive movements.

**** 1100 Class locomotive load category shall be L7 for single 1100 class. L4 shall only apply when operating in multiple unit locomotive consists.**

- a. **QBX Class locomotives are permitted to operate on the following routes only:**
- i. *Woodville Junction to Metropolitan Freight Network (Flemington South Junction) via North Strathfield underpass or North Strathfield goods line and return*
 - ii. *Bowenfels to Metropolitan Freight Network (Flemington South Junction) and return*
 - iii. *Lidcombe to North Strathfield Junction and return via Flemington Middle and East Junctions*
 - iv. *Macarthur to Metropolitan Freight Network (Sefton Park Junction) and return*
 - v. *Macarthur to Metropolitan Freight Network (Marrickville Junction) via East Hills Line and return*
 - vi. *Cabramatta to Granville (for access to Yennora Yard) via Old Main South (up and down)*
 - vii. *Bomaderry, Unanderra, and Port Kembla to Meeks Road Junction and return (this also includes Unanderra to Inner Harbour and return)*

All other routes across the TfNSW Metropolitan Heavy Rail Network may be traversed if dead attached (not powering or providing tractive effort) subject to all track and civil requirements being met.

- b. *The maximum speed for light engine operation shall be 100 km/h. Operation within train consists is up to a maximum speed of 115 km/h.*

Notes for QL class:

- c. *QL locomotive operation above 134t up to 139t restricted as per TS TOC 2, Division Pages, North Section Pages.*

10.42.2. QUBE Logistics Rail – Freight rolling stock

Table 196 – QUBE Logistics Rail – Steel product wagons

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
SKNF	Bulk steel	C	76	31	25.9	1.30	B3	

Table 197 – QUBE Logistics Rail – Open wagons

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
SBAX	Open (ex WBAX)	C	76 80	25	18.0	1.30	B3	- R1
SOAX	Open (ex WOAX)	C	76 80	25	18.0	1.30	B3	- R1

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
SOCY	Open (ex NOCY/ROCY)	A	78 80	28	20.1	1.80	B3	- R1
SOGF	Open (ex AOGF/L)	C	63	18.2	14.0	0.90	B1	^

^ SOGF wagons are not fitted with grade control valves or fixed exhaust chokes. If operating LOADED in the Up direction between Katoomba and Valley Heights, these vehicles shall not exceed 20 per cent of the train mass. No restrictions apply when EMPTY.

Table 198 – QUBE Logistics Rail – Hopper wagons

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
SHQA	Hopper (ex NHLF)	D	62	19	11.9	0.75	B2	
SGSF	Hopper	C	92	24	16.47	1.8	•□B4	R9
SGBF	Hopper (*permanently coupled in pairs)	C	184*	48*	32.61*	1.8	•□B4	R9

Table 199 – QUBE Logistics Rail – Container wagons

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
LOAF	Open wagon	C	63	18.2	14.0	0.90	B1	%
LQAY	Container flat	A	76 84 92	20.0	19.3	2.2	B4	R9 R3, R9 R5, R9
SQBF	Container flat (ex RKBX/ROBX)	C	76 80	20.0	14.9	1.30	B1	- R1
SQDY	Container	C	92	16.1	14.7	2.2	B4	R5
SQEF	80ft Container	B	76 84 92	24	25.7	2.2	B3	- R3 R5
SQEY	Container	C	76 84 92	24	25.7	2.2	B4	- - R5
SQGF	Containers (ex AOGF)	C	76	17	14.0	0.90	B1	R10
SQKF	Container flat (ex RKQX)	C	76 80	18.2	18.0	0.90	B3	- R1
SQLY	Containers (ex AFSY,RFSY)	B	76 80	22	17.9	1.30	B1	R10 R1, R10
SQMY^	Containers (ex RQOY) (Mass reduced SQOY).	B	76 80	22.2	23.7	1.30	B3	- R1
SQNY	Containers (ex AFCY)	B	76	19	15.2	1.30	B2	R10

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
SQOY @	Containers (ex RQOY).	B	76 80	24	23.7	1.30	B3	- R1
SQSY	40ft Container	A	76 84 92	15.94	13.54	2.2	B4	- R3 R5
SQVF	Containers	C	76 80	25	23.2	0.90	B2	- R1
SQVX	Containers	C	76 80	25	23.2	0.90	B2	- R1
TQXF	40ft Container	C	76 89.6	16.4	13.16	2.2	B3	R10 R5, R10

^ When these vehicles are loaded in excess of 76 tonnes gross mass, they are not permitted to operate Valley Heights to Katoomba (both directions)

@ When these vehicles are loaded in excess of 76 tonnes gross mass, they are not permitted to operate Valley Heights to Katoomba (both directions)

% Note: LOAF wagons are not fitted with grade control valves or fixed exhaust chokes. If operating LOADED in the UP direction between Katoomba and Valley Heights, these vehicles shall not exceed 20% of the train mass. No restrictions apply when EMPTY.

10.43. Rail Experience

10.43.1. Rail Experience – Passenger rolling stock

Table 200 – Rail Experience – Passenger rolling stock

Code	Description	Max speed (km/h)	Max loaded mass (t)	Passenger capacity	Length over coupling faces (m)	Draw capacity (MN)	Remarks
DF	Diner	115	48	48 Diners	23.8	0.90	Nos 295 and 935

10.44. Rail First Asset Management

10.44.1. Rail First Asset Management – Locomotives

Table 201 – Rail First Asset Management – Locomotives

Code	Load category	Description	Max speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
44	L12	Diesel	115	108	17.8	0.90	1800		R11
B	L12	Diesel	115	123	18.5	0.90	1500		R11

Code	Load category	Description	Max speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
#C	L4	Diesel	115	134	20.6	1.80	3000	#Applies to the following fitted with QES-3 traction control system – C502, C503, C508	R11
CF	AC6	Diesel	115 60	134 139	22.0	2.25	4500	C44aci (CF4402-CF4408, CF4410-CF4412)	R9,R11, R14 R9,R11, R14, c
CF	AC6	Diesel	115 60	134 139	22.0	2.25	4500	C44aci (CF4420-CF4427)	R11, R13, R14 R11, R13, R14, c
CM	L3, L4*	Diesel Electric	115	134	20.2	2.2	3300		a, b, *
EL	L7	Diesel	115	114	20.5	1.80	2450		R11
FL220	L10	Diesel	115	110	18.4	1.80	2000	Ex Pacific National 42220	R11
GL	L4	Diesel	115	132	18.7	1.80	3000		R11
HL	L10	Diesel	115	110	18.4	1.80	2000	Ex Pacific National 422 class	R11
S	L12	Diesel	115	123	18.6	0.90	1800		R11
T	L13	Diesel	100	69	13.4	1.30	875		R11, d
VL	L4	Diesel	115	130	18.32	1.80	3000		R11

Notes:

- * *CM class locomotive load category to be L4 for single locomotive and L3 for multiple CM locomotives only.*
- a. *CM locomotives are restricted to no more than 4 locomotives in a locomotive consist.*
- b. *CM locomotives are limited to 60 km/h when operating as light locomotives.*
- c. *CF locomotive operation above 134t up to 139t restricted as per TS TOC 2, Division Pages, North Section Pages.*
- d. *T class locomotives can be disregarded when calculating the maximum number of locomotives that can be marshalled on the front of a train.*

10.44.2. Rail First Asset Management – Freight rolling stock

Table 202 – Rail First Asset Management – Grain hoppers

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
CGAY	Grain hopper	B	76 84 92	24	15.5	2.20	●●B4	- R3 R5
CGDY	Grain hopper	B	76 84 92	23	15.5	2.60	●●B4	- R3 R5
CGGY	* 2 permanently coupled grain hopper	B C	Empty *152	24.6	*25.59	1.8	●□B4	- -
CGSY	Hopper	B	76 84 92	23.2	15.49	2.2	●●B4	- R3 R5

Table 203 – Rail First Asset Management – Ore hoppers

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
CHAY	Hopper wagon (* coupled permanently in pairs)	B C	Empty *152	23.0	*25.59	1.80	●□B4	++ ++
CHBY	Hopper wagon (* coupled permanently in pairs)	B C	Empty *152	23.0	*25.59	1.80	●□B4	++ ++
CHEY	Hopper wagon (* coupled permanently in pairs)	B C	Empty *152	21	*22.34	2.2	●□B4	- -

++The door locking mechanism is to be isolated from the MR pipe after locking. If doors are detected open, train to be stopped and rectified. These wagons are not to operate with wheel diameters less than 780mm.

Table 204 – Rail First Asset Management – Ballast hoppers

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
CHOY	Ballast hopper (Remote controlled)	A	76 80	24.8	13.2	1.20	●□B3	- R1
CHTY	Ballast hopper	A	76 80	23	11.6	1.80	●□B4	+ +, R1

+ Maximum speed restricted to 65 km/h when operated on Narrow width routes as listed in the Passenger Train Operating Conditions pages.

Table 205 – Rail First Asset Management – Container flat wagons – part 1

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
CQAX	Container Flat	C	76 87	27	26.9	2.20	B3	R9 R9

Table 206 – Rail First Asset Management – Container flat wagons – part 2

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
CQBY	Container Flat	A	76 84 92	20.2	19.4	2.20	B3	R10 R3, R10 R5, R10
CQCY	Container Flat (Ex NDRF)	B	76	18	14.7	0.75	B2	R10
CQDY	Container Flat	B	76 84 92	21.5	16.5	2.20	B2	R10 R3, R10 R5, R10
CQEY	Container Flat	B C C	76 84 ++ 88 #	15.6	14.5	1.80	B3	R10 ++, R10 #, R10

++ The following vehicles have not been upgraded and are not permitted to exceed 84 tonnes gross:

CQEY204S, CQEY205E, CQEY 211W, CQEY218Q, CQEY219C, CQEY224L.

Wheel tread hollowing shall not exceed 2 mm.

Table 207 – Rail First Asset Management – Container flat wagons – part 3

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
CQFY	Container Flat	A	76 84 88 #	16.25	15.4	1.20	●●B2	R10 R3, R10 #, R10

These vehicles when loaded up to 88 tonnes at a maximum speed of 80 km/h. Wheel tread hollowing shall not exceed 2 mm.

Table 208 – Rail First Asset Management – Container flat wagons – part 4

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
CQGY	Container Flat	A	76 84 92	19.5	20.1	1.80	B4	R10 R3,R10 R5,R10
CQHY	Container Flat	A	76 84	18.3	16.5	1.80	B2	R10 R3, R10

Table 209 – Rail First Asset Management – Container flat wagons – part 5

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
CQJY	60ft container wagon	A	76 84 92	19.0	19.4	2.2	B4	R10 R3, R10 R5, R10
CQKY	Container Flat	A	76 84 87	15.7	14.6	2.20	••B4	- R3 R4
CQMY	Container Flat	A	76 84 92	22	25.7	2.20	B3	- R3 R5

When loaded up to a mass of 80 tonnes the following maximum speeds will apply over the routes indicated:

A maximum speed of 100 km/h on Class 1 track.

Table 210 – Rail First Asset Management – Container flat wagons – part 6

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
CQNY	40ft Container wagon	A	76 84 89	16.4	13.1	2.2	B4	R10 R3, R10 #, R10
CQPY	40ft Container wagon	A	76	16.5	13.1	2.20	B4	R10
CQQY	3 TEU Container Flat (Ex AOOX)	A	76 84 92	23	23.8	1.80	B3	- R3 R5
CQRX	Container Flat (Ex GFRX)	C	76	25	23.7	1.30	B1	
CQRY	Container Flat (Ex CQFY)	A	76 84	16.25	14.0	1.20	B2	R10 R3, R10
CQSY	Container Flat (Ex CQOY)	A	76 87	16.2	14.9	1.20	••B3	- R4
CQTY	Flat wagon – special ADF use	A	76 84 92	19.5	14.6	1.80	B3	R10 R3, R10 R5, R10
CQXY	Container flat (2 unit – 8 axles)	A	152 168 184	35.4	28.3	1.80	B4	R9,R10 R3, R9, R10 R5, R9, R10
CQYY	Container wagon	A	76 84 92	16	13.3	2.45	B4	R9,R10 R3, R9, R10 R5, R9, R10
CQZY	Container wagon	A	76 84	16.6	13.4	2.2	B4	R9 R3, R9

These when loaded up to a maximum of 89 tonnes gross shall operate at a maximum speed of 80 km/h.

