



# Moura System

## **Information Pack**

Version 7.0  
March 2017



## Revision History

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Sectional run times altered to show only Reference Train.

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**Issue 5** February 2012

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Tonnage allowed in system increase from 26tal to 26.5tal.

**Issue 5.7** January 2014

Adjustment of Level Crossing totals.

**Issue 5.8** August 2014

Removal of reference to the 'Origin' Siding.

**Issue 5.9** December 2014

Document reviewed for re-release.

**Issue 6.0** April 2015

Document reviewed for re-release.

**Issue 6.1** January 2016

Asset data adjusted to reflect upgrades.

**Issue 6.2** July 2016

Updated notes for SRT.

**Issue 7.0** March 2017

Format changed, new asset data added,  
removal of Section Running Times.

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## Introduction

All railway operators wishing to operate in Queensland and on Aurizon Network Pty Ltd rail network require Accreditation under the Transport Infrastructure Act 1994 (Qld) and need to consider the following aspects of typical rail operations (note this is not an exhaustive list):

- Provisioning, stabling or stowing areas for Rolling stock
- Train crewing
- Safe working
- Training
- Route knowledge
- Environmental requirements
- Track standards
- Signalling and traction systems standards and constraints
- Safety training
- Management of risk
- Rolling stock registration and Train authorisation
- Legal issues as contained in Aurizon Network's Access Undertaking, Access Agreements and information contained in this pack.

Operators will be required to have Queensland Department of Transport and Main Roads accreditation, hold an Access Agreement with Aurizon Network and meet any conditions and precedents specified in the Access Agreement prior to commencing operations.

The Accreditation process requires applicants to demonstrate competence and capability to safely commence and maintain rail operations. The Accreditation process is managed by the Queensland Department of Transport and Main Roads, which is independent of Aurizon Network.

Contact details are:

Director of Rail Safety Regulation,  
Land Transport and Safety Division  
Rail Safety Unit  
PO Box 673  
Fortitude Valley QLD 4006.

Operators need to be aware of and comply with other general legislation such as but not limited to Workplace Health & Safety, Environmental legislation and Heritage legislation.

This information package is issued as an UNCONTROLLED DOCUMENT and is planned to be reviewed annually. It is on the onus of enquirer to ensure they are using the current version of this document and /or the latest information.

This Information Pack is provided for information purposes only and Aurizon Network does not make any representation or warranty, express or implied, as to the accuracy, suitability or completeness of the information. If any inconsistency between this Information Pack and the Access Agreement or Aurizon Network's Access Undertaking arises, then provisions of the Access Agreement and Aurizon Network's Access Undertaking shall prevail.

If you would like further information, or feel that any information contained within this document is incorrect, please contact us via email at [NAMSDDataStewards@aurizon.com.au](mailto:NAMSDDataStewards@aurizon.com.au)

In this document the legal entity Aurizon Network Pty Ltd is referred to as Aurizon Network.

Definitions - see *APPENDIX A*

## General Information

The Moura System is located in Central Queensland between the latitudes 23°50' S and 24°54' S and longitudes 149°58' E and 151°15' E.

The system services the industrial and rural communities of the Dawson and Callide Valleys in Central Queensland with all trains being hauled by diesel electric locomotives. Product is hauled to the export facilities at R G Tanna Terminal, Auckland Point and Barney Point or to intrastate destinations via the North Coast Line.

The port facilities at R G Tanna, Auckland Point and Barney Point are under the control of the Central Queensland Ports Authority.

Callemondah Yard, Powerhouse and R G Tanna balloon loops are electrified by a autotransformer system with the overhead line equipment operating at 25 000 volts, 50 Hertz, alternating supply (25 kV, 50 Hz, ac).

Trains destined for R G Tanna or the Powerhouse travel via the Byellee flyover, through Callemondah Yard which is part of the Blackwater System and therefore under live overhead wires.

Trains destined for Barney Point and Auckland Point travel via the Moura Short Line which is electrified as are Barney Point and Auckland Point.

The Moura System is single line with passing loops. There are balloon loops at Boundary Hill, Callide Coalfields and Moura Mine.

## General Climate

The system is situated in central Queensland and in a generally warm to hot climate.

The following sub-sections specify general climatic parameters. For latest and more specific information, potential railway operators should consult The Australian Bureau of Meteorology at their Internet Website [www.bom.gov.au](http://www.bom.gov.au).

### Cyclones

Tropical lows, which develop from November to April, occasionally deepen to cause tropical cyclones. Tropical cyclones show great variation in behaviour. They foster high winds, heavy, flood-producing rainfall (especially when a cyclone moves over high ground), and coastal storm surges.

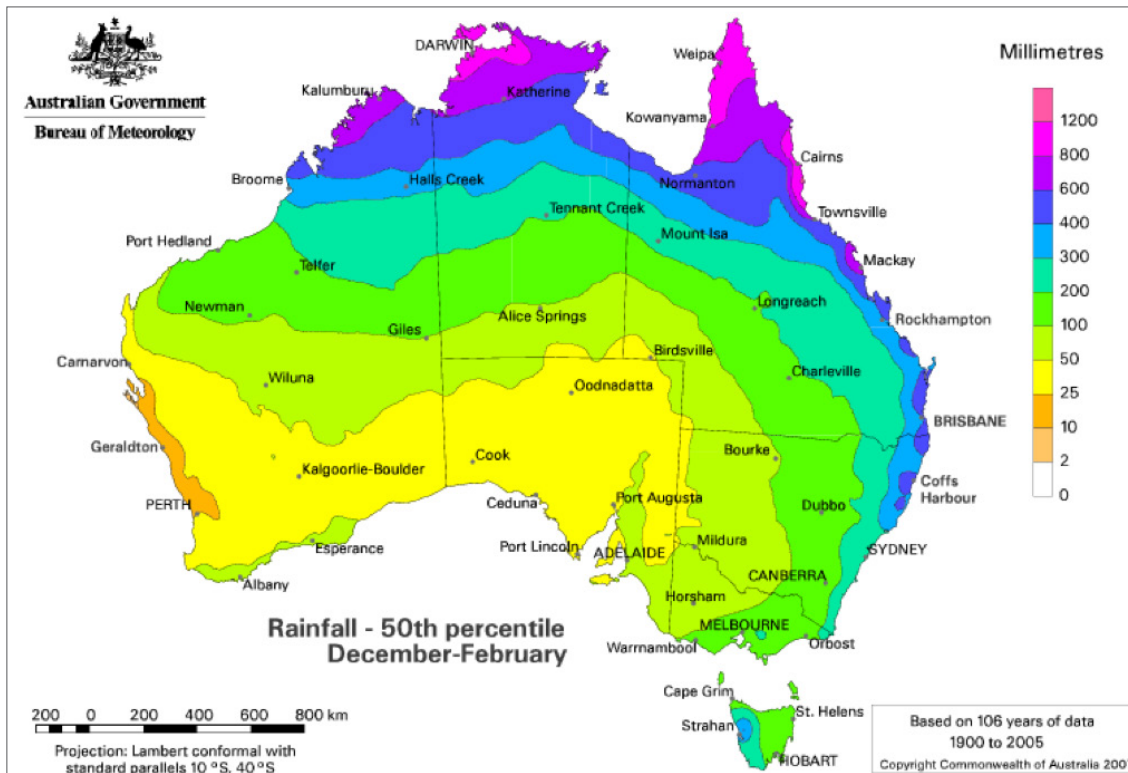
The high wind risk does not usually extend further inland than 50 km. Inland movement reduces the inflow of moisture and cyclone intensity declines, often within a few hours. Not all cyclones are severe.

