

SECTION 18

ROLLING STOCK OUTLINES

ROA MANUAL
SCHEDULE OF AMENDMENTS
SECTION 18

AMENDMENT NUMBER	PAGES AMENDED	AMENDMENT SUMMARY	DATE ISSUED

This Section of the ROA Manual, as highlighted by red text, is superseded by the following RISSB Australian Standard:

- AS 7507 Railway rolling stock - Rolling stock outlines

TABLE OF CONTENTS

Section	Description	Page No.
18.1	SCOPE	18-1
18.2	GENERAL REQUIREMENTS	18-1
18.3	UNRESTRICTED MAXIMUM ROLLING STOCK OUTLINES	18-2
18.4	PRINCIPAL MAXIMUM ROLLING STOCK OUTLINES	18-2
18.5	INTERIM MAXIMUM ROLLING STOCK OUTLINE	18-2
18.6	ULTIMATE MAXIMUM ROLLING STOCK OUTLINE	18-2
18.7	ROUTE CLEARANCE CLASSIFICATION	18-3
18.8	VEHICLE MARKING	18-3
18.9	CURVE NEGOTIATION	18-3
Diagram 18-1	Unrestricted Maximum Rolling Stock Outline Freight and Passenger Vehicles, Plate A.....	18-4
Diagram 18-2	Alternate Unrestricted Maximum Rolling Stock Outline for Roller Bearing Freight Vehicles, Plate B.....	18-5
Diagram 18-3	Principal Maximum Rolling Stock Outline Freight and Passenger Vehicles, Plate C.....	18-6
Diagram 18-4	Alternate Principal Maximum Rolling Stock Outline for Roller Bearing Freight Vehicles, Plate D.....	18-7
Diagram 18-5	Interim Maximum Rolling Stock Outline Freight and Passenger Vehicles, Plate E.....	18-8
Diagram 18-6	Ultimate Maximum Rolling Stock Outline Freight and Passenger Vehicles, Plate F.....	18-9
Diagram 18-7	Maximum Width at Centre of Vehicle Unrestricted and Principal Rolling Stock Outlines.....	18-10
Diagram 18-8	Maximum Width at Centre of Vehicle Alternate Unrestricted and Principal Rolling Stock Outlines.....	18-11
Diagram 18-9	Maximum Width at Centre of Vehicle Interim and Ultimate Rolling Stock Outlines.....	18-12

18.1 SCOPE

- 18.1.1 This section defines the maximum outline for freight, passenger and service vehicles, including track maintenance and construction machines, permissible on the various routes over which the vehicle(s) will operate.
- 18.1.2 Provision is also made for all systems to classify routes and sections according to the vehicle outline which can be accommodated by existing structural clearances.

18.2 GENERAL REQUIREMENTS

- 18.2.1 Vehicles shall be constructed to conform to the limiting outline applicable to the routes over which they are intended to operate. This clearance outline allocation is listed in Table 1.5 of Section 1 of this Manual.
- 18.2.2 The clearances above rail are minimum values and shall be maintained under all conditions of loading, wear and operation on level track. Allowance shall be made for the maximum deflection of load carrying springs or other suspension systems and the maximum permissible wear in wheels, bogie components, centre plates etc. The minimum clearance above rail on level track of the vehicle structure and any fittings or attachments shall permit transit over a convex vertical curve of 300 m radius.
- 18.2.3 Notwithstanding the minimum values of 18.2.2, other sections of this Manual may require greater clearances above rail, eg discharge doors, tank car outlets, brake equipment etc.
- 18.2.4 The bottom of side-hung doors which swing outwards and of other door types which extend laterally beyond the outline when open, shall be a minimum of 1120 mm above rail under all conditions.
- 18.2.5 The outline diagrams illustrate the limiting dimensions for conventional bogie vehicles. Articulated vehicles shall also comply with the requirements of this section including the distance between bogie pivots and from bogie pivots to the end of the vehicle. The relation between bogie centre distance and end overhang shall satisfy the L/V requirements specified in Section 8 of this Manual.
- 18.2.6 The vehicle outlines shown on each diagram have been based on the bogie centres and end overhang indicated, for which the versine and end swing ('centre and end throw') are approximately equal. Other vehicle proportions are permitted provided that the vehicle does not extend beyond the swept envelope generated by the base vehicle. The distance between bogie pivots shall not be increased above that shown on the diagrams unless a reduction is made in the body width dimensions to compensate for the increased centre and end throw on a horizontal curve of 100 m radius.
- In the case of certain track maintenance or construction machines, the owning system may give approval to exceed the maximum overhang indicated.
- 18.2.7 The maximum permissible width at the centre of a vehicle for a range of bogie centres is indicated on Diagrams 18-7, 18-8 and 18-9. These graphs apply as follows:
- (a) Diagram 18-7: Outline Diagrams 18-1 and 18-3
 - (b) Diagram 18-8: Outline Diagrams 18-2 and 18-4
 - (c) Diagram 18-9: Outline Diagrams 18-5 and 18-6
- Widths are shown for the portions above and below 1120 mm above rail.
- 18.2.8 For vehicles with bogie centres less than the base dimension shown on each outline, the maximum width is that given on the outline diagram. For vehicles with bogie centres in excess of the base dimension shown on each outline, the maximum width is determined as follows:
- (a) Outline Diagrams 18-1 and 18-3: The base width is reduced by twice the difference between the centre throw on a 100 m curve for the subject vehicle and that for a vehicle with bogie centres as shown on the outline diagrams.