10.44.3. Rail First Asset Management – Passenger rolling stock

Table 211 – Rail First Asset Management – Passenger rolling stock

Code	Description	Max Speed (km/h)	Max loaded mass (t)	Passenger capacity	Length over coupling faces (m)	Draw capacity (MN)	Remarks
CDAY1	Passenger	115	49	-	23.9	0.45	Ex BMC1

10.45. RailPower Pty Ltd

10.45.1. RailPower Pty Ltd – Locomotives

Table 212 – RailPower Pty Ltd – Locomotives

Code	Load Category	Description	Max speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
CLF	L6	Diesel	115	128	20.5	1.8	3000	CLF 2	R11

10.46. Rothbury Riot Railway & Steam Museum Group Ltd.

10.46.1. Rothbury Riot Railway & Steam Museum Group Ltd. – Passenger rolling stock

Table 213 – Rothbury Riot Railway & Steam Museum Group Ltd. – Passenger rolling stock

Code	Description	Max speed (km/h)	Max loaded mass (t)	Passenger capacity	Length over coupling faces (m)	Draw capacity (MN)	Remarks	Code	Description
MFA	Passenger	115	50	84	22.7	0.30	No 2724 Wooden body	MFA	Passenger
MH	Passenger / Guard	115	50	64	22.7	0.30	No 2711 Wooden body	MH	Passenger / Guard
NDS	Passenger	115	41	64	21.6	0.50		NDS	Passenger
RDH	Passenger	115	45	30	20.3	0.50	No 2239	RDH	Passenger

10.47. Seymour Rail Heritage Centre Inc.

10.47.1. Seymour Rail Heritage Centre Inc. – Locomotives

Table 214 – Seymour Rail Heritage Centre Inc. – Locomotives

Code	Load Category	Description	Max speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
B74	L12	Diesel	115	123	17.8	0.90	1500		R8,R11
C501	L8	Diesel	115	134	20.6	1.80	3000		R11

10.47.2. Seymour Rail Heritage Centre Inc. – Passenger rolling stock

Table 215 – Seymour Rail Heritage Centre Inc. – Passenger rolling stock

Code	Description	Max speed (km/h)	Max loaded mass (t)	Passenger capacity	Length over coupling faces (m)	Draw capacity (MN)	Remarks
BS	Radio Test car	115	47.3		22.8	0.50	

10.48. Southern Shorthaul Railroad

10.48.1. Southern shorthaul Railroad – Locomotives

Table 216 – Southern Shorthaul Railroad – Locomotives

Code	Load category	Description	Max speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
442	L11	Diesel	115	115	18.7	1.80	2000		R11
22	L10	Diesel	115	110	18.4	1.8	2000	2204, ex PN 44216	R11
442s	L11	Diesel	115	115	18.7	1.80	2000	Ex SRA 442 class No. 1, 2, 5, 6	R11
45	L11	Diesel	115	112	17.9	0.90	1800	No 4532 recoded from 45s1	R11
48	L13	Diesel	100	75.2	14.8	1.30	900	No 11,15,28, 29,43 recoded from 48s	R11
49	L13	Diesel	100	81	15.4	0.90	875	Ex CFCLA KL class	R11
600	L12	Diesel	115	112	17.9	0.90	1800	No. 602 Ex AN, same as SRA45 class	R11
80	L9	Diesel	115	121	19.0	1.80	2000	No 8049 ex PN 80 class	R11
830	L13	Diesel	100	71.4	14.8	0.90	900	No 869	R11
B	L12	Diesel	115	123	18.5	0.90	1500		R11
BRM	L4	Diesel	115	130.2	18.3	1.80	3300	BRM001/ BRM002	R11
C	L4	Diesel	115	134	20.6	1.80	3000	No 504-507,509-510 QES-3 system	R11
CLF	L6	Diesel	115	128	20.5	1.8	3000	CLF1,3	R11

Code	Load category	Description	Max speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
CLP	L6	Diesel	115	132	20.5	1.8	3000	CLP9,12	R11
G	L4	Diesel	115	128	19.8	1.80	3000		R11
GM(1)	L13	Diesel	115	110	18.6	0.90	1500	GM 1 – GM11 only	R11
GM(12)	L12	Diesel	115	116.3	18.5	0.90	1800	GM12-GM47 only	R11
RL	L4, L7@	Diesel	115	134	20.0	1.80	3000	No 301, 302, 304-307	R11
S	L12	Diesel	115	123	18.6	0.90	1800		R11
S	L12	Diesel	115	116.3	18.60	0.90	1800	S312	R11
T	L13	Diesel	100	69	13.4	1.30	875		R11 #
SSR	AC6	Diesel Electric AC Traction	115	134	22	2.25	4500	GT46C-Ace	R11 R13 R14

These locomotives can be disregarded when calculating the maximum number of locomotives that can be marshalled on the front of a train.

@ L4 category for multiple RL only, single RL limited to L7.

10.48.2. Southern shorthaul Railroad – Freight rolling stock

Table 217 – Southern Shorthaul Railroad – Freight rolling stock

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
BGGX	Hopper Grain (ex VHGF)	C	76	21	14.9	1.30	B2	
BGGY	Hopper Grain (ex VHGY)	C	76 80	21	14.9	1.30	B2	- R1
BGKF	Hopper Grain (ex NHKF)	C	76 92	25.7	16.87	2.20	••B3	- R5
BGSY	Hopper Grain	C	76 84 92	24.4	16.5	1.80	••B4	- - R5
BGTY	Hopper wagon	B	76 84 92	22.2	15.49	2.20	••B4	- R3 R5
BGVF	Hopper Grain (ex NHVF)	C	76 92	25.7	16.9	1.80	••B3	- R5
BHKF	Hopper Coal (ex NHKF)	C	100	25	16.9	2.20	••B3	-
BHVF	Hopper Coal (ex NHVF)	C F	76 92 100	25	16.9	1.80	••B3	- R5 -

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
BQAY	Container wagon	A	76 84 92	15.9	13.1	2.20	B4	- R3 R5
BQBY	Container wagon	A	76 84	16.6	13.4	2.20	B4	R9 R3, R9
BQCX	Flat wagon (ex ZQNX, VFLX)	C	76	26	20.7	0.75	B1	
BQDF	Flat wagon (ex ZQLX, EQAX, PT)	C	76 92	21.7	20.1	0.75	B1	% %, R5
BQEW	3 Pack Articulated Container Wagon – 8 axles (ex PQAW)	A	152	38	41.2	1.80	B3	R9
BQFY	3 TEU Container flat	A	76 84 92	20.2	19.4	2.20	B3	R10 R3, R10 R5, R10
BQGX	3 TEU Container Wagon (ex CQRX/GFRX)	C	76	25	23.7	1.30	B1	-
BQIX	2 TEU Container Wagon (ex VQOF/VOBX)	C	76 80	19	14.9	1.30	B2	- R1
BQIY	2 TEU Container Wagon (ex CQIY)	B	76 84 88 #	16.5	14.6	1.80	●●B2	R10 R3, R10 #, R10
BQJX	2 TEU Flat Wagon/Sleepers (ex RG)	C	76 80	20.3	15.2	0.90	B1	- R1
BQOX	3 TEU Container Wagons (ex CQOY/EQOY)	C	76 80	24.5	23.7	1.30	B3	- R1
BQPX	3 TEU Container Wagon (ex AQPY/AOOX)	C	76 80	23.4	23.7	1.30	B3	- R1
KGBY	Hopper wagon (*Permanently coupled in pairs)	B C	*168 *184	*39.0	*31.00	2.2	B4	- R5
PQBY	3TEU Container Wagon	C	76 84 92	20.2	19.4	2.20	B4	- - R5

% These vehicles are not fitted with grade control valves or fixed exhaust chokes. If operating LOADED in the Up direction between Katoomba and Valley Heights, these vehicles shall not exceed 20% of the train mass. No restrictions apply when EMPTY.

These vehicles when loaded up to 88 tonnes shall operate at a maximum speed of 80 km/h. Wheel tread hollowing shall not exceed 2mm.

10.49. Specialised Container Transport (SCT)

10.49.1. Specialised Container Transport – Locomotives

Table 218 – Specialised Container Transport – Locomotives

Code	Load category	Description	Max speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
CSR	AC6	Diesel AC	115	134	22.0	2.3	4000	Type SDA1	R14,R11, a, b
G	L4	Diesel	115	128	19.8	1.80	3000		R11
SCT	AC6	Diesel AC	115	134	22.0	2.25	4500	Type GT46C-Ace	R11, R14

- a. *CSR Class locomotives are permitted to operate on the following routes only:*
- i. *Woodville Junction to Metropolitan Freight Network (Flemington South Junction) via North Strathfield underpass or North Strathfield goods line and return*
 - ii. *Bowenfels to Metropolitan Freight Network (Flemington South Junction) and return*
 - iii. *Lidcombe to North Strathfield Junction and return via Flemington Middle and East Junctions*
 - iv. *Macarthur to Metropolitan Freight Network (Sefton Park Junction) and return*
 - v. *Macarthur to Metropolitan Freight Network (Marrickville Junction) via East Hills Line and return*
 - vi. *Cabramatta to Granville (for access to Yennora Yard) via Old Main South (up and down)*
 - vii. *Bomaderry, Unanderra, and Port Kembla to Meeks Road Junction and return (this also includes Unanderra to Inner Harbour and return)*

All other routes across the TfNSW Metropolitan Heavy Rail Network may be traversed if dead attached (not powering or providing tractive effort) subject to all track and civil requirements being met.

- b. *The maximum speed for light engine operation shall be 100 km/h. Operation within train consists is up to a maximum speed of 115 km/h.*

10.49.2. Specialised Container Transport – Passenger rolling stock

Table 219 – Specialised Container Transport – Passenger rolling stock

Code	Description	Maximum Speed km/h	Max gross mass (t)	Passenger Capacity	Length (m)	Draw capacity (MN)	Brake type	Notes
PDAY	Crew accommodation car	115	52	6	23.85	1.8	B3	R9
QCAY	Crew Car	80	52	12	23.9	0.89	Ex JRA	R9

10.49.3. Specialised Container Transport – Freight rolling stock

Table 220 – Specialised Container Transport – Covered wagons

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
ABSY	Box car	A	76 80 84	30.0	23.7	1.30	B3	- R1 R3
ARBY	Refrigerated box car	A	76 84	31.5	23.7	1.30	B4	- R3
PBSY	Box van wagon	A	76 84	28.6	23.5	2.2	B2	R9 R9, R3
PBGY	Box car	A	76 80 84 92	27.1	23.5	1.80	B4	- R1 R3 R5

Table 221 – Specialised Container Transport – Container wagons

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
PQDY	Container	A	76 80	23	25.73	1.3	B1	- R3
PQIY	Container 80 ft / 4TEU	B	76 84	21.2	25.5	1.80	B4	- R3
PQKY	Container 60ft	A	76 80	18.6	19.36	2.85	B3	R9 R9, R3
PQMY	Containers	A	76 84 92	22	20.1	1.30	B3	R10 R3, R10 R5, R10
PQQY	Containers 5 pack articulated (12 axles)	A	228 252 276	59.0	77.8	2.8	B4	- R3 R5
PQSY	40ft Container	A	76 84 92	15.94	13.54	2.2	B4	- R3 R5
RQMY	Containers	A	76 84 92	22	20.1	1.30	B3	R10 R3, R10 R5, R10
VQCY	Container flat (ex RQCY)	A	76 80	20	20.1	1.30	B1	R10 R1, R10
VQDW	Containers	C	76	23	25.7	1.30	B2	

10.50. Sydney Electric Train Society

10.50.1. Sydney Electric Train Society – Locomotives

Table 222 – Sydney Electric Train Society – Locomotives

Code	Load Category	Description	Max speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
#4615	##	Electric	105	114	16.4	0.90		Ex SRA Loco See Note below	
#8606	##	Electric	105	118	20.1	1.80		Ex SRA Loco See Note below	
#8649	##	Electric	105	118	20.1	1.80		Ex SRA Loco See Note below	

Notes for 46/86 Electric Locomotives:

1. No maintenance is to be carried out on the traction equipment unless the pantographs are lowered, air isolated and danger tags applied to the isolating cock.
2. No access is permitted to the roof of the locomotive under the OHW unless an electrical permit is issued by Sydney Trains. Work performed on unwired roads shall be outside electrical safety clearances.
3. A visual inspection of both pantographs shall be performed from the ground as part of each vehicle preparation.
4. For single electric locomotive operation, both pantographs may be used and full parallel control may be used.
5. For multiple electric locomotive operation, a maximum of 2 electric locomotives may be connected to the OHW at any given time within a train. Where electric locomotives are coupled together only a single pantograph per locomotive is permitted. Where the 2 electric locomotives are separated by at least 70m, both pantographs may be used.
6. The Electrical Operating Centre (phone 9379 4911) shall be advised before raising or lowering the pantographs.

Refer to Sydney Metropolitan Area division pages for loads.

10.50.2. Sydney Electric Train Society – Passenger rolling stock

Table 223 – Sydney Electric Train Society – Single deck intercity cars – narrow width classification (Group 1)

Type of car	Sets	Car numbers	Code	Max speed (km/h)	Tare mass (t)	Length body (mm)	Length coupled (m)	Width (mm)	Seat capacity
Motor	U	5003,5021	CF	115	50.0	19812	20.6	2946	52

Notes for 5003 and 5021:

1. *These cars may be marshalled dead attached in a train consist as trailer cars with ONE ONLY pantograph raised to power auxiliary equipment.*

Under these conditions, the cut-out switch in the cabs shall be set to “Cut-out” and labelled “Do not use”. The drivers cabs shall be locked to prevent access by unauthorised personnel.

