Division / Business Unit: Safety, Engineering & Technology
Function: Operations Interface
Document Type: Route Access Standard

D52 Moss Vale - Unanderra

RAS DIRN Section Page

Applicability

ARTC Network Wide

SMS

Publication Requirement

Internal / External

Primary Source

Previous Section Page version + RACNs

Document Status

Version #	Date Reviewed	Prepared by	Reviewed by	Endorsed	Approved
2.0	08 June 21	Operations Standards Manager	Stakeholders	Manager Standards	General Manager Technical Standards 21/06/2021

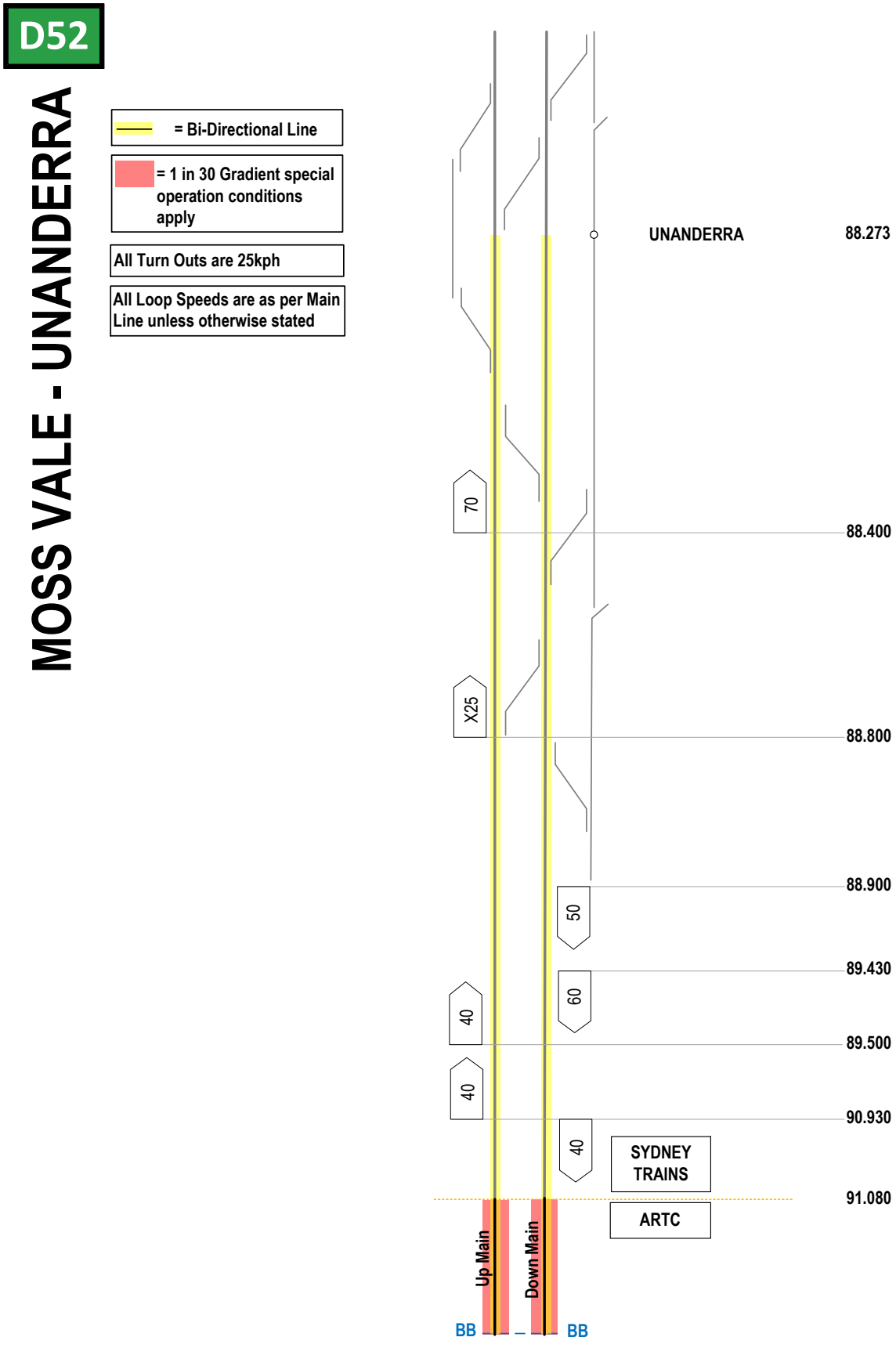
Amendment Record

Amendments to the RAS are published at the following link
https://www.artc.com.au/uploads/RAS_Amendments_Register.xlsx
All changes in this document are highlighted with this colour