(b) Outline Diagrams 18-2 and 18-4: For vehicles with bogie centres greater than 16,150 mm the maximum width is the same as permitted above for Outline Diagrams 18-1 and 18-3. For vehicles with bogie centres between 15,000 mm and 16,150 mm the body width is reduced proportionately from 3,050 to 2,970 mm, and the width below 1,120 above rail remains as 2,900 mm.

(c) Outline Diagrams 18-5 and 18-6: The maximum width is determined as in (a) above.

18.2.9 The width at the end of a vehicle may also require a reduction to ensure the end throw remains within the swept envelope of the base vehicle, depending on the overhang.

18.2.10 The vehicle width may be increased proportionately between the vehicle centre and the bogie centre.

18.3 UNRESTRICTED MAXIMUM ROLLING STOCK OUTLINES

18.3.1 Diagrams 18.1 and 18.2 illustrate the limiting outline for vehicles intended for unrestricted intersystem operation on all standard and broad gauge lines, including electrified lines.

18.3.2 Diagram 18.1 shows a conventional vehicle 22850 mm over end sills and 16150 mm between bogie pivots, with the maximum body width of 2970 mm. Diagram 18.2 shows an alternate outline, 21300 mm over end sills, 15000 mm between bogie pivots and a maximum body width of 3050 mm.

18.4 PRINCIPAL MAXIMUM ROLLING STOCK OUTLINES

18.4.1 Diagrams 18.3 and 18.4 illustrate the limiting outlines for vehicles intended for intersystem operation on all standard gauge lines and broad gauge lines outside Victoria, including electrified lines.

18.4.2 The area outside the wheels, 80 mm above rail and 1130 mm from the vehicle centre line shall be occupied by bogie components only.

18.4.3 The area outside the wheels, 80 mm above rail and 1345 mm from the vehicle centre line, shall be occupied by trip-arms only.

18.5 INTERIM MAXIMUM ROLLING STOCK OUTLINE

18.5.1 Vehicles built to the limiting outline shown on Diagram 18.5 are restricted to operation on routes for which transit clearance has been authorised outside electrified areas.

18.6 ULTIMATE MAXIMUM ROLLING STOCK OUTLINE

18.6.1 Diagram 18.6 illustrates the Ultimate Maximum Rolling Stock Outline for intersystem operation.

18.6.2 This diagram is used to generate the Ultimate Minimum Structure Gauge (Section 1), applicable to all new and substantially modified structures outside electrified areas.

18.6.3 Vehicles conforming to this outline are restricted to operation on routes conforming to the Ultimate Minimum Structure Gauge or for which transit clearance has been authorised.

18.7 ROUTE CLEARANCE CLASSIFICATION

18.7.1 Each rail system shall classify its routes, sections of routes or lines according to the vehicle outlines which can be accepted for transit with the structural clearance available.

18.7.2 Route classification shall be as follows:

- (a) Class A : Will accept vehicles conforming to outline diagrams 18.1 and 18.2
- (b) Class C : Will accept vehicles conforming to outline diagrams 18.3 and 18.4
- (c) Class E : Will accept vehicles conforming to outline diagram 18.5
- (d) Class F : Will accept vehicles conforming to outline diagram 18.6

18.7.3 Route classifications are listed in Table 1.5 of Section 1 of this Manual. Flat, well and open cars are defined by the maximum width; vehicle height is not generally a factor. Transit clearance for these types of vehicles will be influenced by the dimensions of the loading. Systems may impose general or specific loading outlines which differ from the vehicle outlines given in this Section.

18.8 VEHICLE MARKING

18.8.1 Each vehicle shall be marked with the outline to which it conforms.

18.8.2 Details of these markings and their location is given in Section 22 of this Manual.

18.9 CURVE NEGOTIATION

In addition to the dimensional outlines specified by this Section, vehicles shall also comply with the requirements for negotiating curves specified in Section 8.2.15 of this Manual.