2. *Toilets fitted to these cars shall not be used, and shall be locked at all times.*

Table 224 – Sydney Electric Train Society – Heritage / double deck suburban cars – medium width classification (Group 2)

Type of car	Sets	Car numbers	Code	Max speed (km/h)	Tare mass (t)	Length body (mm)	Length coupled (m)	Width (mm)	Seat capacity
Motor Car Series 4 [G]	S	3057	C	115	45.0	19288	20.2	3036	113

[G] Goninans

Table 225 – Sydney Electric Train Society – Heritage / double deck suburban cars – extended medium width classification (Group 4)

Type of car	Sets	Car numbers	Code	Max speed (km/h)	Tare mass (t)	Length body (mm)	Length coupled (m)	Width (mm)	Seat capacity
Motor Car Series 2 [C]	S	3861	C	115	45.4	19288	20.2	3077	112
Trailer Car Series 3 [C]	S	4983	T	115	33.6	19120	20.2	3077	130
Ctrl Trailer Car Series 4 [C]	S	4003	T	115	33.8	19288	20.2	3077	114

[C] Commonwealth Engineering

10.51. Sydney Trains

10.51.1. Sydney Trains – Passenger rolling stock

Table 226 – Sydney Trains – Double deck suburban cars – medium width classification (group 2)

Type of car	Sets	Car numbers	Code	Max speed (km/h)	Tare mass (t)	Length body (mm)	Length coupled (m)	Width (mm)	Seat capacity
Motor Car A/C Series 5 [G]	K	3501-3580	C	115	46.9	19288	20.3	3036	108
Motor Car Chopper A/C [G]	C	3581-3608	C	115	52.0	19288	20.3	3036	104
Ctrl Trailers A/C Series 5 [G]	K	4096-4099	D	115	42.2	19288	20.3	3036	108
Trailer A/C Series 5 [G]	K	4171-4246	T	115	41.2	19288	20.3	3036	118
Trailer A/C [G]	C	4247-4274	T	115	43.0	19288	20.3	3036	115

[G] Goninans

Table 227 – Sydney Trains – Tangara double deck suburban cars – medium width classification (group 2)

Type of car	Sets	Car numbers	Code	Max speed (km/h)	Tare mass (t)	Length body (mm)	Length coupled (m)	Width (mm)	Seat capacity
Motor Car Non Ctrl [G]	T	5101-5285	N	115	50.1	19420	20.2	3000+	112
Motor Car Non Ctrl [G]	T	5801-5820	N	115	53.4	19420	20.2	3000+	112
Motor Car Non Ctrl [G]	T	5851-5870	N	115	55.1	19420	20.2	3000+	98
Trailer Control [G]	T	6101-6289	D	115	42.3	19420	20.3	3000+	98
Trailer Control [G]	T	6801-6841	D	115	45.1	19420	20.3	3000+	98

+ 3168 mm wide with doors open both sides

[G] Goninans

Table 228 – Sydney Trains – Millennium double deck suburban cars – medium width classification (group 3a)

Type of car	Sets	Car numbers	Code	Max speed (km/h)	Tare mass (t)	Length body (mm)	Length coupled (m)	Width (mm)	Seat capacity
Motor Car [D]	M	1501 – 1573	N	115 #	54.8	19430	20.2	3030	122
Trailer Car [D]	M	1001 – 1073	D	115 #	50.6	19872	20.5	3030	104

Maximum speed limited to 115 km/h (for further information refer to TS TOC 2, Division

Pages, Section 17, Passenger Train Operating Conditions, Speed signs – maximum kilometres per hour)

Table 229 – Sydney Trains – Waratah double deck suburban cars – medium width classification (group 3a)

Type of car	Sets	Car numbers	Code	Max speed (km/h)	Tare mass (t)	Length body (mm)	Length coupled (m)	Width (mm)	Seat capacity
Motor Car [D]	A	5301, 5380, 5303 – 5378, 5401, 5480, 5403 – 5478, 5501, 5580, 5503 – 5578, 5601, 5680, 5603 – 5678	N	115 #	52.3	19393	20.2	3035	118
Trailer Driver Car [D]	A	6301, 6401, 6303 – 6380, 6403 – 6480	D	115 #	51.6	19882	20.7	3035	102
Trailer Car [D]	A	6501, 6580, 6503 – 6578, 6601, 6680, 6603 – 6678	T	115 #	48.2	19482	20.3	3035	110

Maximum speed limited to 115 km/h (for further information refer to TS TOC 2, Division Pages, Section 17, Passenger Train Operating Conditions, Speed signs – maximum kilometres per hour)

[D] Downer EDI Rail

Table 230 – Sydney Trains – Waratah Series 2 (SGT) double deck suburban cars – medium width classification (group 3a)

Type of car	Sets	Car numbers	Code	Max speed (km/h)	Tare mass (t)	Length body (mm)	Length coupled (m)	Width (mm)	Seat capacity
Motor Car [D]	B	1601-1641 1701-1741 1801-1841 1901-1941	N	115 #	52.3	19393	20.2	3035	118
Trailer Driver Car [D]	B	1101-1141 1201-1241	D	115 #	51.6	19882	20.7	3035	102
Trailer Car [D]	B	1301-1341 1401-1441	T	115 #	48.2	19482	20.3	3035	110

Maximum speed limited to 115 km/h (for further information refer to TS TOC 2, Division Pages, Section 17, Passenger Train Operating Conditions, Speed signs – maximum kilometres per hour)

[D] Downer EDI Rail

Table 231 – Sydney Trains – Special purpose single deck suburban cars – wide width classification (Group 5)

Type of car	Sets	Car numbers	Code	Max speed (km/h)	Tare mass (t)	Length body (mm)	Length coupled (m)	Width (mm)	Seat capacity
Brake Test	-	3653	C	80	48.0	18739	19.4	3153	

10.51.2. Sydney Trains – Locomotives

Table 232 – Sydney Trains – Locomotives

Code	Load category	Description	Max speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
48	L13	Diesel	100	75.2	14.8	0.90	900	Ex SRA Locos – 4819 & 4827 scrubber exhaust equipped for tunnel working	R11

10.51.3. Sydney Trains – Special purpose rolling stock

Table 233 – Sydney Trains – Special purpose rolling stock

Code	Description	Max speed (km/h)	Max loaded mass (t)	Passenger capacity	Length over coupling faces (m)	Draw capacity (MN)	Remarks
AAH	Commiss Car	115	46.3	5 Berths	23.4	0.50	No 9
AAH	Officers Car	115	42.7	6 Berths	22.7	0.50	No 8% End protection fitted. Wooden car
AAH	Kitchen+Att. Car	115	51.8	6 Berths	22.7	0.50	No 7% End protection fitted. Wooden car
AAH	Spcl Officers Car	115	44.9	4 Berths	22.7	0.50	No 19% End protection fitted. Wooden car
AK%	Track Inspection	115	46.6		22.7	0.30	Wooden body No 812 6 berths
AK	Track Inspection	115	47.8		23.8	0.50	Nos. 2382, 2383 and 2384 Ex FAM sleeper
LIV	Lab. Test Car			6 Berths	20.5	0.30	Air conditioned No 1865 Steel bodied
PAM	Premier Car	115	44.7	6 Berths	22.7	0.30	No 11 Wooden body. Restricted service
SG	State Gov Car	115	51.5	4 Berths	21.4	0.30	Wooden body. Restricted service

% Denotes wooden bodied vehicles fitted with end protection steel beams.

10.51.4. Sydney Trains – Heritage rolling stock

Table 234 – Sydney Trains – Heritage train single / double deck suburban cars – wide width classification (group 5)

Type of car	Sets	Car numbers	Code	Max speed (km/h)	Tare mass (t)	Length body (mm)	Length coupled (m)	Width (mm)	Seat capacity
Motor	-	3102	C	80	51.0	18745	19.4	3185	71
Motor	-	3702, 3708	C	80	52.5	19105	19.8	3142	59
Motor	-	7485	C	80	51.0	19098	19.7	3189	56
Trailer	-	4554	T	80	34.0	19094	19.7	3189	72
Trailer	-	4790	T	80	33.7	19105	19.8	3142	70
Trailer Series 1 (T)	-	4801, 4814	T	115	33.5	19456	20.2	3143	132
Trailer (Wooden body)	-	4279	T	80	23.4	15011	15.5	3175	58
Control trailer	-	4673 (4052)	D	80	35.5	18745	19.4	3156	63

Table 235 – Sydney Trains – Heritage train / double deck suburban cars – medium width classification (group 2)

Type of car	Sets	Car numbers	Code	Max speed (km/h)	Tare mass (t)	Length body (mm)	Length coupled (m)	Width (mm)	Seat capacity
Motor Car Series 4 [G]	S	3001	C	115	45.0	19288	20.2	3036	113
Motor Car Series 1 [C]	S	3805, 3814	C	115	45.4	19456	20.2	3048	112
Trailer Series 4 [G]	S	4101, 4150	T	115	33.6	19120	20.2	3036	130

[C] Commonwealth Engineering

[G] Goninans

Table 236 – Sydney Trains – Heritage train / double deck suburban cars – extended medium width classification (group 4)

Type of car	Sets	Car numbers	Code	Max speed (km/h)	Tare mass (t)	Length body (mm)	Length coupled (m)	Width (mm)	Seat capacity
Motor Car Series 4 [C]	S	3765	C	115	46.6	19288	20.2	3077	112
Motor Car Series 2, 3 [C]	S	3862, 3986	C	115	45.4	19288	20.2	3077	112
Trailer Series 2 [C]	S	4013	T	115	33.8	19288	20.2	3077	129
Trailer Series 3, 4 [C]	S	4050	T	115	33.8	19288	20.2	3077	124
Trailer Series 2 [C]	S	4961	T	115	33.6	19120	20.2	3077	130

Table 237 – Sydney Trains – Heritage train single deck suburban cars – wide width classification (group 5)

Type of car	Sets	Car numbers	Code	Max speed (km/h)	Tare mass (t)	Length body (mm)	Length coupled (m)	Width (mm)	Seat capacity
Control Motor Car [CE]	F1	3426	C	80	50.4	18745	19.4	3156	77
Motor Car [GD]	F1	3218	C	80	50.4	18745	19.4	3185	71
Trailer Car [GD]	F1	4527	T	80	33.5	18745	19.4	3156	61
Control Motor Car [CE]	F1	7396	C	80	50.0	18745	19.4	3156	71

[GD]Government Dockyard

[CE] Clyde Engineering

- a. Operation in daytime and night time hours permitted as per NTR 406.
- b. Banners or temporary signage to be in place at the terminal ends of the set to provide high visibility contrasting colours.
- c. The set shall operate to the normal/general speed signs, with restrictions for wide width rolling stock.
- d. The maximum speed through level crossings shall be restricted to 25 km/h. Driver to be vigilant of vehicles and persons through these areas.
- e. All body side passenger doors shall have crew attendants monitoring them to ensure doors are closed and secured to ensure no inadvertent opening whilst the train is in motion or outside the confines of platforms. In addition crew attendants shall monitor passenger transfers when stopping at stations.
- f. The set shall operate with a driver safety system incorporating two independent safety features. An OEP/deadman and Vigilance system meets this requirement.
- g. An authorised second person shall be in place in the leading cab. An authorised person in this case, is a second person, accompanying the vehicle driver/operator (generally a second driver/operator), with sufficient knowledge of the vehicle to take control and bring the vehicle to a stand in case of an emergency.
- h. If recovery is required, the following conditions shall be followed:
 - a. The recovery set shall be an S or K set.
 - b. Prior to coupling the BP and MR hoses, the S or K set compressor governor cut out setting shall be adjusted down from the normal 800 kPa to approximately 690 kPa. This shall be carried out by a qualified fitter or electrician to ensure correct adjustment.
 - c. The BP and MR shall be coupled and confirmed to be continuous throughout the consist.

- d. Only the automatic air brake shall be utilised, EP is not permitted.
- e. The maximum speed during recovery shall be reduced to 60 km/h outside of platforms and 20 km/h when passing adjacent platforms.