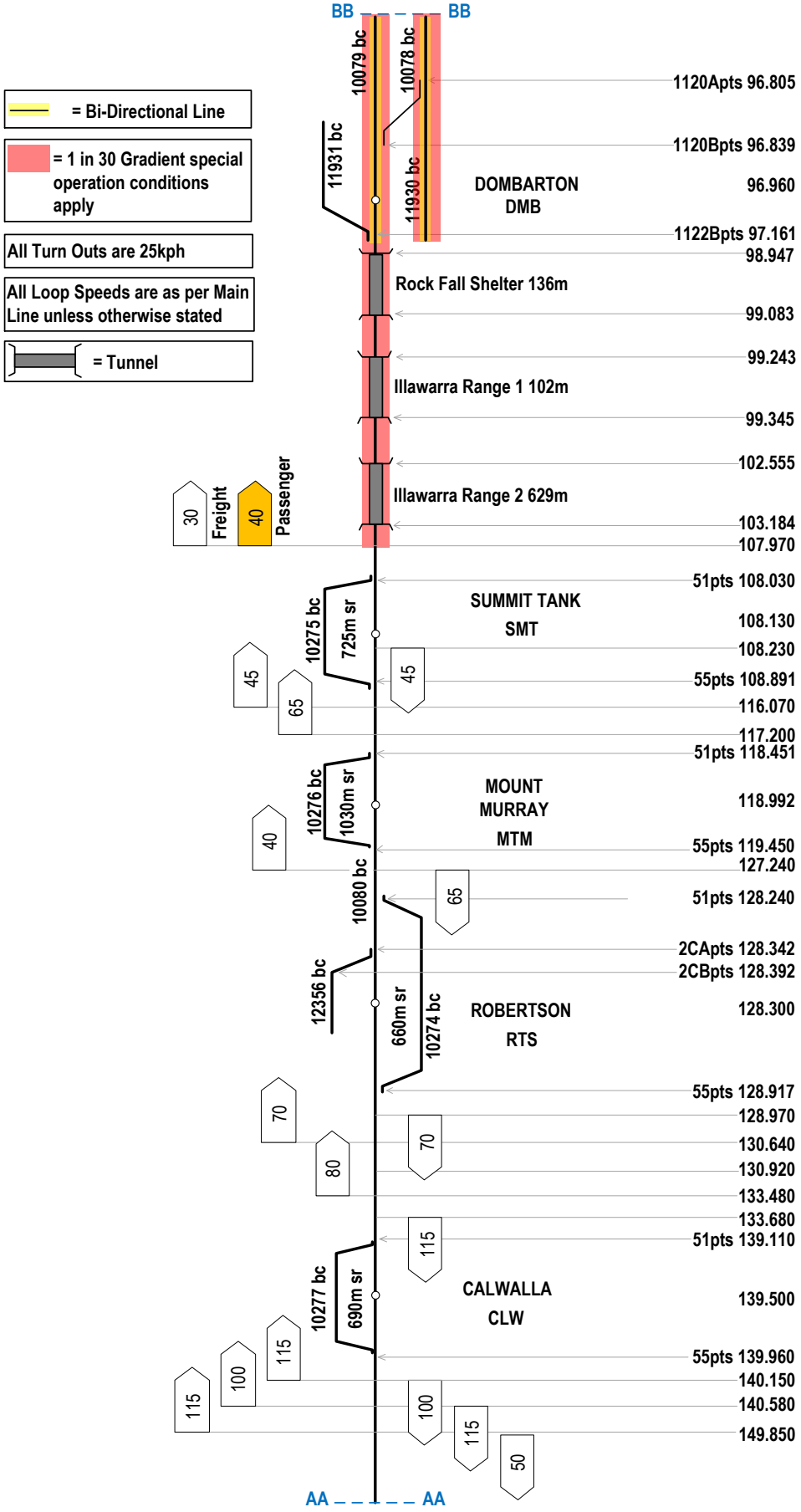
Table of Contents

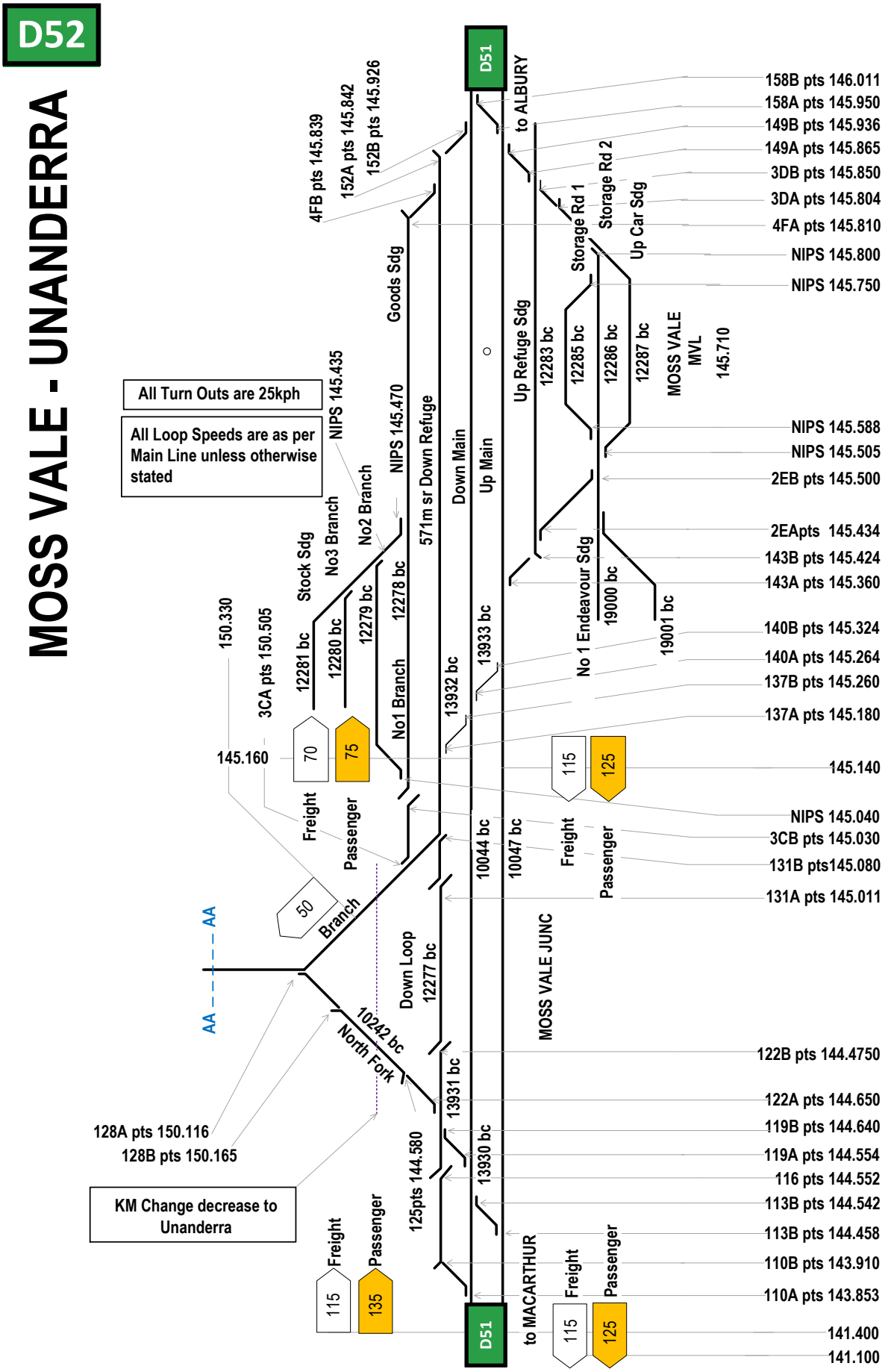
1 Network Diagram

NB: These line maps are indicative only.