DIAGRAM 18-1

UNRESTRICTED MAXIMUM ROLLING STOCK OUTLINE - AUGUST 1991
 FREIGHT AND PASSENGER VEHICLES
 PLATE A

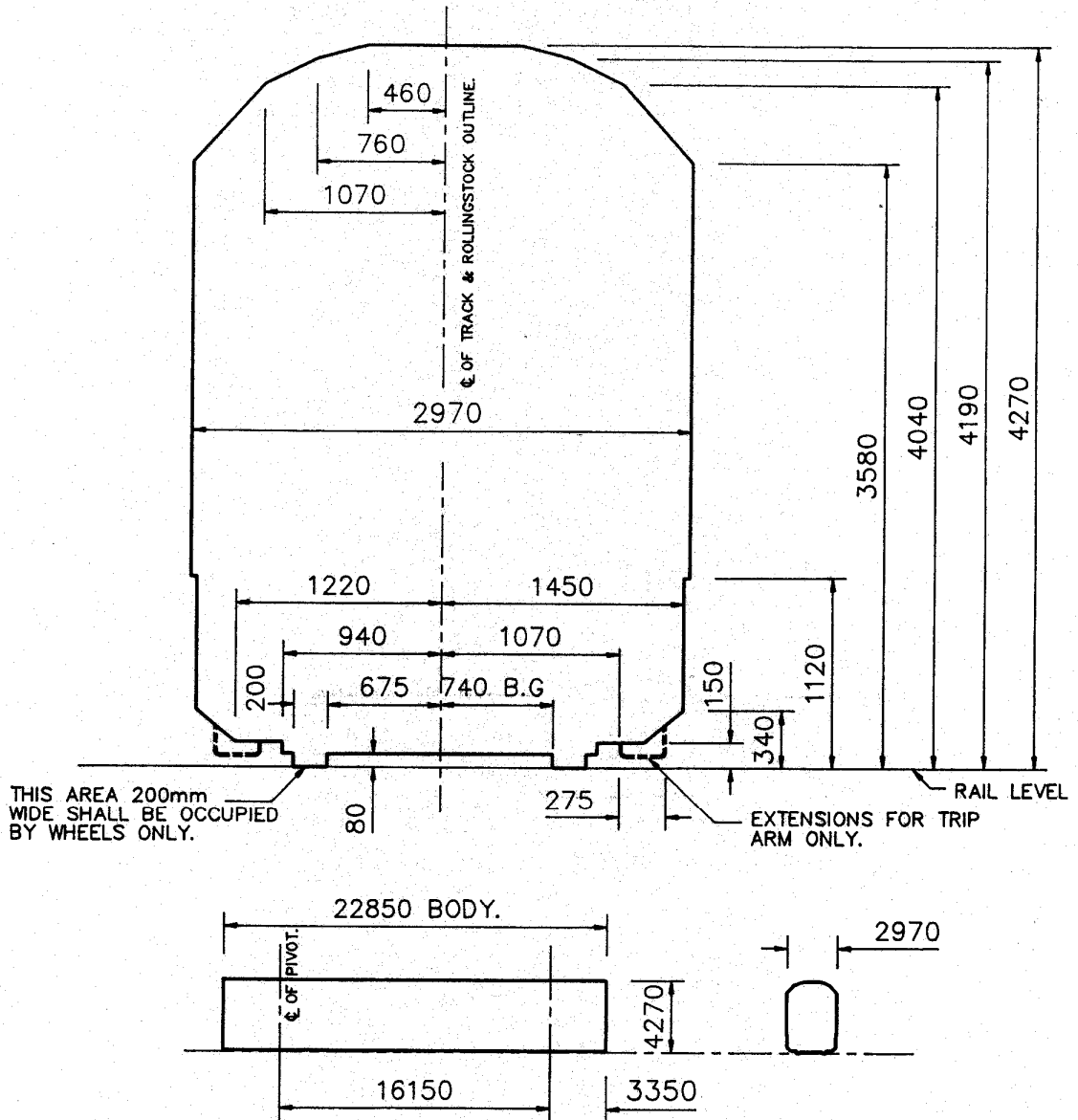


DIAGRAM OF 22.85m BASE VEHICLE

NOTES:

1. FOR UNRESTRICTED INTERCHANGE OF ROLLINGSTOCK ON ALL STANDARD AND BROAD GAUGE LINES THIS PROFILE CANNOT BE INFRINGED IN ANY WAY.
2. THE DISTANCE BETWEEN BOGIE PIVOTS IS NOT TO BE INCREASED ABOVE THAT SHOWN UNLESS ADEQUATE ALLOWANCE IS MADE BY A REDUCTION IN WIDTH TO COMPENSATE FOR THE INCREASED CENTRE AND END THROW ON A CURVE OF 100 METRES RADIUS.
3. THE BOTTOM OF SIDE HUNG DOORS WHICH SWING OUTWARDS SHALL HAVE A MINIMUM HEIGHT ABOVE RAIL OF 1120mm UNDER ALL CONDITIONS.
4. THE CLEARANCES ABOVE RAIL MUST BE PRESERVED UNDER ALL CONDITIONS OF OPERATION, LOADING & MAINTENANCE OF A VEHICLE ON LEVEL TRACK.