10.51.5. Sydney Trains – Special purpose passenger rolling stock

Table 238 – Sydney Trains – Special purpose passenger rolling stock

Code	Description	Max speed (km/h)	Max loaded mass (t)	Capacity	Length over coupling faces (m)	Draw capacity (MN)	Remarks	Code
MHN	Equipment van	115	58.7	24.4 tonnes	23.4	0.50	No 2364	MHN
NAM	Crew Accom.	115	45.4	20 berths	23.4	0.50	No 2332	NAM
PHN	Power Van	115	54.4	6.1 tonne	23.4	0.50	No 2363	PHN

10.51.6. Sydney Trains – Freight rolling stock

Table 239 – Sydney Trains – Track maintenance vehicles

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
NACF	Spoil wagon (Ex NDSF BHP Side dump wagon)	C	76	30.5	13.9	0.75	B2	1
NALF	Robel Train Generator/Compressor Wagon (ex NDLF)	C	46.7	19.8	15.0	2.2	B3	
NARF	Robel Train container Wagon (1958-W)	C	67	22	14.6	0.75	B2	
NDBF	Spoil wagon (Ex NDCH) with crew work platform	C	51.3	17.3	11.7	0.75	B2	
NDCF	Spoil	C	71.4	22	13.1	0.75	B1	
NDCH	Spoil	C	73	22	15.0	0.75	B2	
NDDF	DESEC carrying wagon	C	76	22	19.3	2.2	B2	
NDEF	Robel Rail train clamp wagon	C	60	31	20.1	1.8	B3	
NDFF	Ballast air operated discharge door	C	74	20	11.9	1.80	••B3	2
NDGF	Concrete sleepers	C	75	20.5	14.6	0.75	B3	
NDHF	Concrete sleepers (ex NDGF)	C	75	19.6	14.6	0.75	B3	
NDIF	Robel Rail Train Chute Wagon	C	53.8	36.1	23.8	2.2	B3	3
NDJF	Robel Rail Train Compensation Wagon	C	48.0	21.9	15.0	2.2	B3	
NDKF	Robel Rail Train Clamp Wagon	C	48.7	26.7	15.0	2.2	B3	
NDLF	Robel Rail Train Standard Wagon	C	45.9	19.8	15.0	2.2	B3	

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
NDMX	Ex NOBX wagons	C	76 80	22	15.0	0.75	B3	R1
NDNF	Spoil wagon (Ex NDCH)	C	54.3	17.3	11.7	0.75	B2	
NDOF	Ballast plough	C	37	30	14.0	2.2	••B4	
NDQF	Container wagon(Ex NDXF)	C	74	19	14.1	0.75	B2	
NDRF	Welded rail	C	67	22	14.6	0.75	B2	
NDRF	8 Permanently coupled rail sets (32 axles)	C	512	152	116.8	0.90	B2	4
NDRF	9 Permanently coupled rail sets (36 axles)	C	576	171	131.4	0.90	B2	4
NDRF	16 Permanently coupled rail sets (64 axles)	C	1024	304	233.6	0.90	B2	4
NDSF	Spoil side dump wagons (ex BHP STB/STH)	C	76	34	14.1	0.75	•□B1	1
NDTF	Plasser WTW 40 tilt bed wagon	C	32	32	26	1.8	B4	5
NDUF	Flat track panel transport wagon	C	60	30	29.0	1.0	B4	
NDVF	Container wagon	C	76	19.1	15.0	2.2	B4	
NDWF	Container wagon for transport of sleepers	C	76	20.3	15.0	0.75	B4	
NDXF	Ex NOBX concrete sleeper wagons	C	76	21	15.0	0.75	B2	
NDYF	Container wagon fitted with gantry rail (Ex NDXF)	C	76	21	15.0	0.75	B2	
NDZF	Track panel wagon	C	72	32	28.0	1.8	B4	
NFGF	Match wagon for NHMF wagon	C	20.4	20.4	12.5	0.75	B2	
NFNF	Match wagon for BJ003/005 Ballast Cleaner	C	25	18	12.5	0.75	B2	
NFPF	Match wagon for NHMF wagon	C	18	18	12.5	0.75	B2	
NHBF	Ballast	C	61	19	12.4	1.80	B3	
NHMF	Material handling	C F G	76 80 92 100 120	45	*22.6	2.2	B4	@ R1, @ R5, @ @ @
NHSF	Side dump wagons	C	76	38	12.6	1.80	••B3	
NLJF	Louvre van	C	50	20	14.6	0.75	B2	
NZBF	Ballast plough	C	33	33	11.6	0.75	B2	

Notes:

1. *NACF and NDSF wagons – These vehicles are only permitted to operate within the medium width area bounded by Springwood, Macarthur, Kiama, Port Kembla,*

Cronulla, Bondi Junction, Carlingford/Sandown, Richmond, Newcastle Interchange.

These vehicles do not require match wagons since conveyors are not fitted.

Where these vehicles are operated on the Goods line between ARTC Boundary and Meeks Road, they SHALL operate under single line working conditions with no opposing traffic on the adjacent Goods line.

Operation around the Gosford area shall adhere to the operating conditions detailed in TS TOC 2, Section 17, Passenger train operating conditions, specific localities 7a, operation of medium width rolling stock between Sydney and Newcastle area.

2. *NDFW wagons – OPERATION OF NDFW WAGONS OUTSIDE A WORKSITE WHEN UNEVENLY LOADED:*

These wagons shall not leave a worksite with an excessive load imbalance. This can result in a derailment of the vehicle.

An excessive load imbalance can result when more ballast is discharged from the outer doors on one side of the wagon than that of the other side.

Under exceptional circumstances, the worksite supervisor may arrange for an excessively unbalanced wagon to be taken to the nearest siding for detachment from the train in order to clear the section. In this case, the following operating conditions shall apply:

- ix. The unbalanced wagon is not to exceed a maximum speed of 25 km/h.*
- x. The unbalanced wagon shall not pass another unbalanced NDFW wagon (whether stationary or in motion), on parallel lines where the load imbalance causes both wagons to lean towards one another.*
- xi. The driver of the train conveying the unbalanced wagon shall be informed of the load imbalance.*
- xii. Personnel on or about the track shall remain a safe distance from the unbalanced wagon during its movement, and they shall be warned that there is danger of derailment.*

The unbalanced wagon is not to travel further than the nearest practical location in order to clear the section.

- 3. *NDIF wagons – Shall be transferred in the loaded condition that is with the gantry anchored on the vehicle.*
- 4. *Welded rail (numbered 2301 to 2347 only).*
- 5. *NDTF wagons – These wagons can operate in the tare condition. The tilt mechanism shall be locked in the travelling position (platform tilted at 60 degrees).*

Loaded NDTF wagons will require a TOC Waiver to be issued after weighing and gauge check.

@ These wagons shall be marshalled with a match wagon containing a conveyor support coupled to the conveyor end of the vehicle.

* The conveyor extends 4.3 metres past the vehicle coupler.

Table 240 – Sydney Trains – Container wagons

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
NQAF	Container wagon (ex NLJF)	C	74	18.4	14.6	0.75	B2	
NQJX	Container flat	C	76 80	16.5	15.0	1.3	B3	R10 R1, R10

10.52. Tank Wagons – Miscellaneous

10.52.1. Tank Wagons – miscellaneous – freight rolling stock

Table 241 – Tank Wagons – miscellaneous – freight rolling stock

Code	Description	Owner	Vehicle numbers	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
NTAF	Oil tankers	Ampol / Caltex	3129 – 4727	C	76	26	14.9	0.90	B1	R7
NTAF	Oil tankers	Ampol / Caltex	3331P	C	79.3	27	16.0	0.90	B1	R1
NTAF	Oil tankers	Ampol / Caltex	3332B	C	77.2	26	18.6	0.90	B1	R1
NTAF	Oil tankers	Ampol / Caltex	3363L	C	76.9	26.6	15.6	0.90	B1	R1
NTAF	Oil tankers	Ampol / Caltex	4066A	C	79.8	28.5	15.0	0.90	B1	R1
NTAF	Oil tankers	Ampol / Caltex	4537U	C	79.3	28.4	17.6	0.90	B1	R1
NTAF	Oil tankers	Ampol / Caltex	4538G	C	79.8	28.9	17.7	0.90	B1	R1
NTAF	Oil tankers	Ampol / Caltex	4539P	C	80.0	29.6	17.6	0.90	B1	R1
NTAF	Oil tankers	Ampol / Caltex	4540L	C	80.0	29.7	17.7	0.90	B1	R1
NTBF	Heavy Oil tankers	Ampol / Caltex	3275 – 4721	C	76	25	14.9	0.75	B1	R6, R7
NTBF	Bitumen	BlueScope Steel		C	76	28.8	14.6	0.75	B1	R6, R7
NTBX	Bitumen	BlueScope Steel		C	76	28.8	14.6	0.75	B1	R7
NTBF	Bitumen	Boral	6637 – 6696	C	76	27	15.2	0.75	B1	R6, R7

Code	Description	Owner	Vehicle numbers	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
NTHF	Gas Tank wagons	Boral	6410 and 6411	C	111	56	23.3	0.75	B1	^
NTAF	Oil tankers	BP	7217 – 7317	C	76	25	14.0	0.90	B1	R7
NTHX	Gas tankers	Chemtrans	3480 – 3481	C	76	35	15.6	0.75	B2	R7
NTBF	Bitumen	Emoleum	3433 – 3436	C	76	26	13.7	0.75	B1	R6, R7
RTGX	Gas tanker	Incitec	008	C	76	35	18.0	0.75	B1	
VTGX	Gas tanker (Type 1)	Incitec	008	C	76	36.6	18.0	0.75	B1	
VTGX	Gas tanker (Type 2)	Incitec	007,009	C	76	34.4	16.5	0.75	B1	
NTBX	Bitumen	Koppers	3501 – 3517	C	76	27	16.1	0.75	B1	R7
NTFF	Wine tankers	McWilliams	3455, 3456, 3459 – 3461	C	76	23	14.6	0.75	B1	R7
NTFF	Wine tankers	Manildra	3451-3454, 3457, 3458	C	76	23	14.6	0.75	B1	R7
NTAF	Oil tankers	Mobil	5020 – 7138	C	76	25	13.7	0.90	B1	R7
NTBF	Heavy oil tankers		5430	C	76	19	8.2	0.75	B1	R6, R7
NTAF	Oil tankers	Shell	6015 – 8135	C	76	25	16.5	0.90	B1	R7
NTBF	Heavy oil tankers	Shell	6041 – 6117	C	76	26	16.5	0.75	B1	R6, R7

^ Fitted with 6 wheel bogies, maximum permissible gross mass 111 tonnes and length 23.3 m, are permitted to run on the following routes

Sydney – Woodville Junction, Sydney – Macarthur, Sydney – Lithgow

Maximum permissible speed is subject to lower speed restrictions and other conditions as prescribed herein and Local Appendices.

Not permitted to travel on running lines laid with lighter than 40 kg/m rail or on sidings laid with lighter than 35 kg/m rail. On sidings with 35 kg /m rail maximum speed restricted to 15 km/h.

Not to be unloaded in sidings used by the public or sidings adjacent to buildings or vehicles.

10.53. The Rail Motor Society

10.53.1. The Rail Motor Society – Locomotives

Table 242 – The Rail Motor Society – Locomotives

Code	Load category	Description	Max speed (Km/h)	Live Weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
73	L14	Diesel	70	50	12.0	0.90	650	Ex SRA Loco (7344)	R11

10.53.2. The Rail Motor Society – Diesel rail cars

Table 243 – The Rail Motor Society – Diesel rail cars

Code	Description	Max speed (km/h)	Max loaded mass (t)	Passenger capacity	Length over coupling faces (m)	Draw capacity (MN)	Remarks	Notes
CPH1	Rail Motor	80	25	43	13.6	Small Hook	Shall run coupled with CPH7. Impact resistant front No 2 End Window.	R11
CPH3	Rail Motor	80	25	43	13.6	Small Hook	Not to be run as leading/driving car. Not fitted with vigilance control	R12
CPH7	Rail Motor	80	25	43	13.6	Small Hook	Shall run coupled with CPH1. Impact resistant front No 1 End Window.	R12
HPC	Rail Motor	115	34	27	16.3	Large Hook	No 402	R12
NPF	Diesel Motor	115	43	48	19.2	Small Auto	No 621	R12
NTC	Trailer	115	35	54	19.2	Small Auto	No 721	

10.54. Toll

10.54.1. Toll – Freight rolling stock

Table 244 – Toll – Freight rolling stock

Code	Description	Class	Max Gross Mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
TQCY	Container flat	C	76 80	20.0	20.1	1.30	B1	- R1
TRAY	5 pack Cartainer (12 axles)	A	228	55.0	84.8	1.80	B4	R10

10.55. Transport Equipment Company

10.55.1. Transport Equipment Company – Freight rolling stock

Table 245 – Transport Equipment Company – Freight rolling stock

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
TQAY	Container Wagon	C	76 92	18.2	19.4	2.2	B3	R9 R5, R9
TQBY	Container Wagon	C	76 92	18.3	19.4	2.2	B3	R9 R5, R9
TQDY	40ft Container wagon	A	76 84 89.6	15.3	13.16	2.2	B3	R10 R3,R10 R5,R10

10.56. Transport Heritage NSW

10.56.1. Transport Heritage NSW – Locomotives

Table 246 – Transport Heritage NSW – Locomotives

Code	Load category	Description	Max speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
1803		Steam Loco (non-powered)	40	29	8.5	See Notes		Z18 Class and coded as "1" in Thomas the Tank Engine livery	See below
2705		Steam Loco	60	82	16.6	0.75		Ex SRA Loco Max speed tender first 40 km/h.	R8,R11
3001		Steam Loco	80	101.25	17.6	0.75		Maximum speed tender first 35 km/h	R11
3526		Steam Loco	115	130.05	19.2	0.90		Ex SRA Loco Max speed tender first 40 km/h	R11
3642		Steam Loco	115	163	20.70	0.90		Ex SRA Loco Max speed tender first 40 km/h	R11
3801		Steam Loco	115	204.4	23.3	0.90		Ex SRA Loco Max speed tender first 40 km/h	R11
5910		Steam Loco	80	154	20.6	0.90		Ex SRA Loco Max speed tender first 40 km/h	R11
40	L13	Diesel	%	113	17.4	0.90	1600		R11
42	L12	Diesel	115	122	18.5	0.90	1750	Ex SRA Loco	R11

Code	Load category	Description	Max speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
43	L12	Diesel	115	107.6	17.3	0.90	1600	Ex SRA Loco B7-EL Brake equipment.	R11
442	L11	Diesel	115	115	18.7	1.80	2000	Ex SRA Loco	R11
44	L12	Diesel	115	108	17.8	0.90	1800	Ex SRA Loco	R11
45	L12	Diesel	115	112	17.9	0.90	1800	Ex SRA Loco	R11
#46	##	Electric	105	114	16.4	0.90		Ex SRA Loco See Note below	See below
48	L13	Diesel	100	75.2	14.8	0.90	900	Ex SRA Loco	R11
49	L13	Diesel	100	81	15.4	0.90	875	Ex SRA Loco	R11
70		Diesel	60	48.8	10.2	0.90		Ex SRA Loco	R11
79		Diesel	55	40	10.7	0.90		Ex SRA Loco	R11
#86	##	Electric	105	118	20.1	1.80		Ex SRA Loco See Note below	See below
D1		Diesel	18	86.4	11.5	0.90		Ex AIS Loco	R11

% Max speed 80 km/h on Wide, Extended Medium and Medium tracks, 60 km/h on Narrow electric/Non electric tracks as outlined in Diagram indicating track width classifications (page 38) in Section 1 (page 29)

Notes for 46/86 Electric Locomotives

- 1. No maintenance is to be carried out on the traction equipment unless the pantographs are lowered, air isolated and danger tags applied to the isolating cock.*
- 2. No access is permitted to the roof of the locomotive under the OHW unless an electrical permit is issued by Sydney Trains. Work performed on unwired roads shall be outside electrical safety clearances.*
- 3. A visual inspection of both pantographs shall be performed from the ground as part of each vehicle preparation.*
- 4. For single electric locomotive operation, both pantographs may be used and full parallel control may be used.*
- 5. For multiple electric locomotive operation, a maximum of 2 electric locomotives may be connected to the OHW at any given time within a train. Where electric locomotives are coupled together only a single pantograph per locomotive is permitted. Where the 2 electric locomotives are separated by at least 70m, both pantographs may be used.*
- 6. The Electrical Operating Centre (phone 9379 4911) shall be advised before raising or lowering the pantographs.*

Refer to Sydney Metropolitan Area division pages for loads.