D52 MOSS VALE - UNANDERRA




D52
MOSS VALE - UNANDERRA
All Turn Outs are 25kph
All Loop Speeds are as per Main Line unless otherwise stated
KM Change decrease to Unanderra
D51
to ALBURY
to MACARTHUR
MOSS VALE JUNC
MOSS VALE MVL 145.710
Down Main
Up Main
Up Refuge Sdg
Goods Sdg
571m sr Down Refuge
Down Loop 12277 bc
Up Car Sdg
Storage Rd 1
Storage Rd 2
Stock Sdg
No1 Branch
No2 Branch
No3 Branch
No 1 Endeavour Sdg
Branch
North Fork
12281 bc
12280 bc
12279 bc
12278 bc
13932 bc
13933 bc
12283 bc
12285 bc
12286 bc
12287 bc
19000 bc
19001 bc
10044 bc
10047 bc
13931 bc
13930 bc
10242 bc
3CA pts 150.505
150.330
145.160
4FB pts 145.839
152A pts 145.842
152B pts 145.926
NIPS 145.435
NIPS 145.470
158B pts 146.011
158A pts 145.950
149B pts 145.936
149A pts 145.865
3DB pts 145.850
3DA pts 145.804
4FA pts 145.810
NIPS 145.800
NIPS 145.750
NIPS 145.588
NIPS 145.505
2EB pts 145.500
2EApts 145.434
143B pts 145.424
143A pts 145.360
140B pts 145.324
140A pts 145.264
137B pts 145.260
137A pts 145.180
145.140
NIPS 145.040
3CB pts 145.030
131B pts145.080
131A pts 145.011
122B pts 144.4750
122A pts 144.650
119B pts 144.640
119A pts 144.554
116 pts 144.552
113B pts 144.542
113B pts 144.458
110B pts 143.910
110A pts 143.853
141.400
141.100
125pts 144.580
128A pts 150.116
128B pts 150.165
AA
AA
Freight
Passenger
70
75
50
115
125
135

2 Route Capacity

MOSS VALE – ROBERTSON			
TRAIN TYPE	**MAXIMUM SPEED (KM/H)**	**MAXIMUM AXLE LOAD (TONNES)**	
		LOCOS	**WAGONS**
FREIGHT	115	22.3	19
	100	22.8*	23
	80	22.8*	25
PASSENGER		**LOCOS**	**CARRIAGES**
XPT/RAILCAR	115	N/A	N/A
XPLORER	115	N/A	N/A
DIESEL HAUL	115	22.8*	19
ROBERTSON – UNANDERRA			
TRAIN TYPE	**MAXIMUM SPEED (KM/H)**	**MAXIMUM AXLE LOAD (TONNES)**	
		LOCOS	**WAGONS**
FREIGHT	65	22.8*	25
PASSENGER		**LOCOS**	**CARRIAGES**
XPT/RAILCAR	65	N/A	N/A
XPLORER	65	N/A	N/A
DIESEL HAUL	65	22.8*	19

Note:

1. *Route capacity applies where vehicle characteristics and conditions permit.*

** 134 tonne maximum weight. These posted axle loads are to account for the variability in axle loads for some classes of locomotive. The maximum locomotive weight must still be adhered to.*

3 Maximum Trailing Loads

3.1 DOWN (uphill) LOADS for GENERAL FREIGHT, GRAIN AND COAL

The following table defines the minimum number of locomotive combinations to operate with the maximum trailing load.