### Humidity

This region can experience prolonged periods of high humidity and potential railway operators should consider this when planning / designing rolling stock and machinery to operate on this rail system.

### Rainfall

Highest rainfall occurs on the seaward side of the Great Dividing Range. However, at times in summer the inland extension of low-level moist airflow, in combination with intense surface heating, produces significant thunderstorm activity. Rainfall is mostly confined to the summer months in the northern tropics, where in excess of 90% of the annual total is recorded between November and April. In the north, rain is mostly associated with monsoonal troughs. The wet season in Queensland is predominantly from January to April when monthly rain falls of 400 mm or more can occur. Flooding of low lying areas is likely to occur during periods of extreme rainfall.

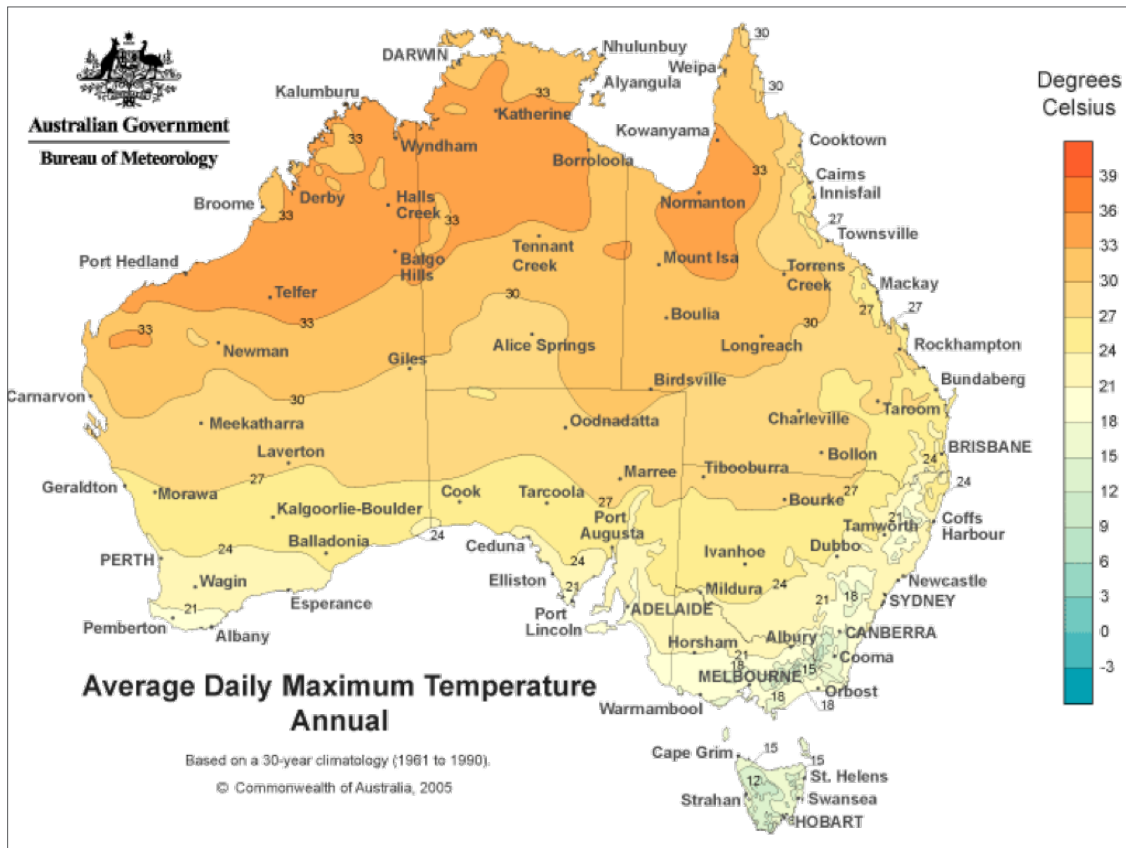


Information is available at the Bureau's website based on past rainfall totals and computer modelling for periods of up to about 3 months. It is important to check the latest information available from the Bureau prior to operating on the Aurizon Network.

## Temperatures

The average annual values of the daytime maximum of the hottest (January) and night-time minimum of the coldest (July) months are indicated on the climatic maps.

During the period of peak temperature, it may be an operational requirement that Line Speed be reduced to minimise the risk of incident (refer Operational Constraints).





## Description of the Railway

The track (1067 mm gauge) on the main trunk route from Byellee Flyover to Moura Mine is generally 60 kg/m rail with concrete sleepers.

Based on the improved asset intelligence provided as a result of the Network Asset Management System, the following new totals are provided for this system. The linear data is accurate to sub-meter distances.

Asset Type	Length / Total
Total Track	315.094 km (Includes yards, sidings & passing loops)
Duplicated Track	0.000 km
Passing Loops	25.111 km (14 Passing Loops)
Sidings	2.048 km (11 Sidings)
Electrified Track	13.700 km (Includes yards, sidings & passing loops)
Access Roads	216.797 km (Including Left and Right side of track)
Level Crossings	149 Crossings
Lubricators	22 Sites
Crew Change Facilities	44 Sites
Turnouts	128 Turnouts (Mainline & Yards)

### Axle Loadings

Maximum axle load	Wheel configuration consistent with or otherwise generating a loading equivalent to
26.5 tal	M 220
20 tal	M 160
15.75 tal	M 130

### Basic Track Map

A basic track map is in *APPENDIX B*. If you require more information about the Moura System that is not included in this document then please contact us via our website [www.aurizon.com.au](http://www.aurizon.com.au) and then click on the Contact Us link and then fill in your enquiry details.

### **Callemondah (Byellee Flyover) to Moura Mine Junction**

This section of the single tracked Moura Line from Callemondah to Moura Mine Junction connects with the Monto Branch at Graham (28.6 km), the Boundary Hill balloon loop at Annandale (119.5 km) and the Biloela and Koorngoo Branches at Earlsfield (128.4 km).

Block trains enter and leave Callemondah via the Byellee Flyover at the northern end of the yard. Access (in an emergency) can also be gained via the Moura Short Line and North Coast Line crossovers at the southern end of the yard.