Notes for 1803:

1. Limited to between ARTC boundary at Marrickville Junction and Central / Sydney Terminal / Eveleigh Yard and return.
2. Brakes are modified to operate as a hauled non-powered vehicle
3. The trailing load behind 1803 shall not exceed 50t
4. The locomotive shall be hauled by a suitable diesel locomotive with one suitable carriage trailing the vehicle
5. The locomotive shall be inspected by a qualified examiner and be fit for movement and all required inspections and maintenance during the movements shall be carried out

10.56.2. Transport Heritage NSW – Passenger rolling stock

Table 247 – Transport Heritage NSW – Passenger rolling stock

Code	Description	Max speed (km/h)	Max loaded mass (t)	Passenger capacity	Length over coupling faces (m)	Draw capacity (MN)	Remarks
ABS	Diner	115	46		21.5	0.50	No 2305
ABX	Pass	60	53	4 bths/ 19 Lnge	22.7	0.30	No 1007. Fitted with internal handbrake, air tap, and tail lamps.
BCS	Club Lounge	115	41	40	23.4	0.50	No 2356, 2357, 2379
BI	First / Buffet	80	25	50	15.5	0.15	No 1561
BI	First	80	25	50	15.5	0.15	No 1564
CBC	Pass	60	43	62	21.4	0.15	Nos 1090, 1089
CN	Composite	115	44	16F + 32E	20.3	0.50	No 1747
EAM	Composite	115	53	20 bths 30 seats	22.1	0.30	No 1829 Wooden body
EFS	Economy	115	40	56	20.4	0.30	No 2090 Fitted with shop.
FAM	Twin. Sleeper	115	49	18 berths	23.4	0.50	No 2391
FO	Economy	80	25	50	15.9	0.15	Nos 1565, 1690, 1671, 1563, 1688
FS	Economy	115	40	64	20.4	0.30	Nos 2093, 2122
GMS1	Lnge/observe car	115	43	2 bths 34 seats	20.5	0.50	Ex BS 2170
HFA	Economy	60	23	40	16.2	0.15	No 1171 Restricted operation Picton – Buxton
HFO	Economy/brake	80	25	44	16.2	0.15	Nos 1566,1665
HFS	Economy	115	40	56	20.4	0.30	No 2017 Guards compartment.
HN	Economy / brake	115	41	52	20.3	0.50	No 2197

Code	Description	Max speed (km/h)	Max loaded mass (t)	Passenger capacity	Length over coupling faces (m)	Draw capacity (MN)	Remarks
HX	Economy/brake	60	42	60	21.4	0.15	No 1006. Fitted with internal handbrake, air tap, & tail lamps.
LAN	Roomette sleeper	115	46	20 Berths	23.4	0.50	No 2352, 2353, 2377
LFA	Economy	60	23	58	16.2	0.15	No 942 Restricted operation Picton – Buxton
MBE	First	115	49.2	45	22.7	0.30	No 62 Wooden body
MCA	Passenger	115	53	58	22.7	0.30	No 2 Ex MCE Wooden body
MFS	Economy	115	40	70	20.4	0.30	No 2137
NAM	Twin. Sleeper	115	46	20 Berths	23.4	0.50	Nos 2338,2373. Fitted with internal handbrake, air tap, and tail lamps.
NAM	Twin. Sleeper	115	46	20 Berths	23.4	0.50	Nos 2375
PFZ	First	115	47	24	20.3	0.50	No 2219
PHA	Power Van	115	54		23.4	0.50	No 2394, 2396
RFN	Buffet	115	44	32	20.3	0.50	No 2187
RMS	Dining Car	115	46	48	23.4	0.50	Nos 2358 & 2359
SWT	Water Gin	80	54	N/A	15.04	0.50	Nos 5 & 6 31540 litres capacity. Pump fitted.
TBC	First	115	47	42	22.7	0.30	No 532
VHO	Guard/Service	115	55		20.2	0.30	%No 1816. Fitted with internal handbrake, air tap, & tail lamps.

% = Wooden bodied vehicles fitted with end protection steel beams.

10.56.3. Transport Heritage NSW – Diesel rail cars

Table 248 – Transport Heritage NSW – Diesel rail cars

Code	Description	Max speed (km/h)	Max loaded mass (t)	Passenger capacity	Length over coupling faces (m)	Draw capacity (MN)	Remarks	Notes
CPH18	Rail Motor	80	25	43	13.6	Small Hook		R12
FP1	1937 Rail Pay Bus	30	5	9	6.6		Shall operate under Manual Block Working Network Rule NSY 512 Manual block working	

Code	Description	Max speed (km/h)	Max loaded mass (t)	Passenger capacity	Length over coupling faces (m)	Draw capacity (MN)	Remarks	Notes
NPF	Diesel Motor	115	43	48	19.2	Small Auto	No 623	R12
NTC	Trailer	115	35	54	19.2	Small Auto	No 723	

10.57. Whitehaven Coal Ltd.

10.57.1. Whitehaven Coal Ltd. – Locomotives

Table 249 – Whitehaven Coal Ltd. – Locomotives

Code	Load category	Description	Max speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
WH	AC6	AC Diesel	115	134	22.0	2.25	4500	Type GT46C-Ace	R11, R14

10.57.2. Whitehaven Coal Ltd. – Freight rolling stock

Table 250 – Whitehaven Coal Ltd. – Freight rolling stock

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
PHWH	*2 permanently coupled coal wagons. (ECP braked)	G B	*240 Empty	21.8	*30.8	2.45	#E1	

#These wagons are permitted to operate in ECP mode for a maximum consist of 84 x PHEH/PHWH/PYH wagons and 3 x XRN class locomotives in head end power configuration only

10.58. Winarch

10.58.1. Winarch – Freight rolling stock

Table 251 – Winarch – Freight rolling stock

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
PHYH	*4 permanently coupled coal wagons.	G B	*480 Empty	21.9	*61.5	2.45	B4 #E1	**

*** Not permitted on grades steeper than 1 in 40 when in the loaded condition.*

#These wagons are permitted to operate in ECP mode for a maximum consist of 84 x PHEH/PHWH/PYH wagons and 3 x XRN class locomotives in head end power configuration only

10.59. Xstrata

10.59.1. Xstrata – Locomotives

Table 252 – Xstrata – Locomotives

Code	Load category	Description	Max speed (km/h)	Live weight (t)	Length over coupling faces (m)	Draw capacity (MN)	Horse-power	Remarks	Notes
XRN	AC6	AC Diesel	115	134	22.0	2.25	4500		R9,R11, R14 R9,R11, R14,a
			60	139					

- a. XRN locomotive operation above 134t up to 139t restricted as per TS TOC 2, Division Pages, North Section Pages.

10.60. Xstrata Rail (NSW) Ltd.

10.60.1. Xstrata Rail (NSW) Ltd. – Freight rolling stock

Table 253 – Xstrata Rail (NSW) Ltd. – Freight rolling stock

Code	Description	Class	Max gross mass (t)	Tare (t)	Length (m)	Draw capacity (MN)	Brake type	Notes
PHEH	*4 permanently coupled coal wagons. (ECP braked)	G B	*480 Empty	21.3	*61.4	2.45	#E1	

- #These wagons are permitted to operate in ECP mode for a maximum consist of 84 x PHEH/PHWH/PHYH wagons and 3 x XRN class locomotives in head end power configuration only.

Section 11
On-track infrastructure maintenance
vehicle data

11. On-track infrastructure maintenance vehicle data

Version December 2023

This Section of the TOC Manual lists all on track infrastructure maintenance vehicles authorised to operate on the TfNSW Metropolitan Heavy Rail network. To gain listing in this document an on track infrastructure maintenance vehicle shall comply with the requirements of TS 04052 *RSU 000 Series – Minimum operating standards for rolling stock – General Requirements* or be covered by an appropriate Concession.

A Train Operating Conditions (TOC) Waiver is required for the operation of any on track infrastructure maintenance vehicles that are authorised, but not listed in this document.

See also Section 12 (page 289) for Road-Rail Vehicle & Trolley/Trailer Data.

11.1. Explanation of notes for on track infrastructure maintenance vehicle data

Note: On-track infrastructure maintenance vehicles and road-rail vehicles shall operate under MANUAL BLOCK WORKING CONDITIONS as per NSY 512 Manual block working unless exempted by NOTE T3, which authorises a vehicle to operate under the control of track signalling.

Table 254 – Explanation of notes for on track infrastructure maintenance vehicle data

Note	Explanation
T1	Vehicle can be removed from rail using portable takeoff.
T2	Vehicle can be coupled into a train consist. Refer to specified maximum trailing load.
T3	Vehicle permitted to operate under the control of track signalling and not under block working conditions.
T4	Maximum speed on a 1 in 30 grade 10 km/h
T5	Maximum speed on a 1 in 30 grade 20 km/h
T6	Maximum speed of vehicle when coupled in a train consist 80 km/h
T7	Maximum speed of vehicle when coupled in a train consist 50 km/h
T8	Restricted to operate in areas designated WIDE in the Passenger Train Operating Conditions pages .
T9	Vehicle can be removed from the track by hand.
T10	Maximum speed of vehicles when coupled in a train consist 60 km/h
T11	Not to travel on rail within electrified area bounded by Broadmeadow – Newcastle Interchange – Bondi Junction – Lithgow – Richmond – Macarthur – Kiama
T12	This vehicle is restricted to a maximum speed of 20 km/h in the forward direction, and 5 km/h in the reverse direction when traversing track fitted with check rails or guard rails such as at points, crossings, bridges and level crossings.
T13	Not in use.

Note	Explanation
T14	This vehicle is restricted to operation within a possession area only . All movements shall be controlled by the possession officer . No other vehicles will be permitted to pass these vehicles on any adjacent lines until the possession officer has been advised that these vehicles have come to a stand and are clear of the adjacent line. The maximum speed permitted within a possession area is 15 km/h.
T15	These vehicles comply with the 'Narrow Square' Rolling Stock outline in the Minimum Operating Standards for Rolling Stock, TS 04052, and are NOT to operate on the following sections of line: Dunmore to Bomaderry, Sutherland to Cronulla, Central to North Sydney, City Circle lines, Erskineville Junction to Bondi Junction, Blacktown to Richmond.
T16	This vehicle is fitted with an automatic coupler and air brake coupling hoses on the rear end and air compressor. This vehicle can be used to shunt rail vehicles.
T17	This vehicle can be marshalled within a train consist in a position consistent with its draw capacity and the train can operate under the control of track signalling and not under block working conditions. The train conveying these vehicles shall operate under block working conditions when these vehicles are marshalled as the last vehicle of the train.
T18	Vehicles identified with this note shall operate in travel mode with a driver safety system incorporating two independent safety features. The two independent safety features shall consist of a vigilance system (task linked preferred) plus a suitable authorised person OR alternatively, a task linked vigilance system plus a driver enabling device (deadman). The latter is a mandatory requirement for driver only operation. An authorised person in this case, is a second person, accompanying the vehicle driver/operator, with sufficient knowledge of the vehicle to take control and bring the vehicle to a stand in case of an emergency.
T19	In exception to Note T3 above, Block working will apply to this vehicle over designated Sydney Metropolitan lines as shown in Locomotive Operations – Block working of single unit diesel cars (page 56)
T20	This vehicle shall operate as the leading vehicle when travelling in a convoy with other infrastructure maintenance vehicles. This limitation does not apply when in work mode.
T21	This vehicle is not fitted with height restrictors to limit the travel of its moveable elements. (<i>For example truck and tray mounted cranes, booms on excavators, EWP's and cherry pickers and tipper bodies or tipping trays</i>). This vehicle therefore can infringe the minimum safe approach distances when working under overhead wiring and is only permitted to work on track where an electrical permit to work has been issued (Overhead wiring is isolated) Travel under live OHW is permitted .
T22	Trolleys do not require lights during daylight operation, however during conditions of poor visibility, night operations and within tunnels, suitable front and rear lights shall be fitted.
T23	This vehicle is restricted to operation on class 1 track only, operation on class 2 track is not permitted.
T24	This vehicle is fitted with an elevated work platform (EWP) that shall not be utilised when the vehicle is on rail. Travel of the vehicle on rail, with the EWP stowed in the travel position, is permitted. For road/rail vehicles, the EWP may be used if the vehicle is in road mode not utilising the rail wheels.
T25	This vehicle is fitted with an elevated work platform (EWP) that is permitted to be utilised when on rail. The EWP is not permitted to be utilised while the vehicle is in motion (vehicle shall be stationary for EWP use). Travel of the vehicle on rail, with the EWP stowed in the travel position, is permitted.