			MAXIMUM TRAILING LOAD (TONNES)				
	Sections	Locomotive Class	Single	Double	Triple	Quad	Notes
1	91.080 km to Moss Vale	AC6	1130	2260	3390	- -	
2	91.080 km to Moss Vale	AC6 + L2	- -	1750	- -	- -	b
3	91.080 km to Moss Vale	AC6 + 2 x L2	- -	- -	2529	- -	b
4	91.080 km to Moss Vale	2 x AC6 + L2	- -	- -	2727	- -	b
5	91.080 km to Moss Vale	L3/L4	500	1000	1500	- -	1, a
6	91.080 km to Moss Vale	L2	900	1800	2700	3600	
7	91.080 km to Moss Vale	L3/L4	750	1500	2250	3000	a
8	91.080 km to Moss Vale	L5	690	1380	2070	2760	
9	91.080 km to Moss Vale	L6	551	1102	1653	2204	
10	91.080 km to Moss Vale	L7	543	1086	1629	2172	
11	91.080 km to Moss Vale	L8	517	1034	1551	2068	
12	91.080 km to Moss Vale	L9	485	970	1455	1940	
13	91.080 km to Moss Vale	L10	430	860	1290	1720	
14	91.080 km to Moss Vale	L11	388	776	1164	1552	
15	91.080 km to Moss Vale	L12	362	724	1086	1448	

Notes to Table
1. Empty wheat / coal vehicles. ARTC Unanderra to Dombarton running times (19 minutes) to apply.
a Locomotive classes separated by a slash indicates all combinations of those classes are acceptable.
b The AC6 locomotive shall be a C44ACi or GT46C-ACe type AC locomotive and the L2 locomotive can be NR or AN class.

3.2 UP (downhill) LOADS for GENERAL FREIGHT, GRAIN AND NON-COAL

The following table defines the minimum number of locomotive combinations to operate with the maximum trailing load.

			MAXIMUM TRAILING LOAD (TONNES)				
	Sections	Locomotive Class	Single	Double	Triple	Quad	Notes
1	Moss Vale to 91.080 km	AC6	2400	- -	- -	- -	1, 3
2	Moss Vale to 91.080 km	AC6	- -	3600	- -	- -	2, 3
3	Moss Vale to 91.080 km	AC6 + L2	- -	2400	- -	- -	1, 3, b
4	Moss Vale to 91.080 km	AC6 + L2	- -	3600	- -	- -	2, 3, b
5	Moss Vale to 91.080 km	AC6 + 2 x L2	- -	- -	2400	- -	1, 3, b
6	Moss Vale to 91.080 km	AC6 + 2 x L2	- -	- -	3600	- -	2, 3, b
7	Moss Vale to 91.080 km	2 x AC6 + L2	- -	- -	2400	- -	1, 3, b
8	Moss Vale to 91.080 km	2 x AC6 + L2	- -	- -	3600	- -	2, 3, b
9	Moss Vale to 91.080 km	L2	- -	3600	- -	- -	2, 3
10	Moss Vale to 91.080 km	L2	2080	2400	- -	- -	1, 3
11	Moss Vale to 91.080 km	L2/L3/L4	- -	3300	- -	- -	2, 3, a
12	Moss Vale to 91.080 km	AC6 +L3/L4	- -	3300	- -	- -	2, 3, a, b
13	Moss Vale to 91.080 km	L4 + L5/L6/L7/L8/L9	- -	3300	- -	- -	2, 3, a, c
14	Moss Vale to 91.080 km	L3/L4	1840	2400	- -	- -	1, 3, a
15	Moss Vale to 91.080 km	L5	1872	2400	- -	- -	1, 3
16	Moss Vale to 91.080 km	L6	1651	2400	- -	- -	1, 3
17	Moss Vale to 91.080 km	L7	1610	2400	- -	- -	1, 3

			MAXIMUM TRAILING LOAD (TONNES)				
18	Moss Vale to 91.080 km	L8	1563	2400	- -	- -	1, 3
19	Moss Vale to 91.080 km	L9/L10	1200	2400	- -	- -	1, 3, a
20	Moss Vale to 91.080 km	L11	1191	2382	2400	- -	1, 3
21	Moss Vale to 91.080 km	L12	1112	2224	2400	- -	1, 3
22	Moss Vale to 91.080 km	L13	500	1000	1500	2000	3

Notes to Table

1 Single pipe trains.

2 Two pipe trains.

Two pipe vehicles have a main reservoir that recharges the air brake system.
The maximum train length of two pipe vehicles on a train is 46 vehicles. Up to 6 empty or loaded single pipe vehicles may be attached to the REAR of a loaded or empty two pipe train. The two-pipe portion shall not exceed 40 wagons.