ALTERNATE UNRESTRICTED MAXIMUM ROLLING STOCK OUTLINE - AUGUST 1991
FOR FREIGHT VEHICLES
PLATE B

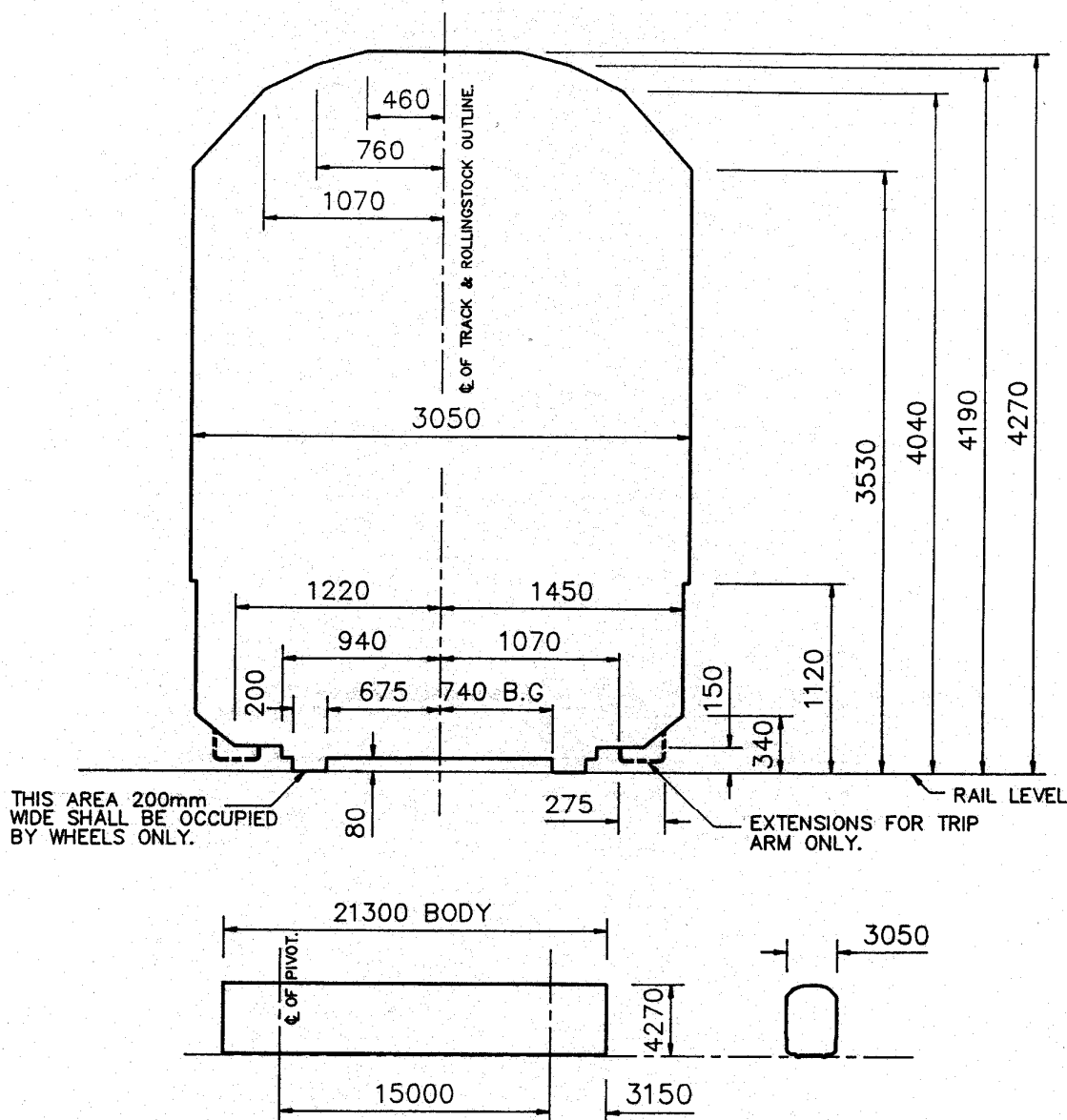


DIAGRAM OF 21.3m FREIGHT VEHICLE

NOTES:

1. FOR UNRESTRICTED INTERCHANGE OF ROLLINGSTOCK ON ALL STANDARD AND BROAD GAUGE LINES THIS PROFILE CANNOT BE INFRINGED IN ANY WAY.
2. THIS DIAGRAM APPLIES ONLY TO VEHICLES IN WHICH THE CENTRE PLATE LATERAL MOVEMENT (EXCLUSIVE OF FLANGE TO RAIL CLEARANCE) IS LIMITED TO 20mm EITHER SIDE OF THE LONGITUDINAL CENTRELINE.
3. THE DISTANCE BETWEEN BOGIE PIVOTS IS NOT TO BE INCREASED ABOVE THAT SHOWN UNLESS ADEQUATE ALLOWANCE IS MADE BY A REDUCTION IN THE WIDTH 3050 TO COMPENSATE FOR THE INCREASED CENTRE AND END THROW ON A CURVE OF 100 METRES RADIUS.
4. THE BOTTOM OF SIDE HUNG DOORS WHICH SWING OUTWARDS SHALL HAVE A MINIMUM HEIGHT ABOVE RAIL OF 1120mm UNDER ALL CONDITIONS.
5. THE CLEARANCES ABOVE RAIL MUST BE PRESERVED UNDER ALL CONDITIONS OF OPERATION, LOADING AND MAINTENANCE OF A VEHICLE ON LEVEL TRACK.