11.2. Abigroup

Table 255 – Abigroup

Plant Number	Description	Max Speed (km/h)	Loaded Mass (t)	Length (m)	Notes	Remarks
70000	Pandrol Jackson Tamper	20	34	14.6		
70006	Two axle ballast hopper	15	39.8	10.8	T14	
70007	Two axle ballast hopper	15	39.8	10.8	T14	
70034	Kershaw 46 – 2 Ballast regulator	15	17.7	10.5	T14	

11.3. Aurizon

Table 256 – Aurizon

Plant Number	Description	Max Speed (km/h)	Loaded Mass (t)	Length (m)	Notes	Remarks
MMY034	Loram rail grinder	80	796	211.6	T20	See notes below

Notes for MMY034:

The vehicle is restricted to the mainline operations only and is not permitted on the passenger only lines. The vehicle is not permitted on the Cronulla, Richmond, East Hills, ESR, ECRL, North Shore, Bankstown, Airport, and City Circle Lines.

11.4. Australian Rail Track Corporation

Table 257 – Australian Rail Track Corporation

Plant Number	Description	Max Speed (km/h)	Loaded Mass (t)	Length (m)	Notes	Remarks
BX0031,033	Plasser USP 3000C ballast regulator	50	26.5	14	T4	
BX043-054	Plasser PBR 203 ballast regulator	50	22.5	11	T4	
CS098,100-102	Tamper/Compare (on track) Compressor	30	4	2.9		
DS005	Plasser DTS62N dynamic track stabiliser	80	62	19	T2	0.10 draw capacity
HOX244	Permaquip ACI MkV elevating work platform	30		3.2		
ML 54-56,58,59	Kershaw 19.1 sleeper trailer	30	1.4	2.85	T1	Towed by resleeping machine
PHX68	Techniplan Fast Clipping machine	30	6	2.6		
PJ012,22,26,28,29,32,33	Plasser Mammot track jack	30	1.5	2	T1	
PJ 047,49,55,56	Plasser HGR 230 track jack	30	1.5	2	T1	

Plant Number	Description	Max Speed (km/h)	Loaded Mass (t)	Length (m)	Notes	Remarks
PJ054,57,58,60,61-64	Gemco track jack	30	3	3		
PN 300 – 303	Nordco LS dog spike puller	30	5.5	5	T1	
SF 051	Nordco Super B lock spike driver	30	11	8	T1	
SM008, SM010	Comeng tie scarifier	30	3.5	3.6	T1	
SM009	Comeng / Gemco scarifier			4		
SM015-17	Kershaw 345 scarifier	30	6.5	7	T1	
SX070	Aresco tie handler	30	3			
SX077,79-81	Gemco Model 30 tie handler	30	3	2.7	T1	
SX089,97-101	Comeng Aresco tie handler	30		3	T1	
SX105 – 108	Kershaw Model 47/3 tie handler	30	12	9	T1	
SX109-114	Kershaw model 12/5 tie crane	30	7.5	6	T1	
TJ048	Tamper Vibratool spot tamper	30	5.5	5	T1	
TJ060, TJ062	Plasser 07-275 turn-out tie tamper	80	36.5	19		
TJ063 – 066	Plasser PTT16 spot tie tamper	30	11	7	T1	
TJ075	Plasser 07-16 production tie tamper	80	29	15	T4	
TJ085-088	Plasser 08-16 production tie tamper	80	31	15	T4	
TJ089	Plasser 79-800W turnout tie tamper	80	33.5	15	T4	

11.5. Azbuild

Table 258 – Azbuild

Plant Number	Description	Max Speed (km/h)	Loaded Mass (t)	Length (m)	Notes	Remarks
X11	Track Jack	4	1.6	1.9	T14	

11.6. Blue Scope Steel

Table 259 – Blue Scope Steel

Plant Number	Description	Max Speed (km/h)	Loaded Mass (t)	Length (m)	Notes	Remarks
234	Plasser 79.800W Tamping machine	60	33.4	12.8	T4	

Plant Number	Description	Max Speed (km/h)	Loaded Mass (t)	Length (m)	Notes	Remarks
331	Plasser PBR 201 Ballast regulator	50	22.5	10.2	T4	

11.7. Brimble Rail Pty Ltd

Table 260 – Brimble Rail Pty Ltd

Plant Number	Description	Max Speed (km/h)	Loaded Mass (t)	Length (m)	Notes	Remarks
TMS055	Plasser USP 3000C Ballast Regulator (ex BX028)	80	26.5	14	T4, T18	
TMS188	Plasser 07-275 Turnout Tamper (ex TJ073)	80	38	19	T18	
TMS201	Plasser PBR201 Ballast Regulator	50	19.69	10.1	T18	Refer to notes for TMS201
TMS277	Mechanised Track Patrol Vehicle (ex ML039)	115	48	15	T3, T18, T19	
TMS290	Plasser 79-800W tamper/production (ex TJ090)	80	33.5	15		
TMS373	Plasser 09-32 Tamper	80	74.1	30.1	T18, b	Refer to notes for TMS373
TMS400	Medium width Plasser Unimat 08-475/4S Tamper (Refer to notes for Medium width operation)	90	96.6	33.7	T18, a	Refer to notes for TMS400

Notes for TMS400:

- a. *Vehicle is a Medium width vehicle and is only permitted to operate on Wide, Extended Medium, and Medium width corridors (refer to TS TOC 1, section 1.10, and ESC215 for corridor widths).*
- b. *Refer to TS TOC 2, Section 17, Specific localities, for operating conditions of Medium rolling stock across the network.*

Notes for TMS373:

- c. *This vehicle shall be operated with a driver/operator and a second driver/operator or authorised person who is qualified in signal recognition.*

Notes for TMS201:

- d. *This vehicle shall be operated with a driver/operator and a second driver/operator or authorised person who is qualified in signal recognition.*
- e. *Where possible, A end of vehicle shall be used as the leading end for driver visibility.*

- f. *Appropriate signal distances shall be maintained such that both drivers (or driver and authorised person) have sufficient visibility of signals at all times. This may require stopping short of signal or reducing speeds on signal approach.*
- g. *Cameras shall be fitted to assist with visibility (for worksite only, not for travel).*

11.8. Daracon Rail

Table 261 – Daracon Rail

Plant Number	Description	Max Speed (km/h)	Loaded Mass (t)	Length (m)	Notes	Remarks
3579	Jackson HTT 6700 Tamper	30	32	15.7		
3580	Kershaw 46-2 Ballast Regulator	30	17.7	10.6		

11.9. Downer EDI Rail

Table 262 – Downer EDI Rail

Plant Number	Description	Max Speed (km/h)	Loaded Mass (t)	Length (m)	Notes	Remarks
TMP 05	Jackson Mk3 Tamper	22	32	15		See notes below

Notes for TMP 05:

- a. *The tamper shall be limited to a maximum speed of 5 km/h when traversing points and crossings.*
- b. *A second ground based person shall be used to pilot the tamper when reversing.*
- c. *Tamping tynes to be clear when in travel mode.*

11.10. Harbinger Plant

Table 263 – Harbinger Plant

Plant Number	Description	Max Speed (km/h)	Loaded Mass (t)	Length (m)	Notes	Remarks
TAMP-001	Jackson HTT 6700 Tamper	15	34	15.7	T14	
REG-001	Kershaw 46-2 Ballast Regulator	15	17.7	10.5	T14	

11.11. Harsco Track Technologies

Table 264 – Harsco Track Technologies

Plant Number	Description	Max Speed (km/h)	Loaded Mass (t)	Length (m)	Notes	Remarks
FT3	Harsco tamper	35	16	9.2		

Plant Number	Description	Max Speed (km/h)	Loaded Mass (t)	Length (m)	Notes	Remarks
FT9	Harsco rail bending machine	25	6	5.4		

11.12. John Holland

Table 265 – John Holland

Plant Number	Description	Max Speed (km/h)	Loaded Mass (t)	Length (m)	Notes	Remarks
RG 9	48 Stone Rail grinder	80	335	76		Shall have two crew members
32029	International Tractor	10	5.5	5.1	T16	
340130 – 340140	PEM 807 (6 units) (even numbered)	6	24	2.1	T14, T21	See notes for 340130-340141 and 340114
340131 – 340141	LEM 460 (6 units) (odd numbered)	6	24.2	3.5	T14, T21	
340114	1 – 6 PEM807 Turnout gantry crane 7 – 12 LEM460 Powered lifting trolley	6	24	2.1	T14, T21	See notes for 340130-340141 and 340114
		6	24.2	3.5	T14, T21	
M209464- M209469	Geismar PEM 807 XL Q6C Gantry Crane	5	24	2.1	T14, T21	-
411003	Plasser USP 5000 RT regulator	90	100	26.3	T17, T18	See notes for 411003/4, 412002, 412004, 412007/8
411004	Plasser USP 5000 RT regulator	90	100	26.3	T17, T18	See notes for 411003/4, 412002, 412004, 412007/8
41108	Plasser USP 3000C ballast regulator	50	39.5	15	T4, T18	
41112	Plasser PBR201 ballast regulator	50	19.3	11		with broom
41113	Plasser PBR201 ballast regulator	50	19.6	9.4		with broom
41115	Plasser PBR201 ballast regulator	50	14.1	7.7		
41119	Tamper BE-VR Ballast regulator	50	12	7.4		See Notes for 41119 below
41134	Plasser SSP-305 Ballast Regulator (M518)	80	69	28	T17, T18	See notes for 41134
41135	Plasser SSP-110 Ballast Regulator	80	43.2	14.4	T23, a, b	See notes for 41135 below

Plant Number	Description	Max Speed (km/h)	Loaded Mass (t)	Length (m)	Notes	Remarks
411001	Plasser SSP-303 Ballast Regulator (M519)	60	69	28	T17, T18, a, b	See notes for 411001
412001	Plasser Unimat 08-475/4S track and crossing tamper (Serial M520)	100	98	32.3	T18	
412002	Plasser USP 5000 RT regulator	90	100	26.3	T17, T18	See notes for 411003/4, 412002, 412004, 412007/8
412004	Plasser 08-16 4x4 C100RT Tamper	100	70	18.2	T17, T18	See notes for 411003/4, 412002, 412004, 412007/8
412007	Plasser 09-16 RT Tamper	80	100	30.5	T17, T18	See notes for 411003/4, 412002, 412004, 412007/8
412008	Plasser 09-16 RT Tamper	80	100	30.5	T17, T18	See notes for 411003/4, 412002, 412004, 412007/8
41217	Plasser Beaver 79-800W tamper	50	36	13.7	T4	
41228	Plasser 08-475/4s tamper	80	78	28.2	T18	
41264	Plasser 09-32 CSM tamper	80	69	27.5		See notes for 41264
41268	Plasser 08-16 SH tamper	80	40	14.6	T18	
42106	BHB Ballast scarifier	15	4.5	4.7	T14	
42110	Comeng scarifier	10	3.5	4	T14	
42116	Comeng scarifier	15	4	3.9	T14	
42303	Combo sleeper scarifier	10	5.1	3.9	T14	
42312	Gemco tie extractor	15	3.3	2.7	T14	See notes for 42312
42318	Tamper TR10 Sleeper extractor	25	15	9.9	T11, T14+	See Notes for 42318 and 42320 below
42320	Tamper TR10 Sleeper extractor	25	15	9.9	T11, T14	See Notes for 42318 and 42320 below
42328	Gemco sleeper inserter	15	4	2.9	T14	

Plant Number	Description	Max Speed (km/h)	Loaded Mass (t)	Length (m)	Notes	Remarks
42637	Tamper Ride on dog spike puller	15	5.5	5.2	T14	

Notes for 340130-340141 and 340114:

When on rail the PEM807 shall be marshalled (coupled) between the LEM460 units.