3 Lead locomotives must be fitted with a pressure maintaining brake valve

a Locomotive classes separated by a slash indicates all combinations of those classes are acceptable.

b The AC6 locomotive shall be a C44ACi or GT46C-ACe type AC locomotive and the L2 locomotive can be NR or AN class.

c Not all L5/L6/L7/L8/L9 locomotive types are fitted with extended range dynamic brake that can satisfy the requirements in Section 3.6 and qualify as a 2 pipe train operating in excess of 2400 t.

Refer to Section 3.7 for special conditions for single pipe trains in excess of 2400 tonnes and up to 1500 metres long.

3.3 UP (downhill) LOADS for COAL

The following table defines the minimum number of locomotive combinations to operate with the maximum trailing load.

			MAXIMUM TRAILING LOAD (TONNES)				
	Sections	**Locomotive Class**	**Single**	**Double**	**Triple**	**Quad**	**Notes**
1	Moss Vale to 91.080 km	AC6	- -	4500	- -	- -	1, 3
2	Moss Vale to 91.080 km	AC6	- -	4600	- -	- -	2, 3
3	Moss Vale to 91.080 km	AC6	- -	- -	5000	- -	2, 4
4	Moss Vale to 91.080 km	L4	- -	4200	- -	- -	1, 3
5	Moss Vale to 91.080 km	L3	- -	4500	- -	- -	1, 3, 5

1 Two pipe trains.

2 ECP trains.

3. Tahmoor to Inner harbour route.

4. ECP trains from Western coal fields.

5. To allow some locomotive flexibility in the Tahmoor – Inner Harbour trains a single L3 category locomotive can be substituted by a single L4 category locomotive however in these instances only 42 wagons out of the 45 wagon consist can be loaded.

3.4 Additional Locomotives on UP Trains (excess to haulage requirements)

1. Additional locomotives can be marshalled headend to those listed in the table, however the maximum power marshalled at the front of the trains shall not exceed:
   - 16,000 HP for DC locomotives
   - 13,500 HP for AC locomotives
2. For combined DC and AC locomotives the lower figure shall apply.
3. Locomotives attached to the train for balancing purposes (i.e. excess to haulage requirements) that are dead attached, not fitted with dynamic brake or do not have operating dynamic brake are to be included in the trailing load of the train.

3.5 General Braking requirements – UP direction:

1. All wagons (ECP wagons excepted) shall be fitted with fixed exhaust chokes as per AS 7510.2 (Brake Cylinder release time for a Freight Vehicle fitted with a fixed exhaust choke shall be 350 kPa to 70 kPa in 30 to 50 seconds.),
2. Wagons fitted with Grade Control Valves are not permitted on this line,
3. Dynamic brake shall be used if available and operational,
4. The train shall apply dynamic braking of no more than 990 kN in total up to the ARTC/TfNSW boundary near Unanderra (Note that a reduced dynamic brake force applies in TfNSW area),
5. The minimum allowable axle load for vehicles in the front third of a train shall not be less than 10 tonnes for dynamic braked trains.

3.6 Braking requirements – UP direction – 2 Pipe Trains

1. Locomotives programmed to work 2-pipe trains in excess of 2400 tonne shall be fitted with extended range dynamic brake,
2. In the event of a dynamic brake failure, there shall be at least 50% of active locomotives in the consist with operable dynamic brake that can be controlled from the lead unit (e.g. a triple locomotive train must have 2 of the 3 locomotives with operable dynamic brake).

If the driver has any trouble in adequately recharging the brake pipe as a result of the dynamic brake failure, the train shall be brought to a stand and held with the locomotive independent brake and sufficient handbrake while the brake pipe fully recharges. If the driver again has trouble in adequately recharging the brake pipe later in the journey, the train shall be brought to a stand and secured by handbrakes. The train may be subsequently moved only by dividing the train or attaching additional locomotive/s with operable dynamic brake.

3.7 Conditions for Operation of single pipe trains greater than 2400 tonne and up to 4000 tonne and up to 1500 m in length

These trains must operate under mandatory dynamic brake conditions which means all locomotives must be fitted with operable extended range dynamic brakes.