There are eight passing loops on this section, namely Stowe, Stirrat, Clarke, Fry, Mt Rainbow, Dumgree, Annandale and Belldeen.

Track structure is predominantly 60 kg/m rail on concrete sleepers with some 53 kg/m on concrete and 47 kg/m on timber sleepers on sidings only.

The maximum permissible axle loading is 26.5 tonnes.

The maximum speed for 26.5 tonne axle load traffic is 80 km/h.

The speed of block trains heading towards Callemondah is restricted to 40 km/h between 90.489 km and 80.120 km at Mount Alma (Mount Rainbow Range).

The maximum grade (not compensated for horizontal alignment) that a Up train - (eastbound) will encounter is 1 in 63 (23 kp) whilst for a Down train (westbound) is 1 in 50 (several locations).

---

#### Existing minimum nominal horizontal curve radii are as follows:

---

running line	300 m
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siding and depots	140 m
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Fencing along this corridor complements adjacent land usage and is maintained at the following standard, poor (50 %) and medium to good (50 %).

### **Moura Mine Junction to Moura**

This section of the single track has been constructed using 47 / 41 / 30 kg/m rail on timber sleepers.

The maximum permissible axle loading is 15.75 tonnes.

This section of track caters for a maximum speed of 40 km/h to Moura.

The maximum grade (not compensated for horizontal alignment) that a Up train - (northbound) will encounter is 1 in 70 (180 kp) whilst for a Down train (southbound) is 1 in 52 (189 kp).

From Moura Mine Junction to Moura it is Remote Controlled Signaling (RCS) to 189.747km and Direct Traffic Control to Moura.

From Moura to Moura Mine Junction it is DTC to 181.896km then RCS to Moura Mine Junction.

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#### Existing minimum nominal horizontal curve radii are as follows:

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running line	360 m
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siding and depots	140 m
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Fencing along this corridor complements adjacent land usage and is maintained at the following standard, poor (30 %) and medium to good (70 %).

Track south of 183.400km is owned by Queensland Rail. Track from Moura Station to Goolara is owned by Queensland Rail.

### **Moura Mine Junction to Moura Mine**

This single track and balloon loop has been constructed using 60 kg/m rail on concrete sleepers.

The maximum permissible axle loading is 26.5 tonnes.

This section of track caters for block trains running at a maximum speed of 50 km/h.

The maximum grade (not compensated for horizontal alignment) that a Up train - (northbound) will encounter is 1 in 124 whilst for a Down train (southbound) is 1 in 126.

---

Existing minimum nominal horizontal curve radii are as follows:

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running line	271 m
balloon loop	300 m
siding and depots	140 m

---

Fencing along this corridor complements adjacent land usage and is maintained at the following standard, poor (50 %) and medium to good (50 %).

### **Earlsfield to Koorngoo**

This section of the single track past 0.230km is owned by Queensland Rail and has been effectively removed, including bridges.

### **Earlsfield to Callide Mine**

This single track section leading to the balloon loop has been constructed using 53 kg/m rail on concrete sleepers, with the balloon loop being constructed using 47 kg/m rail on timber sleepers.

The maximum permissible axle loading is 26.5 tonnes.

There are two passing loops on this section, namely Koonkool and Dakenba (which is also the junction with the Biloela Branch).

The maximum grade (not compensated for horizontal alignment) that a Up train - (northbound) will encounter is 1 in 80 whilst for a Down train (southbound) is 1 in 50.

---

Existing minimum nominal horizontal curve radii are as follows:

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running line	160 m
balloon loop	140 m
siding and depots	140 m

---

Fencing along this corridor complements adjacent land usage and is maintained at the following standard, poor (50 %) and medium to good (50 %).

### **Dakenba to Biloela**

This section of the single track is owned by Queensland Rail past 16.420km, and has been effectively removed, including bridges.

### Annandale to Boundary Hill Balloon

This single track and balloon loop has its junction with the Moura Line at 119.541 km just east of Annandale and has been constructed using 47 kg/m rail on timber sleepers.

The maximum permissible axle loading is 26.5 tonnes.

This section of track caters for block trains running at a maximum speed of 25 km/h.

The maximum grade (not compensated for horizontal alignment) that an Up train - (northbound) will encounter is 1 in 300 whilst for a Down train (southbound) is 1 in 53.

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Existing minimum nominal horizontal curve radii are as follows:

---

running line	300 m
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balloon loop	300 m
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siding and depots	140 m
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Fencing along this corridor complements adjacent land usage and is maintained at the following standard, poor (30 %) and medium to good (70 %).

### Moura Short Line

This single track electrified section connects the North Coast Line at Parana (522.8 km) with the Byellee Flyover connection from Callemondah, bypassing Barney Point, Auckland Point and Gladstone.

Moura Short line is the original name given to the track from Parana to Moura via Earlsfield in the early days due to the original line to Moura leaving the Central Line at Kabra.

The section of track north of the passing loop on the Moura Short Line at Callemondah to the connection with the Moura Line is not electrified.

Track structure is 60 kg/m rail on concrete sleepers.

The maximum permissible axle loading is 26.5 tonnes.

This section of track caters for traffic with a maximum speed of 80 km/h.

The maximum grade (not compensated for horizontal alignment) that a Down train (northbound) will encounter is 1 in 50 whilst for an Up train (southbound) is 1 in 80.

---

Existing minimum nominal horizontal curve radii are as follows:

---

running line	300 m
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---

siding and depots	140 m
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---

Fencing along this corridor complements adjacent land usage and is maintained at the following standard, poor (50 %) and medium to good (50 %).

### Graham to Taragoola

Graham to 18.800km is owned by Aurizon Network. Remainder of Monto branch is owned by Queensland Rail. This single track railway heads south to Taragoola (elevation 65 m) the southern boundary with the Maryborough System, a distance of 14.4km.

Track structure is a mix of nominal 30 kg/m rail on timber sleepers.

The maximum allowable axle load is 15.75 tal.

The maximum allowable speed is 50 km/h.

The maximum grade (not compensated for horizontal alignment) that a northbound (Up) train will encounter is 1 in 50 whilst for a southbound (Down) train, the maximum grade is 1 in 50.

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Existing minimum nominal horizontal curve radii are as follows:

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running line	200 m
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Fencing along this corridor complements adjacent land usage and is at the following standard, poor (5 %), medium (35 %) and good (60 %). Fencing will be maintained at its current standard.

### Gladstone Precincts

Within the precincts of Gladstone station there are destinations for all traffic types.

General traffic and block trains use the balloon loops at in Gladstone whilst block trains use the Barney Point balloon loop. Kwik Drop Door (KDD) triggers have been installed at all coal unloading facilities.

Traffic using Barney Point travels through South Gladstone yard to QAL, over the North Coast Line and connects with the Moura Short Line west of Parana.