PRINCIPAL MAXIMUM ROLLING STOCK OUTLINE - AUGUST 1991
 FREIGHT AND PASSENGER VEHICLES
 PLATE C

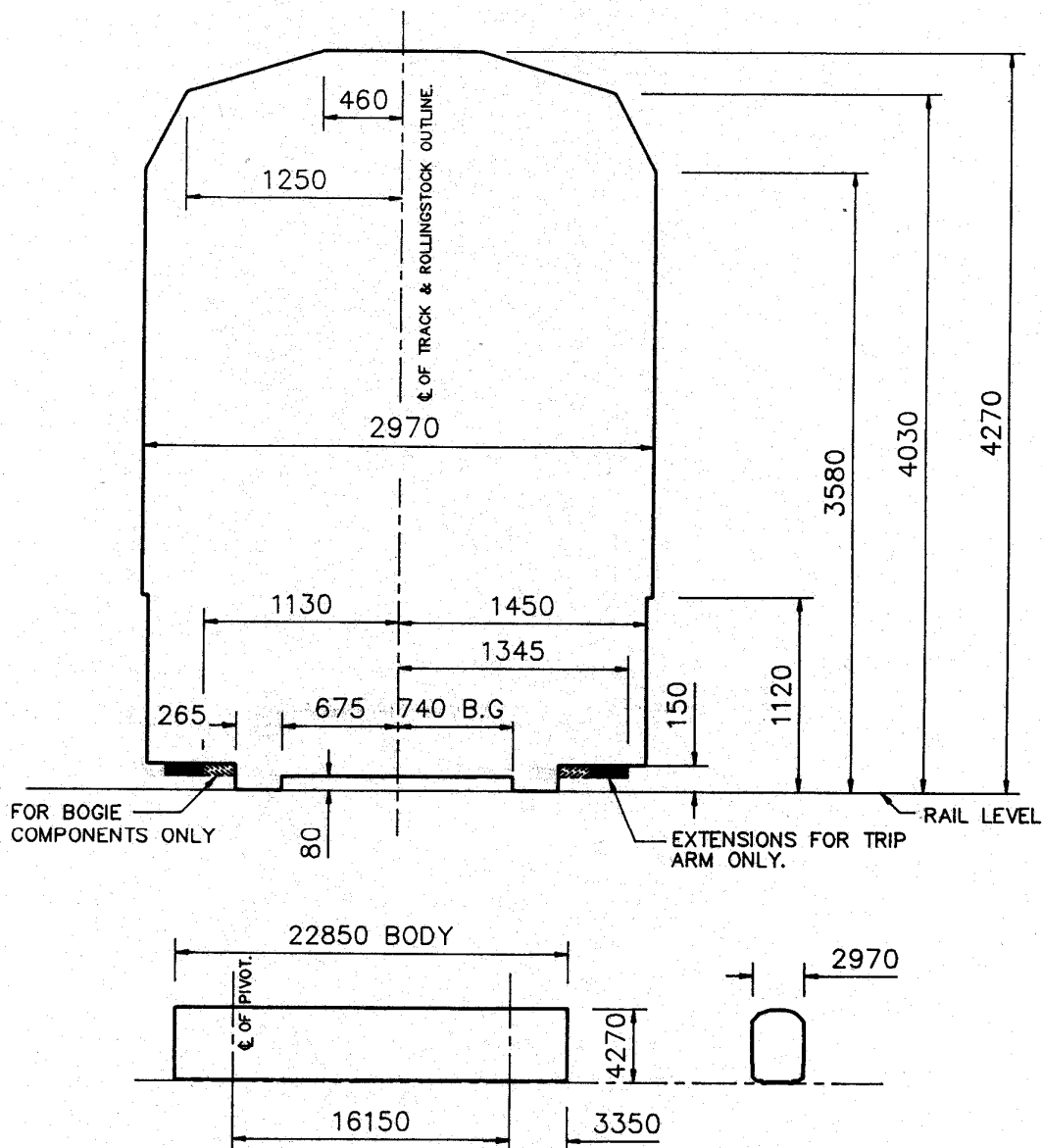


DIAGRAM OF 22.85m FREIGHT VEHICLE

NOTES:

1. THIS PROFILE CANNOT BE INFRINGED IN ANY WAY FOR INTERCHANGE OF ROLLINGSTOCK ON ALL STANDARD GAUGE LINES AND BROAD GAUGE LINES OUTSIDE VICTORIA.
2. THE DISTANCE BETWEEN BOGIE PIVOTS IS NOT TO BE INCREASED ABOVE THAT SHOWN UNLESS ADEQUATE ALLOWANCE IS MADE BY A REDUCTION IN WIDTH TO COMPENSATE FOR THE INCREASED CENTRE AND END THROW ON A CURVE OF 100 METRES RADIUS.
3. THE BOTTOM OF SIDE HUNG DOORS WHICH SWING OUTWARDS SHALL HAVE A MINIMUM HEIGHT ABOVE RAIL OF 1120mm UNDER ALL CONDITIONS.
4. THE CLEARANCES ABOVE RAIL MUST BE PRESERVED UNDER ALL CONDITIONS OF OPERATION, LOADING AND MAINTENANCE OF A VEHICLE ON LEVEL TRACK.