Other conditions and recommendations for this operation are:

1. It is recommended that no less than one locomotive be provided for each 1000 tonnes or part thereof of train load (e.g. a load of 2800 tonne should have a minimum of 3 locomotives - a load of 3200 tonne should have a minimum of 4 locomotives),
2. The minimum axle load in the front third of the train should not be less than 10 tonnes,
3. Locomotive(s) may be marshalled at the rear of the train from Summit Tank to Unanderra in order to comply with the Horsepower limit at the front of the train,
4. The speed of the train must be controlled by the dynamic brake supplemented by the use of the air brake as required,
5. Crews, where there are locomotive(s) marshalled on the rear of the train, must have a clear understanding of procedures for operating these trains in the event of the loss of radio communication.
6. If the dynamic brake fails on one locomotive only after departing Summit Tank, the train may continue under the control of the remaining dynamic brake and supplemented by the air brake.

   If the driver has any trouble adequately recharging the brake pipe, the train must be brought to a stand and held on the locomotive independent brake and sufficient handbrakes and the brake pipe fully recharged,

   The train may then continue under the control of the remaining dynamic brake and supplemented by the air brake,

   If the driver again has trouble adequately recharging the brake pipe, the train must be brought to a stand and secured by handbrakes,

The train may be subsequently moved only by dividing the train or attaching additional locomotive(s) with operable dynamic brake.

7. If the dynamic brake fails on more than one locomotive after departing Summit Tank, the train must be brought to a stand and secured by handbrakes. The train may be subsequently moved by dividing the train or attaching additional locomotive(s) with operable dynamic brakes.

   If the dynamic brake fails on more than one locomotive between Moss Vale and Summit Tank, the train must be divided at the first suitable location.

   If the train is required to be divided above, each portion of the train must comply with the Operator's procedure for single pipe train load and length limits.

4 Special Access Conditions

4.1 Heritage Passenger Trains

1. Train loads for heritage passenger trains shall not exceed the tested/agreed load for each specific locomotive type.
2. The cutting out of brakes is not permitted.
3. The operator shall have driving procedures that specifically address the braking issues associated with the route (such as speed, heat input to wheels, brake fade, re-charge of brake pipe following brake releases).
4. The operator shall have a procedure in place to manage the train and communicate with network control in the event of a runaway.
5. Drivers shall be trained in those driving and communication procedures.
6. Train guards shall be trained to carry out duties such as securing and protecting the train in the event of a train failure.

4.2 Light Locomotives & Light Trains

Definitions

- A light locomotive or light locomotives operate without any trailing load.
- A light train is a train where the trailing load is less than the mass of the hauling locomotive(s).

The following conditions apply to light locomotives and light trains operating in the UP direction from Moss Vale to Unanderra:

- Dynamic brake must be fitted and operational on a single locomotive or a light train hauled by a single locomotive,
- Dynamic brake must be fitted and operational at least half the locomotives where there are multiple unit locomotives or a light train hauled by multiple unit locomotives. The lead locomotive must be able to control other dynamic brake locomotives.
- The park-brake on light locomotive(s) must be operational.

4.3 Out of Gauge Steel Trains

The following table lists locations where crossings may be made as authorised.

LOCATION	CROSSING
MT MURRAY	LOOP LINE
ROBERTSON	LOOP LINE
CALWALLA	LOOP LINE
MOSS VALE	NUMBER ONE BRANCH STORAGE SIDING

4.4 Self-Propelled Diesel Trains

Conditions for the operation of self-propelled diesel trains are:

XPT	XPLORER/ ENDEAVOUR	CONDITIONS OF OPERATION
DOWN DIRECTION (UNANDERRA – MOSS VALE)		
✓		All power cars operating
	✓	All engines operating
✓		Maximum 7 trailer cars with 2 power cars or 3 trailer cars with 1 power car powering and 1 power car disabled
✓	✓	All compressors operating