From Barney Point to QAL Junction, the track structure is 41 kg/m and 47 kg/m rail on timber sleepers. The maximum permissible axle load is 26.5 tonnes. The maximum permissible speeds on this section are 25 km/h from Barney Point to QAL junction (2.3 km) and 60 km/h from QAL Junction to the Moura Short Line junction at Parana.

Gladstone main line (North Coast Line) has a maximum allowable axle load of 20 tal.

Throughout Gladstone yard and the Auckland Point balloon loops, the various track structures include 31 kg/m, 41 kg/m and 47 kg/m rail on timber sleepers.

The maximum permissible axle load is 15.75 tonnes.

The maximum permissible speed on these sections is 25 km/h.

The steepest grade in this area is 1 in 134 against the southbound train.

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Existing minimum nominal horizontal curve radii are as follows:

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running line	260 m
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siding and depots	140 m
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Fencing along this corridor complements adjacent land usage and is maintained at the following standard, poor (50 %) and medium to good (50 %).

### Callemondah Yard, Powerhouse and Golding Loops

Callemondah yard is the holding yard for trains accessing the Powerhouse Loop and the three balloon loops at Golding, with all roads electrified. Kwik Drop Door (KDD) triggers have been installed at all coal unloading facilities.

Track structure is a mix of 60 kg/m on concrete sleepers 53kg/m rail on concrete and timber, and 47 kg/m rail on timber sleepers.

The maximum permissible axle loading is 26.5 tonnes.

This section of track caters for traffic with a maximum speed of 25 km/h.

The maximum grade (not compensated for horizontal alignment) that a down train (that is westbound) will encounter is 1 in 90 whilst for an up train (that is eastbound) the grade is 1 in 96.

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#### Existing minimum nominal horizontal curve radii are as follows:

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running line	140 m
balloon loop	300 m
siding and depots	140 m

Fencing along this corridor complements adjacent land usage and is maintained at the following standard, poor (50 %) and medium to good (50 %).

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#### Minimum nominal horizontal radius for new or upgrade works is as follows:

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running line	2170 m	160 km/h running
	1662 m	140 km/h running
	1221 m	120 km/h running
	848 m	100 km/h running
	542 m	80 km/h running
balloon loop	300 m	minimum radius
siding and depots	140 m	minimum radius

---

## Description of the Track

The track on this system is a mix of 60 kg/m, 53 kg/m, 47 kg/m and to a lesser extent 41 kg/m and 31 kg/m rails with the associated sleeper types namely concrete and timber on crushed rock ballast. 60 kg/m and 53 kg/m rails are generally continuously welded, whilst 47 kg/m rail is generally long welded into 110 m lengths and 41 kg/m and 31 kg/m rails are mechanically jointed in varying lengths of less than 110 m. Glued insulated joints are used for train detection using track circuits.

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Speeds through the curved leg of turnouts are governed by the angle of that turnout i.e.

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1 in 12	25 km/h
1 in 12 (tangential)	40 km/h
1 in 16	50 km/h
1 in 25	80 km/h

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The curves on the track section between Callemondah and Moura Mine Junction are generally transitioned (with the exception of turnout curves), but the curves elsewhere are generally regular (non-transitioned).

For more information on Working Plan and Section drawings, please contact us via our website [www.aurizon.com.au](http://www.aurizon.com.au) and then click on the Contact Us link and then fill in your enquiry details.

## Overhead Line Equipment

The Moura Short Line (Barney Point, Parana, Callemondah), part of the Byellee Flyover and Callemondah to Powerhouse Loop and Golding Loop are electrified by an autotransformer system with the overhead line equipment operating at 25 000 volts, 50 Hertz, alternating supply (25 kV, 50 Hz, ac). Distribution is via a contact wire suspended from a catenary wire and these two wires are held in place by supporting structures to maintain ideal pantograph/contact wire interaction.

Typically, the autotransformer system also uses a 25 kV AC feeder wire run on the back of the supporting structure which is used for voltage support throughout the electrified network.

The dual wire distribution system is automatically tensioned to maintain a constant wire tension and requires a pantograph uplift force of 80 N 3 10 N for smooth sparkless current collection.

The contact wire height may vary from 4400 mm to 5850 mm above rail level.

Typically, the traction system uses both rails for return current.

## Operational Constraints - Infrastructure

During the summer months of high temperatures, hot weather precautions for track stability are observed to reduce the risk of incident in accordance with Aurizon Network's Safety and Security Standard SAF/STD/0075/CIV Hot Weather Precautions for Track Stability, namely :

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### Air Temperature 38°C and above

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On timber sleepered track, restrict EMU's to 80 km/h and all other trains to 60 km/h<sup>#</sup>

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On concrete sleepered track, restrict all trains to 120 km/h

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### Air Temperature 40°C and above

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On timber sleepered track, restrict EMU's to 60 km/h and all other trains to 40 km/h<sup>#</sup>

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On concrete sleepered track, restrict all trains to 60 km/h

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<sup>#</sup>Steel sleepered track and timber sleepered track with interspersed steel sleepers shall be regarded as equivalent to timber sleepered track for track stability.

Speed restrictions may also be put in place after maintenance activities in accordance with Aurizon Network Safety Standards.

The extent of restriction will depend upon the type of maintenance activity and risk of track misalignments.

Force Majeure Events will also see the imposition of speed restrictions, the extent and severity of the restrictions being dependent on the event.

## Operational Constraints - Rolling stock

All new rolling stock requires to be accepted via the Rolling Stock Authorisation Process. Rolling stock which conforms with Drawing Nos. 2236, 2237 and 2238 may operate in an unrestricted manner on main lines providing all other conditions of railing are met.

For rolling stock to conform with drawing numbers 2236, 2237 and 2238 the static rolling stock profile must be within the diagram. As well as the static component, dynamic effects need to be considered and these effects are contained within the Rolling Stock Interface Standard - SAF/STD/0145/INF/NET.

Rolling stock not conforming to these drawings may be accepted via the Rolling stock Authorisation Process and may be operated subject to constraints / limitations imposed as a result of the Authorisation Process.

Rolling stock conforming to A2-37328 is permitted to run on the Moura System providing all other conditions of railing are met.

Potential railway operators should ensure that they have the latest revision of these drawings before the planning and construction of rolling stock.



## Trackside Detection Equipment

### Dragging Equipment Detectors (DED)

Dragging equipment detectors are placed at the following strategic locations along the route to give early warning of rolling stock defects and minimize the effect of any derailment incident:

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#### Moura Short Line - Parana to Byellee

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7.515 km	-	1 track
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#### Moura Junction - Moura Mine

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3.485 km	-	1 track
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#### Graham - Taragoola

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19.400 km	-	1 track
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#### Annandale - Boundary Hill

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3.730 km	-	1 track
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#### Earlsfield - Callide Mine

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1.994 km	-	1 track
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### Hot Bearing / Hot Wheel Detectors (HBD/HWD)

Hot Bearing / Hot Wheel Detectors are located at the following locations:

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#### Byellee Flyover - Moura Mine

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112.100 km	-	1 track (HBD)
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160.000 km	-	1 track (HBD)
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Operators are required to stop immediately if advised of dragging equipment, Hot Bearing/Hot Wheel detection by the train controller.