ALTERNATE PRINCIPAL MAXIMUM ROLLING STOCK OUTLINE - AUGUST 1991
FOR FREIGHT VEHICLES
PLATE D

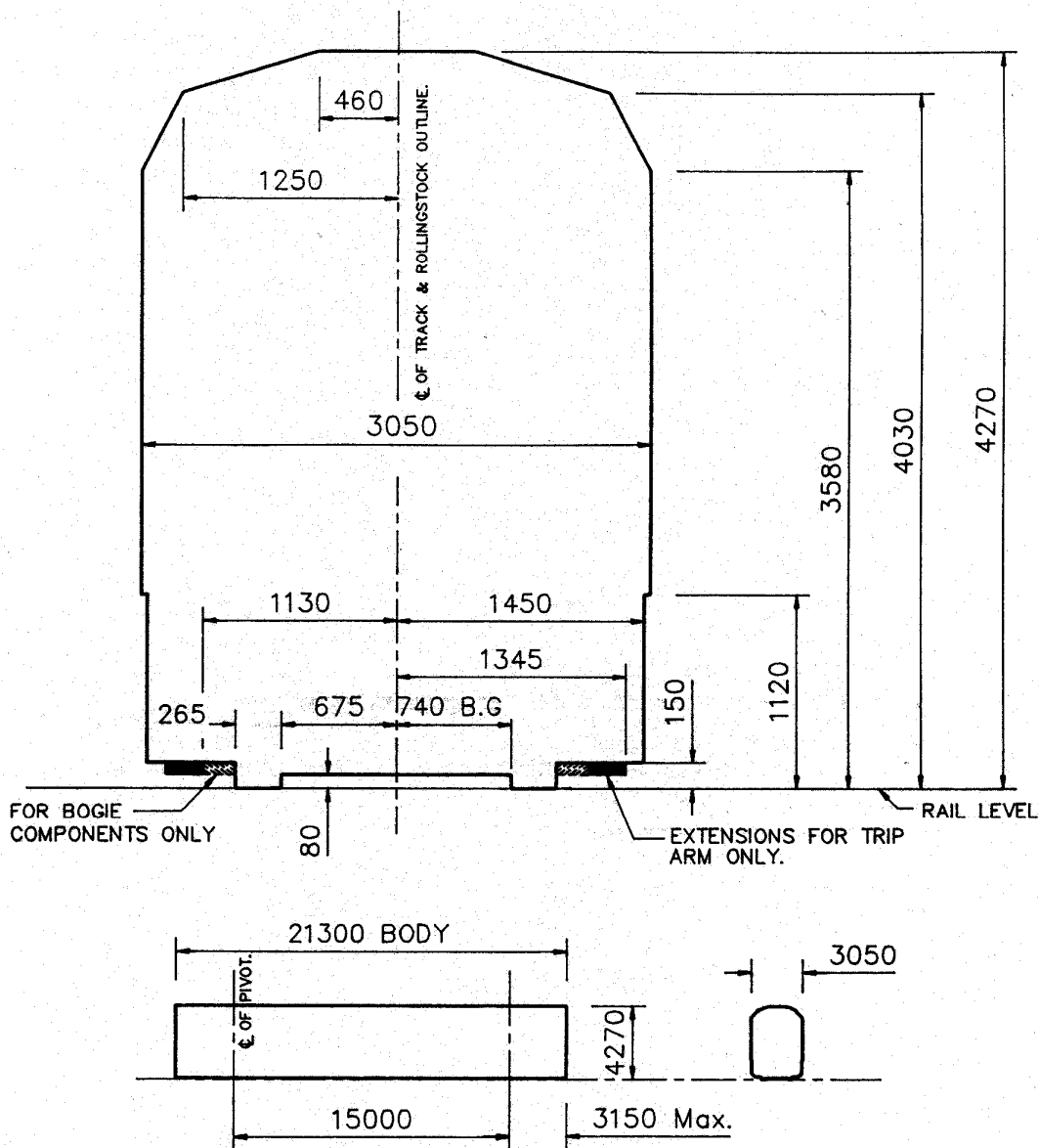


DIAGRAM OF 21.3m FREIGHT VEHICLE

NOTES:

1. FOR INTERCHANGE OF ROLLINGSTOCK ON ALL STANDARD GAUGE LINES AND BROAD GAUGE LINES OUTSIDE VICTORIA THIS PROFILE CANNOT BE INFRINGED IN ANY WAY.
2. THIS DIAGRAM APPLIES ONLY TO VEHICLES IN WHICH THE CENTRE PLATE LATERAL MOVEMENT (EXCLUSIVE OF FLANGE TO RAIL CLEARANCE) IS LIMITED TO 20mm EITHER SIDE OF THE LONGITUDINAL CENTRELINE.
3. THE DISTANCE BETWEEN BOGIE PIVOTS IS NOT TO BE INCREASED ABOVE THAT SHOWN UNLESS ADEQUATE ALLOWANCE IS MADE BY A REDUCTION IN THE WIDTH OF 3050 TO COMPENSATE FOR THE INCREASED CENTRE AND END THROW ON A CURVE OF 100 METRES RADIUS.
4. THE BOTTOM OF SIDE HUNG DOORS WHICH SWING OUTWARDS SHALL HAVE A MINIMUM HEIGHT ABOVE RAIL OF 1120mm UNDER ALL CONDITIONS.
5. THE CLEARANCES ABOVE RAIL MUST BE PRESERVED UNDER ALL CONDITIONS OF OPERATION, LOADING AND MAINTENANCE OF A VEHICLE ON LEVEL TRACK.