Notes for 411003/4, 412002, 412004, 412007/8:

- a. Maximum trailing load not to exceed 120 t.*
- b. When self-propelled the vehicles may be marshalled in pairs of 08-16 Tamper – USP5000 Regulator, or 09-16 Tamper – USP5000 Regulator.*
- c. When locomotive hauled the vehicles shall be dead attached and shall be set in locomotive hauled mode. That is any drives disengaged or locked out and any other equipment set as required for locomotive hauling.*

Notes for 41119:

- a. This vehicle is out of gauge in width and therefore shall be stationary when being passed by other traffic in dual track areas.*
- b. This vehicle shall not be passed by other traffic if the vehicle is moving or is stationary on a track curvature of 400 metres or less.*
- c. Whilst operating on a work site in dual track areas, the vehicle shall cease operations when there is a likelihood of passing traffic. Infrastructure personnel shall ensure there is adequate clearance for a passing movement or in the case of item 'b' above, the vehicle is to be moved to a safe location clear of the curve, before such a movement takes place.*
- d. During passing movements the maximum speed for passing the stationary ballast regulator shall be 30 km/hr for all other trains.*

Notes for 41134:

- a. Operation is limited to 15 km/h when operating as a single self-propelled vehicle or if the brush/broom end of the vehicle is not coupled to another vehicle or train.*
- b. Maximum trailing load not to exceed 120t.*
- c. When the vehicle is hauled in a train consist, the vehicle shall be prepared as per the manufacturer's procedures for operation within a train consist.*

Notes for 411001:

- a. Maximum trailing load not to exceed 120t.*
- b. When the vehicle is hauled in a train consist, the vehicle shall be prepared as per the manufacturer's procedures for operation within a train consist.*

Notes for 41135:

- a. When broom end is leading a second crew member competent in signal recognition and train protection procedure is required.
- b. When operating above 36t, the vehicle shall be restricted to class 1 track as per note T23, operating below 36t is permitted on class 1 and class 2 track.

Notes for 41264:

When trailer end is leading a second crew member competent in signal recognition and train protection procedure is required.

Notes for 42312:

These vehicles are out of gauge on vehicle width below platform height. Caution shall be exercised by operators for obstacles in this area.

Notes for 42318 and 42320:

These machines may be passed by other trains on adjacent lines, at a speed not exceeding 30 km/h. The machine shall be in the stationary non operable condition with all its hydraulics folded in the narrow position.

This machine may pass other stationary trains located on adjacent lines at a speed not exceeding 25 km/h.

11.13. Kennards

Table 266 – Kennards

Plant Number	Description	Max Speed (km/h)	Loaded Mass (t)	Length (m)	Notes	Remarks
207063	Rosenquist CD500 Pandrol Fast clip machine	15	5	4.9	T14	
207064	Rosenquist CD500 Pandrol Fast clip machine	15	5	4.9	T14	

11.14. Laing O'Rourke

Table 267 – Laing O' Rourke

Plant Number	Description	Max Speed (km/h)	Loaded Mass (t)	Length (m)	Notes	Remarks
BTL01	Pony express track layer	80	57	27.6	T17	See Notes for BTL01 below
BTL02	Plasser tracklayer SVM1000	50	84	27	T2, T17	See Notes for BTL02 below
BTM07	Pandrol Jackson 6700 stitch tamper	30	30.2	14.2		
PEM	001 – 008 PEM807 Turnout gantry crane	6	24	2.1	T14, T21	See notes on PEM and LEM
LEM	001 – 008 LEM460 Powered lifting trolley	6	24.2	3.5	T14, T21	See notes on PEM and LEM

Plant Number	Description	Max Speed (km/h)	Loaded Mass (t)	Length (m)	Notes	Remarks
REG002	Harsco BE-AD Ballast regulator	80	18	10.1		
REG006	Knox Kershaw KBR 875 Ballast regulator	60	16	12.4		
REG007	Knox Kershaw KBR 875 Ballast regulator	60	16	12.4		
REG010	Knox Kershaw KBR-925 Ballast Regulator	30	20.2	11.2		
TAMP005	Aresco car shunter				T16	
TAMP007	Jackson 6700 Point Tamper	50	31.7	14.8		
TAMP009	Plasser 09-32 CSM Tamper	80	69	27.4		Trailing load not to exceed 69t
TAMP030	Jackson (HTT) 6700S Production Tamper	30	31.8	15.9		
TAMP031	Jackson (HTT) 6700S Production Tamper	15	31.8	13.4	T14, T18, T23, T24	See notes on TAMP031
TRIP001	Nordco Trip tie inserter TRIPP model C	30	17.5	10.7		
TRIP002	Nordco Trip tie inserter TRIPP model C	30	17.5	10.7		

Notes for BTL01:

This vehicle is classified as out-of-gauge.

A route clearance check will be required and the exact route specified for all movements, including working of the vehicle. All movements will be as an out of gauge vehicle under single line working conditions, with special conditions applying. A TOC Waiver and Special Train Notice (STN) will be required for all movements of this vehicle.

The transfer of this vehicle shall be accompanied by supervising personnel.

The transfer of this vehicle shall be with the vehicle in non-working mode.

Unless otherwise indicated, the maximum speed of this vehicle is 80 km/h.

A minimum of one cover vehicle shall be attached to this vehicle at all times, due to inadequate parking brake on Track Laying machine

Notes for BTL02:

The following operating conditions apply:

Where the length of the hauling train does not exceed 20 wagons, the SVM 1000 track layer shall be marshalled as the last vehicle. In this case the SVM 1000 shall have brakes cut in and operational. For the purposes of this note and note 2 below, any

multi-pack wagons included in the hauling train consist, shall be counted as the number of platforms. For example, a 5 pack wagon shall be counted as 5 wagons.

Where the hauling train exceeds 20 wagons in length (See note 1 above), the SVM 1000 shall be marshalled as follows:

Locomotives / Train / SVM 1000 Track Layer (Brakes cut out) / 3 Match trucks of minimum mass 17 tonnes each.

(This requirement is due to the SVM 1000 having a low sensitivity to changes in brake pipe pressure. The sensitivity decreases as the train length increases.)

The air brake and hand brake shall be cut in and fully operative on all match trucks. The brake pipe shall be continuous throughout the train.

The total unbraked mass of the hauling train, including the mass of the SVM 1000 track layer, shall not exceed 10% of the total train mass.

Notes on PEM and LEM:

When on rail the PEM807 shall be marshalled (coupled) between the LEM460 units.

Notes on TAMP031:

Due to signal visibility, this vehicle requires two operators or an operator and second person that is competent in signal recognition.

11.15. Martinus Rail

Table 268 – Martinus Rail

Plant Number	Description	Max Speed (km/h)	Loaded Mass (t)	Length (m)	Notes	Remarks
TJ061	Plasser 07-275 Turnout Tie Tamper	50	36.5	19	-	-

11.16. McConnell Dowell

Table 269 – McConnell Dowell

Plant Number	Description	Max Speed (km/h)	Loaded Mass (t)	Length (m)	Notes	Remarks
MV0331	Plasser track jack	15	1.7	1.5	T14	
MV0332	Plasser track jack	15	1.7	1.9	T14	
MV8049	Robel rail threader type 43.32	13	1.5	2.2	T14	This vehicle shall not operate over points or crossings as it has double flanged wheels
z040/457	Kershaw 46-2 Ballast regulator	30	17.5	10.7	T18	
z040/458	Kershaw 46-2 Ballast regulator	15	17.5	10.5	T14	

Plant Number	Description	Max Speed (km/h)	Loaded Mass (t)	Length (m)	Notes	Remarks
z040/461	Jackson (HTT) 6700 Tamper	15	32.5	14.9	T14	
z040/463	Jackson (HTT) 6700 Tamper	30	32.5	14.7		

11.17. Queensland Rail

Table 270 – Queensland Rail

Plant Number	Description	Max Speed (km/h)	Loaded Mass (t)	Length (m)	Notes	Remarks
MMK 20	Harsco sleeper crane	25	9	3.4	T14	
MML 85	Harsco MBTX Sleeper renewer	30	6.45	4.1	T14	

11.18. Rhomberg Rail

Table 271 – Rhomberg Rail

Plant Number	Description	Max Speed (km/h)	Loaded Mass (t)	Length (m)	Notes	Remarks
# M437	09-3X continuous action mainline tamping machine	80	77	23.1		
# M438	DTS62N dynamic track stabilizer	80	60	18.6		
# M439	BT102 broom trailer	80	20	13		Shall operate with M437 or M438
# M440	PT200 ballast ploughing trailer	80	12	10		Shall operate with M437 or M438
M521	Plasser SSP – 303 Ballast regulator (M521)	70	65.8	28	T17, T18	@ See notes for M521 and M525
M524	Plasser SSP – 09-3X Tamper Regulator	80	150	41.4	T17, T18	Max. haul load not to exceed 120 tonnes
M525	Plasser SSP – SSP 305 Ballast Regulator (M525)	80	66.2	29.1	T17, T18	@ See notes for M521 and M525
M580	Plasser SSP 303 Ballast Regulator (M580)	100	77	28.8	T17, T18	See notes for M580
M865	Medium width Plasser 08-275/3S Switch Tamper (Refer notes for Medium operation)	90	80	28	T18, **Refer to notes	** Refer to notes for M865
M946	Plasser Unimat 08-475/4s tamper	80	105	33	T18	\$ See notes below
PJ018	Plasser Mammut track jack	10	1.5	2	T14	
TJ097	Brad 4131 tamper	15	6.8	5.3	T14	

Instructions for the locomotive hauling of M437, M438, M439 and M440

- a. Three (3) empty wagons of minimum mass 20 tonnes shall be marshalled between the hauling locomotive and the Rhomberg Rail consist to provide braking effort.*
- b. A Main Reservoir run around hose will be required to run from the hauling locomotives to the Rhomberg Rail consist to release the spring applied brakes of the machines.*
- c. The Rhomberg Rail consist will have operators on board and will be under power.*
- d. The braking system of the Rhomberg Rail consist is not compatible with that of the hauling train and will be unbraked, however, the operators on board the Rhomberg Rail consist will apply its brakes independently, if required, in cooperation with the driver of the hauling train .*
- e. As the Rhomberg Rail vehicles will be manned and have spring parking brakes, the brake retention test will not be required.*
- f. The crew of the hauling locomotive shall have discreet radio communication with the crew of the Rhomberg Rail consist at all times.*
- g. This train shall operate under manual block working conditions.*

\$ Notes for M946

Self Propelled

- a. This vehicle shall operate under manual block working.*

Locomotive Hauled

- a. When this vehicle is locomotive hauled, the train shall be block worked if this vehicle is in the last three vehicles on the train.*
- b. A Rhomberg Rail Operator is to ride aboard this vehicle to monitor vehicle movements and shall have discreet radio communication with the train crew at all times.*
- c. The operator of this vehicle shall ensure the following and advise the train crew of the hauling locomotive:*
 - All gearboxes have been disengaged.*
 - All drive axle lock outs have been engaged.*
 - All driver's brake valve levers, (in all cabs) have been moved to the 'neutral' position.*
- d. Normal brake retention tests shall be carried out on all train consists.*

@ Notes for M521 and M525:

- a. Maximum trailing load not to exceed 120t.*

- b. When the vehicle is hauled in a train consist, the vehicle shall be prepared as per the manufacturer's procedures for operation within a train consist.

Notes for M580: When operated plough end leading, a second driver or authorised second person competent in signal recognition is required.

** Notes for M865:

- a. The vehicle is permitted to operate across the TfNSW Metropolitan Heavy Rail Network on the Medium, Extended Medium, or Wide lines only (operation on Narrow lines is not permitted). Refer to TS TOC 1 section 1.10 for allowable area of operation, and for more specific details refer to AMB Track Standard ESC 215.
- b. Refer to TS TOC 2, Section 17, Specific localities, for operating conditions of Medium rolling stock across the network.
- c. This vehicle shall be operated by two drivers/operators who are qualified in signal recognition.

11.19. Speno Rail Maintenance

Table 272 – Speno Rail Maintenance

Plant Number	Description	Max Speed (km/h)	Loaded Mass (t)	Length (m)	Notes	Remarks
RR24-M21	24 stone rail grinder	80	186	52.3	T3	Couple with M22. Operates as RR48
RR24-M22	24 stone rail grinder	80	186	52.3	T3	
RR36-M24A	36 stone rail grinder	70	206	52.3		
RR24-M30	24 stone rail grinder	60	151	44.9	T18, T20	
RR24M31A	24 stone rail grinder	60	157.1	40.6	T3	Coupled to RR36M24A operates as RR60M1A
RR24MT2A	24 stone rail grinder	50	167.7	46.9	T18	
RR32A	32 stone rail grinder	50	120	39	T3	
US7	Speno flaw detection vehicle w/raised UT trolley w/lowered UT trolley	80 60	65.6t	18.33	T18, a 18, a	

Notes:

- a. Operation under track signalling (block working not required) is only permitted when both track circuit actuators (TCA) are functioning. If any of the TCA's are not functioning, the vehicle is not permitted to operate under track signalling and shall

be stopped. Operation shall then be block worked as per Block working of single unit diesel cars TS TOC 1, Section 2.17.