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**Hot Bearing Detectors are located in the system at:**

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7.515km	-	1 track (HBD)
32.600km	-	1 track (HBD)
45.900km	-	1 track (HBD)
54.400km	-	1 track (HBD)
69.000km	-	1 track (HBD)
82.700km	-	1 track (HBD)
102.600km	-	1 track (HBD)
115.000km	-	1 track (HBD)
125.000km	-	1 track (HBD)
134.500km	-	1 track (HBD)
146.300km	-	1 track (HBD)
161.800km	-	1 track (HBD)
173.900km	-	1 track (HBD)

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**Axle Counters**

Axle counters are used on the section, Byellee Flyover to Moura Mine.

An axle counter at each end of a section determines whether an axle is entering or leaving the section and counts the number of axles passing the counter in each direction. By keeping an accurate count of axles into the section, then the number of axles out of the section, the system can determine if the section is occupied or not.

## Weighbridges

In general weighbridges are located on balloon loop immediately after the loadout station for the purpose of overload detection.

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On the Moura System weighbridges are located at:

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Moura Mine	-	overload detector
Callide Coalfield	-	overload detector
Boundary Hill	-	overload detector

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The maximum permitted speed of trains over weigh-in-motion weighbridges is 10 km/h.

Train weigh data will be available to operators for their trains.

## Information Systems

ViziRail is an Operational Information System developed specifically to meet business and regulatory requirements relative to managing operations on the Aurizon network. It provides valuable information regarding train performance, rail maintenance activities and network incident data.

This integrated scheduling and network monitoring tool provides Aurizon with a source of network information and is used within all Network Planning, Yard and Control Centres operated by Aurizon.

The integrated modules within ViziRail include:

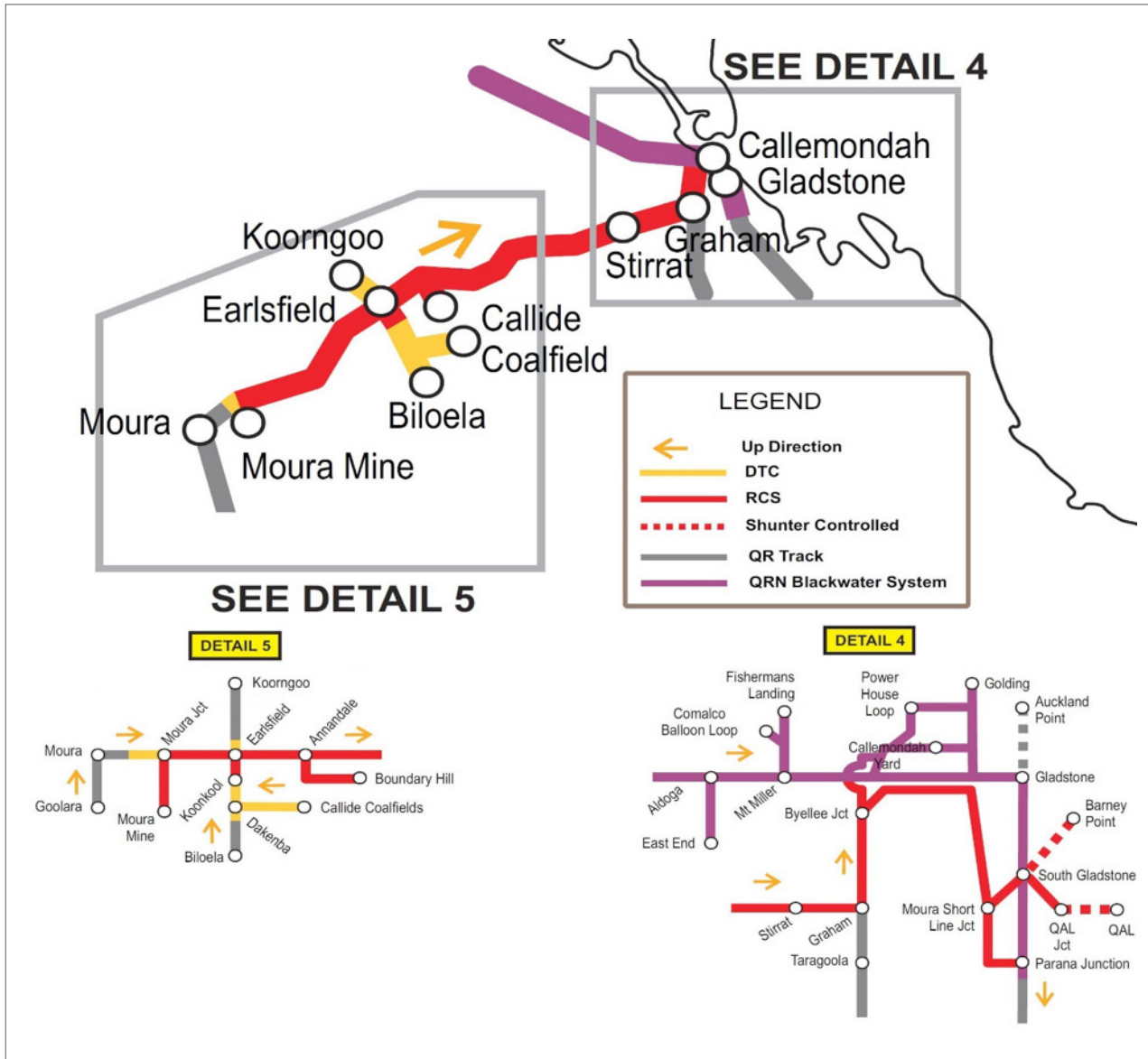
- LTP - Long Term Planning module where timetable specific train templates are created and maintained. This module also includes the ability to generate scenario's for 'what if' analysis.
- STP - The Short Term Planning of trains including the ability to plan around train constraints and add ad hoc services
- Possessions - Planned infrastructure maintenance for the network, including actual data relating to activities that occur on day of operation
- Speed Restrictions - The capture of network speed restrictions, including when the restriction is imposed and lifted.
- Planning Graphs + Train Control Diagrams - A visual and interactive representation of a geographical area, these graphs display all train services, possessions and speed restrictions within the selected time frame. Graphs can be accessed in LTP or STP mode.
- Train Notices - Advice provided to stakeholders about activities on the network such as vehicle authority to travel, speed restrictions and possessions.
- Incidents - Capturing the events relating to incidents on the network, with the ability to provide advice to Aurizon management and customers as required
- ATR - Actual Train Running captures all day of operation events for a train, including delays, cancellations and terminations which can be linked to incidents as required
- BLD - Train Consists are linked to trains on day of operation and includes rollingstock validation, dangerous goods advice and data relating to the actual weight and length of trains

## Operational Systems and Train Control

The Moura system is operated by Remote Control Signalling (RCS) for the majority of the system with the sections Graham to Taragoola, Earlsfield to Koorngoo, Moura to Goolara and Koonkool south operated using Direct Traffic Control (DTC) with train movements controlled from Rockhampton.