XPT	XPLORER/ ENDEAVOUR	CONDITIONS OF OPERATION
✓	✓	Emergency coupler available
✓	✓	No brake cut outs allowed
✓	✓	EP brake, automatic brake, hand and all spring parking brakes fully operational
UP DIRECTION (MOSS VALE – UNANDERRA)		
✓		One or two power cars operating
✓		Single power car not permitted (train must consist of at least two vehicles (i.e. two power cars or one power car, one trailer)
	✓	All engines operating
	✓	At least half traction engines working. Single car not permitted
✓		Maximum 7 trailer cars with 2 power cars or 3 trailer cars with 1 power car powering and 1 power car disabled
✓	✓	All compressors operating (compressor on any dead power car to be switched to hotel supply)
✓	✓	Emergency coupler available
✓	✓	No brake cut outs allowed
✓	✓	EP brake, automatic brake and all spring parking brakes fully operational

4.5 Intermodal (Container Trains) Summit Tank-ARTC/TfNSW Boundary – Unanderra

This requirement applies to all intermodal (container) trains diverted from the Defined Interstate Rail Network via Summit Tank because of the potential for any vehicle in the consist to be loaded to the maximum allowable height above rail of 4050 mm (as published in the Route Access Standard General Information, Chapter 7 – Loading Restrictions).

As the tracks between Moss Vale and Unanderra are only authorised for container traffic operating to a **maximum height of 3916 mm above rail**, all trains conveying container traffic, which have been diverted from the Defined Interstate Rail Network, shall operate as an out of gauge train. This infringement is in height only and does not affect passing traffic.

The following operating conditions shall apply:

- A maximum speed of 15 km/h is imposed through all tunnels between Moss Vale and Unanderra. The speed limit shall apply for the full length of the train.
- The Network Controller shall ensure that all crews are reminded of this requirement prior to the operation.

5 Operating outside or beyond the prescribed operating conditions

The safety implications of not operating to the prescribed requirements and limits between Summit Tank and Unanderra in the UP direction are high. Any proposals by operators to operate outside or beyond the existing operating conditions requires the submission of technical and risk analyses to both ARTC and TfNSW for determination.

Examples of operating outside or beyond the prescribed operating conditions include:

- operating beyond the maximum train load allowed
- operating beyond the train length, maximum number of wagons or both permitted
- operating above the allowable maximum speed for single pipe trains
- axle load of vehicles in the front third of a train is lower than permitted
- application of dynamic brake above the specified limit

Under the Rail Safety National Law, it is the obligation of the rolling stock operator (RSO) to undertake change management and safety validation activities when deviating from existing operational parameters.

The operator shall, through the technical and risk analyses, demonstrate that the proposed train operating outside or beyond the prescribed operating conditions by the RIM is safe in relations to:

- In-train forces: L/V ratio analyses (where applicable) to support all locomotive-wagon and wagon-wagon combinations (at different loading states) in the consist under dynamic or emergency brake application on the tightest curve to ensure it is not encroaching the derailment limit.
- Train braking capacity: a review that train brake characteristics are fit for purpose for example: net brake ratio, choke timings, brake block coefficient of friction, tonnes per operative brake.

6 Location of Speed Signs

LOCATION	KILOMETRAGE	DOWN		UP	
		NORMAL	PASS	NORMAL	PASS
UNANDERRA	88.273				
TfNSW territory (See Note1)	88.400	-	-	65	-
	88.800	-	-	X25	-
	88.900	50	-	-	-
	89.430	60	-	-	-
	89.500	-	-	40	-
	90.930	40	-	40	-
Start ARTC Territory	91.080				
DOMBARTON	96.968				
	107.970	-	-	30	-
	107.970	-	-	-	40
SUMMIT TANK	108.272				
	108.230	45	-	-	-
	116.070	-	-	45	-
	117.200	-	-	65	-
MT MURRAY	118.992				
	127.240	65	-	40	-
ROBERTSON	128.306				
	128.970	70	-	-	-
	130.640	-	-	70	-
	130.920	80	-	-	-
	133.480	-	-	80	-
	133.680	115			
CALWALLA	139.366				
	140.150	100		115	
	140.580	115		100	
	149.850	50		115	
	150.330			50	
MOSS VALE	150.898				

Note 1: These speed boards are located in TfNSW area and are subject change (refer to TfNSW TOC Section pages for up-to-date information on these speed boards).