11.20. Swietelsky

Table 273 – Swietelsky

Plant Number	Description	Max Speed (km/h)	Loaded Mass (t)	Length (m)	Notes	Remarks
DR73112	Plasser 09-3X Dynamic Tamper	80	129.5	34.2		
DR73113	Plasser SSP 303 Ballast regulator (M529)	80	67	28.1	T17, T18, a, b, c	See notes for DR 73113
DR73116	Plasser 09-3X Tamper (S/N = 497)	80	94.1	29.91	T18, d, e	See notes for DR73116 / DR73117
DR73117	Plasser SSP-303 Ballast Regulator (S/N = 498)	80	66	27.36	T18, T23, d, e	See notes for DR73116 / DR73117

Notes for DR 73113:

- a. Operation is limited to 15 km/h when operating as a single self-propelled vehicle or if the brush/broom end of the vehicle is not coupled to another vehicle or train.
- b. Maximum trailing load not to exceed 120t.
- c. When the vehicle is hauled in a train consist, the vehicle shall be prepared as per the manufacturer's procedures for operation within a train consist.

Notes for DR 73116 / 73117:

- d. This vehicle is not permitted to operate in the ESR or in the City Underground.
- e. This vehicle shall be operated with a driver/operator and a second driver/operator or authorised person who is competent in signal recognition.

11.21. Sydney Trains

Table 274 – Sydney Trains

Plant Number	Description	Max Speed (km/h)	Loaded Mass (t)	Length (m)	Notes	Remarks
BJ003 (BJR003)	Plasser UHR-RM-74 ballast cleaner	60	74	27.3	T2, T17, T18	0.50 draw capacity and below
BJ005 (BJR005)	Plasser UHR-RM-74 ballast cleaner	60	74	27.3	T2, T17, T18	0.50 draw capacity and below
BX055-056	Plasser SSP110 ballast regulator	80	36.3	18	T2, T5, T7, T18	0.10 draw capacity
BX059	Plasser SSP 300 ballast regulator	80	29.5	14	T2, T7, T18	0.10 draw capacity

Plant Number	Description	Max Speed (km/h)	Loaded Mass (t)	Length (m)	Notes	Remarks
BX060	Plasser SSP302 ballast regulator	80	42	20.6	T2, T18	0.10 draw capacity
BX061	Plasser SSP303 ballast regulator	80	66	27.8	T17, T18	See notes for BX061/62
BX062	Plasser SSP303 ballast regulator	80	66	27.8	T17, T18	See notes for BX061/62
DS001-004	Plasser DTS62N dynamic track stabiliser	80	62	19	T2, T18	0.10 draw capacity
MTPV 1	Mermec Roger 800 Mechanised Track Patrol Vehicle	115	69	23.3	T18	See notes for MTPV 1 and MTPV 2
MTPV 2	Mermec Roger 800 Mechanised Track Patrol Vehicle	115	66	23.3	T18	See notes for MTPV 1 and MTPV 2
PJ048	Plasser HGR 230 track jack	10	1.5	2	T1	
PJ079	Plasser Mammut track jack	10	1.5	2		
TJ091-092	Plasser CAT continuous tie tamper	80	40.3	18	T2, T4, T7, T18	0.10 draw capacity
TJ095	Plasser Unimat 09-32 tamper	80	135	35.1	T18	
TJ096	Plasser Unimat 09-32/4S tamper	80	135	35.1	T18	
TJ107-108	Plasser Unimat 08-475/4S turnout tamper	80	114.6	32.11	T18	See notes for TJ107-108
DVE 1,3,5,6,7	Plasser OHW 10 overhead wiring drum vehicle	50	28	8		See notes for DVE and MVE.
MVE 2 to 7	Plasser OHW 10 overhead wiring main vehicle	50	26	12	T18	See notes for DVE and MVE.
166	XPT Bogie Transfer Trolley	2.5	14.37	5.26		The vehicle is restricted to operating within the confines of Sydenham Maintenance Centre (XPT Service Centre), to the Dock Siding between the bogie store and the main depot building.

Notes for BJ003 and BJ005:

- a. *BJ003 and BJ005 are identified as BJR003 and BJR005 in TRIMS, DTPOS, AEI tags and wayside systems that read AEI tags.*

Notes for BX061 and BX062:

- a. Operation is limited to 15 km/h when operating as a single self-propelled vehicle or if the brush/broom end of the vehicle is not coupled to another vehicle or train.*
- b. Maximum trailing load not to exceed 120t.*
- c. When the vehicle is hauled in a train consist, the vehicle shall be prepared as per the manufacturer's procedures for operation within a train consist.*

Notes for MTPV1 and MTPV2:

- a. These vehicles shall operate to the medium speed boards (in areas with 3 speed boards) or normal speed boards (in areas with 2 speed boards).*
- b. The Geomatic camera, lighting equipment, and associated mounting frame shall be within the rolling stock outline at all times. Wheel wear and wheel turning shall require the packing between the vehicle body and Geomatic equipment to be adjusted as required.*
- c. Operation under track signalling is only permitted when both track circuit actuators (TCA) are functioning. If any of the TCA's are not functioning, the vehicle is not permitted to operate under track signalling and shall be stopped. Operation shall then be block worked as per Block working of single unit diesel cars, TS TOC 1, Section 2.17.*
- d. MTPV1 is fitted with AIMS (in. camera/lights), Track Geography System, OHW measuring system, Rail Prof measuring system, Rail Corrugation measuring system.
MTPV2 is fitted with AIMS (inc. camera/lights).*
- e. Trailing load not to exceed 72 t.*

Notes for DVE and MVE:

- a. DVE shall be operated with MVE.*
- b. MVE, DVE consist shall be last 2 vehicles in a train consist.*

Notes for TJ107 and TJ108:

Tampers only permitted on the following lines (including speed restrictions):

<i>Main West</i>	<i>Bankstown (40 km/h max speed)</i>
<i>Main North</i>	<i>Cronulla (40 km/h max speed)</i>
<i>Illawarra</i>	<i>Richmond (40 km/h max speed)</i>
<i>Main South</i>	<i>Carlingford (40 km/h max speed)</i>
<i>Old Main South</i>	<i>East Hills (General speed boards)</i>
<i>North Shore</i>	<i>Leppington</i>
<i>City Circle</i>	

11.22. RKR Engineering

Table 275 – RKR Engineering

Plant Number	Description	Max Speed (km/h)	Loaded Mass (t)	Length (m)	Notes	Remarks
25	Tracklift – Self propelled 25 t.m Crane	8	14	11.8	T14	

11.23. Taylor Rail Australia Pty Ltd.

Table 276 – Taylor Rail Australia Pty Ltd.

Plant Number	Description	Max Speed (km/h)	Loaded Mass (t)	Length (m)	Notes	Remarks
6700	Jackson (HTT) 6700 Production Tamper	22	31.8	15.9		
KBR925	Knox Kershaw KBR925 Ballast Regulator	28	20	12		
TRA10	Plasser 09-2X Production Tamper	80	80.2	23.7	T18	
TRA JAX 002	Jackson 6700S Tamper	15	31.8	14.8	T14	
TRA JAX 003	Pandrol Model 6700S Switch tamper	30	34.5	13.3	T15	
TRA REG 003	Knox Kershaw KBR 925 Ballast Regulator	15	20.0	11.5	T14	
TRA REG 004	Knox Kershaw KBR 925 Ballast Regulator	15	20	11.2	T14	
TRT1	Unimat Plasser 190 Tamper	20	13	8		
TRT2	Ballast regulator – Model 116a	20	10.7	7.5	T15	
TRT3	Ballast distributor	20	20	4.8		Shall be hauled by TRT2 ballast regulator

Section 12

Road rail vehicle data

12. Road rail vehicle data

Version December 2022

The list of all road/rail vehicle, trailers, trolleys, light support frames, heavy support frames and quadricycles has been removed from this section and placed into TS TOC 4 (previously TS 13000) *Road/rail vehicle and small plant data*.

TS TOC 4 lists all road/rail and plant type vehicles authorised to operate on the TfNSW Metropolitan Heavy Rail network. To gain listing in this document a road/rail vehicle shall comply with the TS 04052 *RSU 000 Series – Minimum operating standards for rolling stock – General Requirements* or be covered by an appropriate Concession.

All road-rail vehicles shall be recertified annually for operation on the TfNSW Metropolitan Heavy Rail network in accordance with the TS 04090.1 *Road/Rail Vehicle Certification & Re-certification*.

All trolleys, trailers, and light/heavy support frame vehicles shall be recertified annually for operation on the TfNSW Metropolitan Heavy Rail network in accordance with the TS 04091.1 *Trolley, Trailer & Quadricycle Certification & Re-certification*.

Recertification status can be checked in the TS TOC 4 *Road/rail vehicle and small plant data*.

A Train Operating Conditions (TOC) Waiver is required for the operation of any on track infrastructure maintenance vehicles that is authorised, but not listed in TS TOC 4.

12.1. Explanation of notes for on-track infrastructure track maintenance and road-rail vehicle data

Note: On-track infrastructure maintenance vehicles and road-rail vehicles shall operate under MANUAL BLOCK WORKING CONDITIONS as per Sydney Trains Network Rule NSY 512 Manual block working unless exempted by NOTE T3, which authorises a vehicle to operate under the control of track signalling.

Table 277 – Explanation of notes for on track infrastructure track maintenance and road rail vehicle data

Note	Explanation
T1	Vehicle can be removed from rail using portable takeoff.
T2	Vehicle can be coupled into a train consist. Refer to specified maximum trailing load.
T3	Vehicle permitted to operate under the control of track signalling and not under block working conditions.
T4	Maximum speed on a 1 in 30 grade 10 km/h
T5	Maximum speed on a 1 in 30 grade 20 km/h
T6	Maximum speed of vehicle when coupled in a train consist 80 km/h
T7	Maximum speed of vehicle when coupled in a train consist 50 km/h
T8	Restricted to operate in areas designated WIDE in the Passenger Train Operating Conditions pages .
T9	Vehicle can be removed from the track by hand.

Note	Explanation
T10	Maximum speed of vehicles when coupled in a train consist 60 km/h
T11	Not to travel on rail within electrified area bounded by Broadmeadow – Newcastle Interchange – Bondi Junction – Lithgow – Richmond – Macarthur – Kiama
T12	This vehicle is restricted to a maximum speed of 20 km/h in the forward direction, and 5 km/h in the reverse direction when traversing track fitted with check rails or guard rails such as at points, crossings, bridges and level crossings.
T13	Not in use.
T14	This vehicle is restricted to operation within a possession area only . All movements shall be controlled by the possession officer . No other vehicles will be permitted to pass these vehicles on any adjacent lines until the possession officer has been advised that these vehicles have come to a stand and are clear of the adjacent line. The maximum speed permitted within a possession area is 15 km/h.
T15	These vehicles comply with the 'Narrow Square' Rolling Stock outline in the Minimum Operating Standards for Rolling Stock, TS 04052, and are NOT to operate on the following sections of line: Dunmore to Bomaderry, Sutherland to Cronulla, Central to North Sydney, City Circle lines, Erskineville Junction to Bondi Junction, Blacktown to Richmond.
T16	This vehicle is fitted with an automatic coupler and air brake coupling hoses on the rear end and air compressor. This vehicle can be used to shunt rail vehicles.
T17	This vehicle can be marshalled within a train consist in a position consistent with its draw capacity and the train can operate under the control of track signalling and not under block working conditions. The train conveying these vehicles shall operate under block working conditions when these vehicles are marshalled as the last vehicle of the train.
T18	Vehicles identified with this note shall operate in travel mode with a driver safety system incorporating two independent safety features. The two independent safety features shall consist of a vigilance system (task linked preferred) plus a suitable authorised person OR alternatively, a task linked vigilance system plus a driver enabling device (deadman). The latter is a mandatory requirement for driver only operation. An authorised person in this case, is a second person, accompanying the vehicle driver/operator, with sufficient knowledge of the vehicle to take control and bring the vehicle to a stand in case of an emergency.
T19	In exception to Note T3 above, Block working will apply to this vehicle over designated Sydney Metropolitan lines as shown in Locomotive Operations – Block working of single unit diesel cars (page 56)
T20	This vehicle shall operate as the leading vehicle when travelling in a convoy with other infrastructure maintenance vehicles. This limitation does not apply when in work mode.
T21	This vehicle is not fitted with height restrictors to limit the travel of its moveable elements. (<i>For example truck and tray mounted cranes, booms on excavators, EWP's and cherry pickers and tipper bodies or tipping trays</i>). This vehicle therefore can infringe the minimum safe approach distances when working under overhead wiring and is only permitted to work on track where an electrical permit to work has been issued (Overhead wiring is isolated) Travel under live OHW is permitted .
T22	Trolleys do not require lights during daylight operation, however during conditions of poor visibility, night operations and within tunnels, suitable front and rear lights shall be fitted.
T23	This vehicle is restricted to operation on class 1 track only, operation on class 2 track is not permitted.
T24	This vehicle is fitted with an elevated work platform (EWP) that shall not be utilised when the vehicle is on rail. Travel of the vehicle on rail, with the EWP stowed in the travel position, is permitted. For road/rail vehicles, the EWP may be used if the vehicle is in road mode not utilising the rail wheels.
T25	This vehicle is fitted with an elevated work platform (EWP) that is permitted to be utilised when on rail. The EWP is not permitted to be utilised while the vehicle is in motion (vehicle shall be stationary for EWP use). Travel of the vehicle on rail, with the EWP stowed in the travel position, is permitted.

12.2. Road rail vehicle data

Refer to TS TOC 4 *Road/rail vehicle and small plant data*.