Operations at QAL, Barney Point and Auckland Point are shunter controlled.

Train Control map:



## Communications

Communications on the Moura System between Driver and Controller is via a UHF radio system (Train Control Radio - TCR) utilising a number of Aurizon Network channels and frequencies. Transceivers “auto” switch channels to suit geographical location.

Frequency specification and coverage details are available as part of the “Access Enquiry Process”.

Access to the Maintenance Supervisory Radio System (MSR) can be gained by using Aurizon Network telephone extensions depending on location or UHF radio system utilising Aurizon Network channels.

In addition, all current locomotives (including Multiple Units and Miscellaneous Vehicles such as Rail Motors) carry and all units new to the system will be required to carry a UHF radio operating on Aurizon Network Channel 1. This provides on-board and wayside communications including end to end, train to train and train to track gangs over a distance on average of 8 - 10 km.

Communications on board locomotives must conform to Aurizon Network’s Safety Management System SAF/STD/0014/TEL/NET - Mobile Voice Radio Communications Systems.

## Incident Recovery Time and Management

Historically it is anticipated that on the Moura System a minor incident could result in disruption to services for 6 hours and a major incident for 2 days.

Incident recovery is dependant on the nature, severity and location of each unique incident that may occur on this system. To enable quick response in case of emergency, latitudes and longitudes of passing loops are detailed below:

Location	Latitude	Longitude
Gladstone	-23.84652248	151.23624
Barney Point (unloader)	-23.84547598	151.2707502
Callemondah (middle of yard)	-23.86484279	151.2169369
Golding (RGCT - any unloader)	-23.82810234	151.2316741
Stowe (middle of loop)	-23.96907851	151.203834
Graham (pts to Monto Line)	-23.99005395	151.1990157
Stirrat (middle of loop)	-23.99900002	151.0926973
Clarke (middle of loop)	-24.0647362	150.9172342
Fry (middle of loop)	-24.08800163	150.8213211
Mt Rainbow (middle of loop)	-24.14285507	150.7092059
Dumgree (middle of loop)	-24.17016245	150.5647867
Boundary Hill (loader)	-24.20607357	150.4782027
Annandale (middle of loop)	-24.19263184	150.4627003
Earlsfield (pts to Biloela Line)	-24.22602504	150.4180938

Belldeen (Middle of loop)	-24.40898218	150.260991
Moura Mine (loader)	-24.52852957	150.0662863
Moura (middle of yard)	-24.56808492	149.9764451
Koonkool (middle of loop)	-24.23760178	150.4215031
Dakenba (middle of loop)	-24.34719666	150.4939795
Callide Mine (loader)	-24.3276615	150.6246861
Koorngoo (middle of sdg)	-24.7176114	150.3239064
Calliope (middle of loop)	-24.00602445	151.2029475
Taragoola (middle of loop)	-24.10095857	151.2196311

## Rail / Road Interfaces

Operators on the Moura System will encounter 149 Rail / Road Interfaces categorised as follows:

Public (with Active Flashing Light/Boom Gate Control)	-	11
Public (with Passive Control - Signs)	-	25
Occupation (Private Access with Active Control)	-	2
Occupation (Private Access with Passive Control)	-	102
Aurizon Network Maintenance	-	12

These are located as following includes level crossings on the red-boarded Moura - Goolara section.

	Public		Occupation		Maintenance	
	Active	Passive	Active	Passive	Active	Passive
Moura Short Line and Moura Mine Balloon Loop	9	18	1	83	0	6
Barney Point and Q.A.L.	0	1	1	4	0	0
Boundary Hill Mine	0	0	0	5	0	0
Callide Valley South and Callide Coalfields	1	8	0	5	0	4
Gladstone Monto	0	0	0	0	0	1
Byelle Flyover	0	0	0	0	0	2

## Rail Operations and the Environment

All railway operators are required to comply with all relevant State, Federal and Local Legislation and Laws, current at the time, relating to the management and protection of the Environment.

Aurizon Network currently has a number of licences and/or approvals for activities undertaken at either Aurizon Network facilities or on the Aurizon Network corridor. Aurizon Network's licences and approvals fall under two main areas:

1. Fixed Locations;

Aurizon Network has a number of licences for activities managed by its operational Business Groups in particular locations, such as refuelling locations.

2. Itinerant or Varied Locations;

Aurizon Network also has a number of licences for activities that occur at more than one location, such as maintenance activities.

Railway operators will need to ascertain with the Department of Environment and Heritage Protection or Other Regulatory Body their responsibilities in regard to obtaining an Environmental Authority (ies) for the type of operation proposed.

Copies of all Environmental Authorities administered in Queensland are available upon request from the Department of Environment and Heritage Protection.

### Environmental Noise

The Transport Infrastructure Act recognises a railway as a beneficial asset, which is necessary for the community's environmental, social and economic well-being.

Queensland Rails Code of Practice for Railway Noise Management ("the Noise Code") nominates "planning levels" for railway noise which may be used as a guide in deciding a reasonable noise level for the activity. The Noise Code recognises, however, those levels may not be appropriate for an existing railway. It envisages that it may be reasonable to apply the levels only in the long term to allow time to progressively reduce any significantly adverse effects on the environmental values from its operation.

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The long term planning levels are:

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LAeq (24 hour)	65dBA
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LAmx	87dBA
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They are to be assessed one (1) metre in front of the most exposed part of the building facade of an affected noise sensitive place.

(Note: the Noise Code is a industry code approved by State Minister for Environment under Section 5478 of Environment Protection Act)

### Code of Practice for Railway Noise Management

Noise is recognised as a form of environmental nuisance in the Environment Protection Act. Aurizon Network intends to meet its general environmental duty with respect to noise by implementing the Noise Code.

The purpose of the Noise Code is to provide a means by which Aurizon Network can demonstrate it is taking reasonable and practicable measures to minimise unreasonable interference with the acoustic amenity of neighbouring noise-sensitive communities from Aurizon Network's railway activities.

The Noise Code is a self imposed set of rules for carrying out all Aurizon Network railway activities.

It is not intended to manage the noise impacts of a third party's operational activities. It is to be made available to third parties operating trains on Aurizon Network infrastructure to the extent that its terms are reasonably applicable to those operators. It is expected that all Rail Operators will abide by the Code

### Wheel Squeal & Flanging

Wheel Squeal is caused by friction forces between the top of rail and wheel interface whereas, flanging noise is predominantly caused by friction forces between the side of rail and wheel interface. Continuous or sustained wheel squeal produced primarily on the low rail side, is distinct from discontinuous “flanging noise” that is produced on the high rail side. Continuous wheel squeal is of a high level, and Aurizon Network’ experience is that it may cause significant community reaction, while flanging noise is of a lower level and is more accepted by the community.

Generally, tighter radius curves (i.e. under 300 metre radius) when associated with a number of rolling stock factors that promote wheel squeal, may result in squeal being produced. Rolling stock factors that may promote wheel squeal include:

- Higher wheel hardness
- Stiff primary suspensions
- High centre plate friction
- Worn wheel treads
- Misaligned axles
- Unmatched wheel tread diameters, and
- Incorrectly adjusted side bearers

Note that one Top of Rail Lubricator is located between Callemondah and Gladstone to manage wheel squeal / noise complaints located near the hospital.

### Noise Complaints

Aurizon Network is corporately committed to act towards its neighbours in a considerable and reasonable manner. This good neighbour commitment assumes a reasonable degree of tolerance from neighbours and a commitment by Aurizon Network to take action where appropriate.

Where Aurizon Network receives complaints about noise from railway activities for which they may be responsible, Aurizon Network responds to those complaints and maintains records of those complaints in accordance with its Environmental Management System (EMS).

Where available, generic data will be supplied on request to a third party operator who is proposing operations within a defined network. That data will indicate those areas where Aurizon Network has received prior complaints relating to its train operations. It will be made available when a third party operator is undertaking the development of its Environmental Investigation and Risk Management Report (EIRMR) as part of its Access Agreement conditions.

### Third Party Requirements

Any railway operator obtaining access to the network shall be required to commission an environmental investigation of the proposed operations. This investigation will be conducted by a suitably qualified person, reasonably acceptable to both parties.

In response to the findings of such an investigation, the operator shall produce an EIRMR that identifies the risks of Environmental Harm associated with the operation and provides proposed controls to address the risks. This shall be reviewed by, and agreed with, Aurizon Network.

In addition, the operator shall have in place an EMS, which, amongst other things, has regard for the issues, risk and control measures identified in the Environmental Investigation and Risk Management Report. Further details on requirements for environmental issues can be found in Aurizon Network’s Access Undertaking.

Aurizon Network has determined that it holds no EMS documentation that, without disclosure to a third party operator, would either:

- Compromise or restrict a third party’s operations or increase or place at risk the environmental performance of the third party operator or itself, and
- Limit or restrict the abilities of a third party operator to develop such documentation that would not be reasonably expected of the operator to develop on its own behalf, commensurate with the size and subsequent environmental risks of the proposed operations and the organisational resources available to it, to undertake such operations.



Any EMS documentation (wholly or partially) identified as specifically relating to the control of corridor infrastructure (below rail) environmental issues, will be made available to the operator to assist in formulating appropriate and consistent operational (above rail) controls within their Environmental Investigation and Risk Management Report and EMS.

### **Coal Dust Mitigation**

Network is corporately committed to reducing its operational impact on the communities and environment it operates through.

Coal dust is recognised as a form of environmental nuisance in the Environmental Protection Act 1994.

Aurizon Network has developed a Coal Dust Management Plan with the participants of the central Queensland coal supply chain. This plan has been approved by the Department of Environment and Heritage Protection and includes dust mitigation methods which must be adhered to:

#### **Mines**

Mine loading methodologies at each loadout must deliver a veneered 'garden bed profile' to the wagon surface (e.g. edge of loaded coal 100mm below cant rail, levelled top, loading methodology to maximum volume [taking into consideration axle load] and minimises coal spillage outside the wagon.

Install a veneering spray station to Aurizon Network's standard at the mine loadout prior to December 2013, spray the loaded coal surface with an approved veneer and integrate veneering with loading methodology. Mines and operators are to ensure their direct employment and contract loaders adhere to the changing loading requirements.

#### **Ports**

Export and domestic unloading facilities must ensure all wagons are fully unloaded and a clean wagon is presented to the rail corridor. A wagon cleaning facility or some other dust mitigation means should be implemented to reduce hang up coal and parasitic coal.

### **Coal Dust Monitoring**

Aurizon Network has a coal dust monitoring station located at 31.640km on the Moura system. An additional monitoring station will be installed at by June 2013.

All loaded and empty coal trains are monitored for coal dust emissions when passing these sites and results are recorded and made available to coal mine owners.

### **Maximum Train Length**

The maximum length of trains is determined by:

- requirements for crossing/passing other trains
- requirements for braking performance of the train
- capacity of the route
- draw gear capacity
- train handling
- requirements for road/pedestrian access across the track

Where it is necessary for a train to cross, pass or be passed by another train, the maximum train length allowable shall be such that the comparison train length is not longer than the crossing loop length.

Variations of train length for a particular train configuration is possible and would need to be negotiated as part of access agreement negotiations.

### **Rollingstock Braking Rate**

Signal design parameters and train braking characteristics will be compared during the development of the Interface Risk Management Plan.

## Future Infrastructure Improvements

Future improvements planned for the system as funding becomes available include:

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### Current committed projects:

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Rail Upgrade

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Formation Strengthening

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Fencing Upgrades & Renewals

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### Network improvements identified but yet to be committed/funded have been broken into broad categories:

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Maintain Reliability and Efficiency

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Power Supply Equipment Replacement

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Increase Capacity

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## Infrastructure Management and Access

Not all mainline, sidings, yards, load and unloading facilities that connect to Aurizon Network owned track is owned and managed by Aurizon Network.

Third party access to non Aurizon Network managed infrastructure is by commercial arrangement with the relevant party.

For more defined ownership of track please email - [access.services@aurizon.com.au](mailto:access.services@aurizon.com.au) or visit our website [www.aurizon.com.au](http://www.aurizon.com.au) and then click on the Contact Us link and then fill in your enquiry details.

## APPENDIX A - Definitions (State wide)

### **Access Agreement**

The agreement between Aurizon Network and a Railway Operator detailing all terms and conditions applicable to the operation of the Railway Operator's trains on the Aurizon Network.

### **Access Undertaking**

A document approved by the Queensland Competition Authority (QCA) in accordance with the QCA Act 1997 (Q) that sets out principles for negotiating access to Aurizon Network's declared services.

### **Accreditation**

Accreditation in accordance with part 4, Chapter 6 of the Transport Infrastructure Act 1994 (Queensland) and "Accredited" has a similar meaning.

### **ATP (Automatic Train Protection)**

Automatic Train Protection is a computer controlled system designed to make sure the train

- does not exceed the current speed limit
- does not exceed the limit of authority generated by the interlocking (and usually indicated by a signal at STOP)
- does not make unreasonable train movements during shunting, when stationary, or at start up

### **AWS (Automatic Warning System)**

Automatic Warning System is designed to

- provide an in-cab visible and audible indication of the aspect displayed in the next signal
- prompt and warn the train driver of a RESTRICTED signal aspect displayed in the next signal
- stop the train if the driver fails to acknowledge the AWS alarm of a RESTRICTED signal aspect

### **Axle Counters**

At some locations in Remote Controlled Signalling (RCS) Territory an axle counter system has been provided to detect occupancy of a section of track.

An axle counter at each end of a section determines whether an axle is entering or leaving the section and counts the number of axles

passing the counter in each direction. By keeping an accurate count of axles into the section, then the number of axles out of the section, the system can determine if the section is occupied or not.

### **Block Train**

A train consisting entirely of similar classes of wagons of axle loads over 12.2 tonnes marshalled together for a certain class of traffic. The definition is also extended to cover trains in which 12 or more such wagons loaded to more than 12.2 tonnes gross per axle are included within a length of 315 metres or less of the train.

### **Comparison Train Length**

Static train length and 2% of static train length (train handling allowance) + 125mm per vehicle (for coupler and draw gear tolerances).

### **Crossing Loop Length**

The maximum length in metres of the train which can be accommodated in the loop to allow normal operation of the signalling systems for crossing or passing movements.

### **Daily Train Plan (DTP)**

Collectively, the scheduled times for all Train Services operating on Aurizon Network's Rail Infrastructure and any Planned Possession on a particular day.

### **Declared Services**

Services declared as available for access by third party operators in accordance with the QCA Act 1997 (Q).

### **Declared Infrastructure**

Infrastructure declared as available for access by third party operators in accordance with the QCA Act 1997 (Q).

### **Design Neutral Temperature**

The rail temperature at which the track is designed to be stress free as defined in Aurizon Network's Civil Engineering Track Standards Part 2 (CETS 2).

**Direct Traffic Control (DTC)**

Direct Traffic Control (DTC) is an absolute block safeworking system used to control the movement of trains in non-signalled territory.

Central to DTC is an on-board DTC computer which displays authorities stored in its database. The relevant authority is activated by the train crew following an exchange of codes between the crew and the controller. Codes are exchanged verbally using the train control radio.

The procedures governing the operation of DTC are detailed in Aurizon Network's Safety Management System Standard saf/std/0041/swk/net "Direct Traffic Control Manual".

**Dragging Equipment Detectors (DED)**

A mechanism positioned on sections of track to detect any dragging equipment on train.

**Dragging Equipment Detectors Alarm (DED Alarm)**

Part of the Aurizon Network System which advises the Train Controller either by a computer prompt message that a D.E.D. has been activated and the train driver by a recorded voice message.

**Electromagnetic Compatibility (EMC)**

The ability of an equipment or system to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to anything in that environment.

**EPP (Noise)**

Environmental Protection (Noise) Policy 1997; Subordinate Legislation to the Queensland Environmental Protection Act 1994.

**FMS**

Freight Management System (FMS), a mainframe computer based application that monitors overall train performance.

**Force Majeure Event**

Means any cause, event or circumstance, or combination of causes, events or circumstances, which is beyond the reasonable control of the Party affected thereby and which by the exercise of due diligence such Party is not reasonably able to prevent or overcome, including but not limited to, results of abnormal weather conditions, act of God, breakdown of any facilities or machinery or unavailability of essential equipment, strikes or other industrial dispute.

**Hot Wheel & Bearing Detectors (HWD/HBD)**

Heat sensors located at strategic locations on the system that identify abnormal temperatures in wheels and wheel bearings as the train passes over, transmits a signal to the train control panel that necessitates an inspection of the suspect wagon and remedial action.

**KP**

Kilometre Post

**Line Code**

Line Code, a unique alpha-numeric identifier applied to a section of track on the network and usually run from junction point to junction point. Each numeric identifier is unique and can be further rolled up into Corridors using the alpha identifier.

**LSC**

Line Section Code, a unique alpha-numeric identifier applied to a section of the network.

**LWR**

Long welded rail. Rail that has mechanical rail joints spaced at intervals between 110m and 220m.

**Master Train Plan (MTP)**

Collectively, the scheduled times as advised by Aurizon Network from time to time for all Train Services operating on Aurizon Network's Rail Infrastructure where such scheduled times remain unchanged from week to week, and any Planned Possessions.

**Nominal Rail Size**

Rail sizes 20, 31 and 41 kg/m are all nominal rail sizes used to group together a range of rail types and sizes originally designated in the imperial unit "lb/yd". The term "nominal" is used in recognition of the variation in the dimensions, mass and engineering properties of the rails in this category.

**Railway Operator**

A person who has, or is seeking, Access from Aurizon Network to operate Train Services on the Rail Infrastructure and who is, or who will become, Accredited in respect of those Train Services.

**Red-Boarded Line**

A line with a stop board attached to the rail preventing traffic entering the section

### **Remote Controlled Signalling (RCS)**

A system of safeworking where train movements are governed by aspects displayed in Colour Light Signals which are controlled from a remote location and by the passage of trains. Some colour light signals and points may be released by the Train Controller to be operated from a local area by using:

- a local control panel;
- an electrically released shunting frame;
- a zone released shunting system, or
- emergency push buttons.

Railway Operators trains are expected to meet existing signalling standards to ensure track circuits and other signalling equipment operate safely and effectively - in particular Aurizon Network's Safety Management System SAF/STD/0006/SIG/NET "Principles for the Signalling of Trains" must be complied with.

### **Remote Train Overview Application (RTOA)**

A PC based system providing real time operational information, gathering information on train running and rail network status for immediate and continuously updated display and historical analysis.

### **Rolling stock Authorisation Process**

The process for determining and validating rolling stock compliance and registration as detailed in Aurizon Network's Safety and Security Standard SAF/STD/0068/RSK/NET - Rolling stock Compliance, Validations and Registration.

Being a multi-tier client-server application, different levels of access/security ensure confidentiality of an Operator's train performance statistics.

### **Standard Train**

The predominant type of train operating on the line/system.

### **SWR**

Short welded rail. Rail that has mechanical rail joints spaced at intervals less than 110m.

### **Train Authorisation**

The process for acceptance of a train configuration whose rolling stock is registered under Aurizon Network's Safety Management System SAF/STD/0068/RSK/NET - Rolling stock Validation, Acceptance and Registration.

### **Unit Train**

A train composed entirely of the one class and one draw gear classification of rolling stock.

### **Universal Traffic Control (UTC)**

A PC based train control supervisory system that provides the means to remotely control train movements over a large area and provide management and train users with real time train related information.

### **ViziRail**

A fully integrated scheduling, possession planning, monitoring and reporting tool for managing the Aurizon Network's below-rail network.

ViziRail also supports the provision of all QCA and Queensland Transport (QT) reporting requirements.

### **Weather Monitoring System (WMS)**

Remote weather monitoring stations providing critical information regarding temperature, rainfall and stream levels.

### **Wheel Impact Load Detector (WILD)**

In track monitoring system to identify wheel flats.

### **YCS**

Yard Control System (YCS), a mainframe computer based application that monitors overall location and status of approved rolling stock.