INTERIM MAXIMUM ROLLING STOCK OUTLINE - AUGUST 1991
 FREIGHT AND PASSENGER VEHICLES
 PLATE E

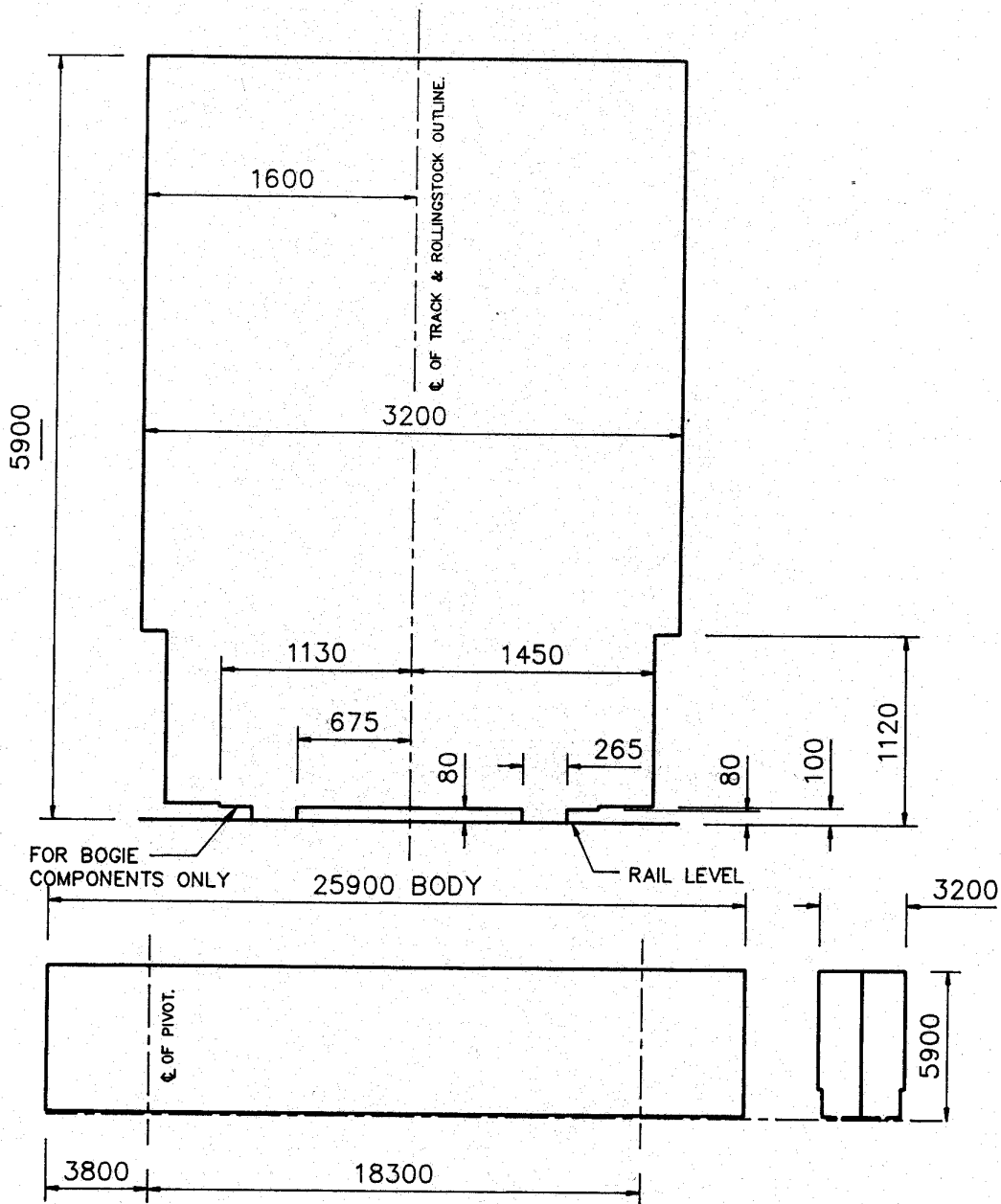


DIAGRAM OF 25.9m CONVENTIONAL VEHICLE

NOTES:

1. FOR INTERCHANGE OF ROLLINGSTOCK ON ALL STANDARD GAUGE LINES & BROAD GAUGE LINES OUTSIDE VICTORIA THIS PROFILE CANNOT BE INFRINGED IN ANY WAY.
2. THIS DIAGRAM APPLIES ONLY TO VEHICLES IN WHICH THE CENTRE PLATE LATERAL MOVEMENT (EXCLUSIVE OF FLANGE TO RAIL CLEARANCE) IS LIMITED TO 20mm EITHER SIDE OF THE LONGITUDINAL CENTRELINE.
3. THE DISTANCE BETWEEN BOGIE PIVOTS IS NOT TO BE INCREASED ABOVE THAT SHOWN UNLESS ADEQUATE ALLOWANCE IS MADE BY A REDUCTION IN THE WIDTH 3200 TO COMPENSATE FOR THE INCREASED CENTRE AND END THROW ON A CURVE OF 100 METRES RADIUS.
4. THE BOTTOM OF SIDE HUNG DOORS WHICH SWING OUTWARDS SHALL HAVE A MINIMUM HEIGHT, ABOVE RAIL OF 1120mm UNDER ALL CONDITIONS.
5. THE CLEARANCES ABOVE RAIL MUST BE PRESERVED UNDER ALL CONDITIONS OF OPERATION, LOADING & MAINTENANCE OF A VEHICLE ON LEVEL TRACK.

ULTIMATE MAXIMUM ROLLING STOCK OUTLINE - AUGUST 1991
 FREIGHT AND PASSENGER VEHICLES
 PLATE F

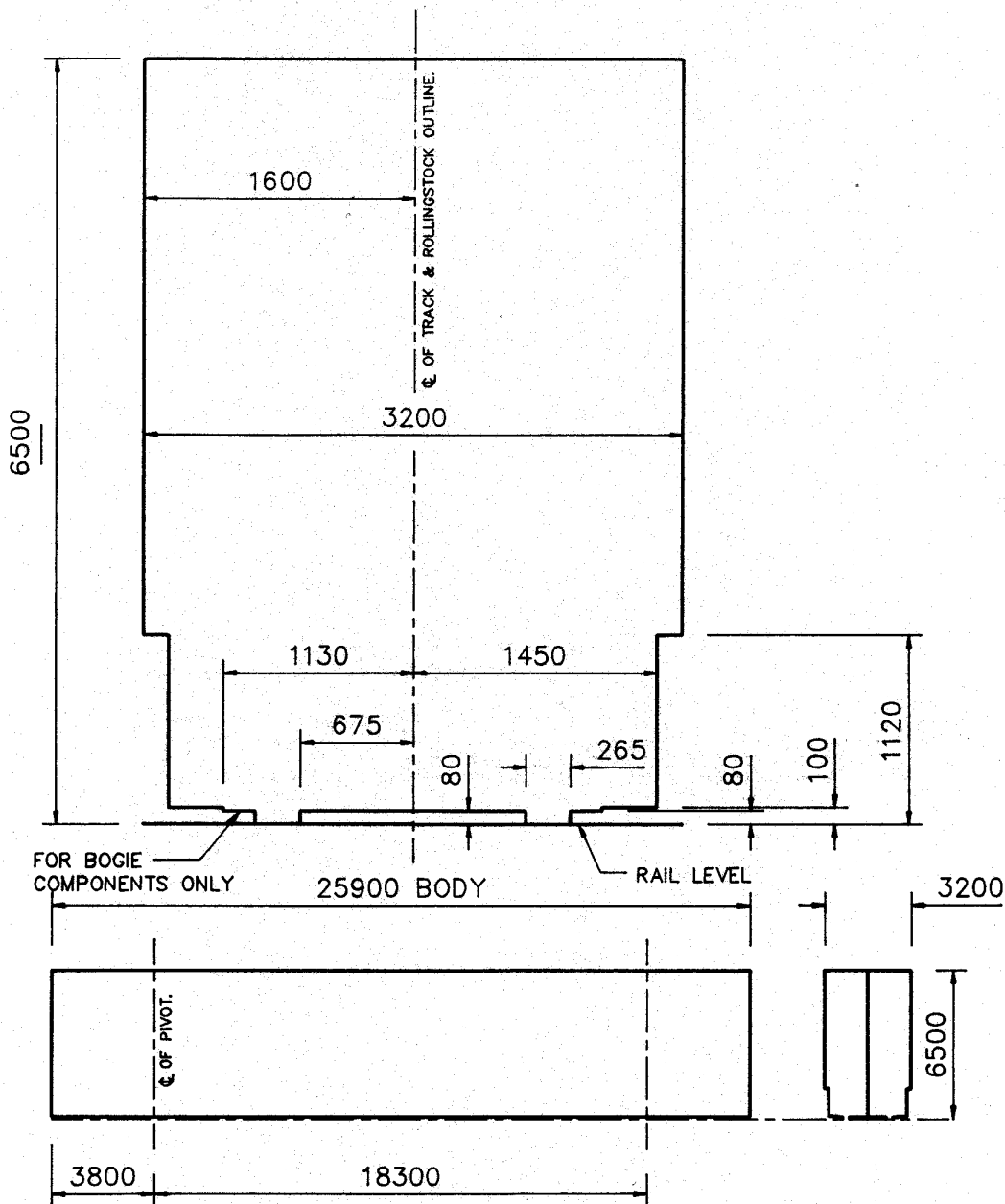
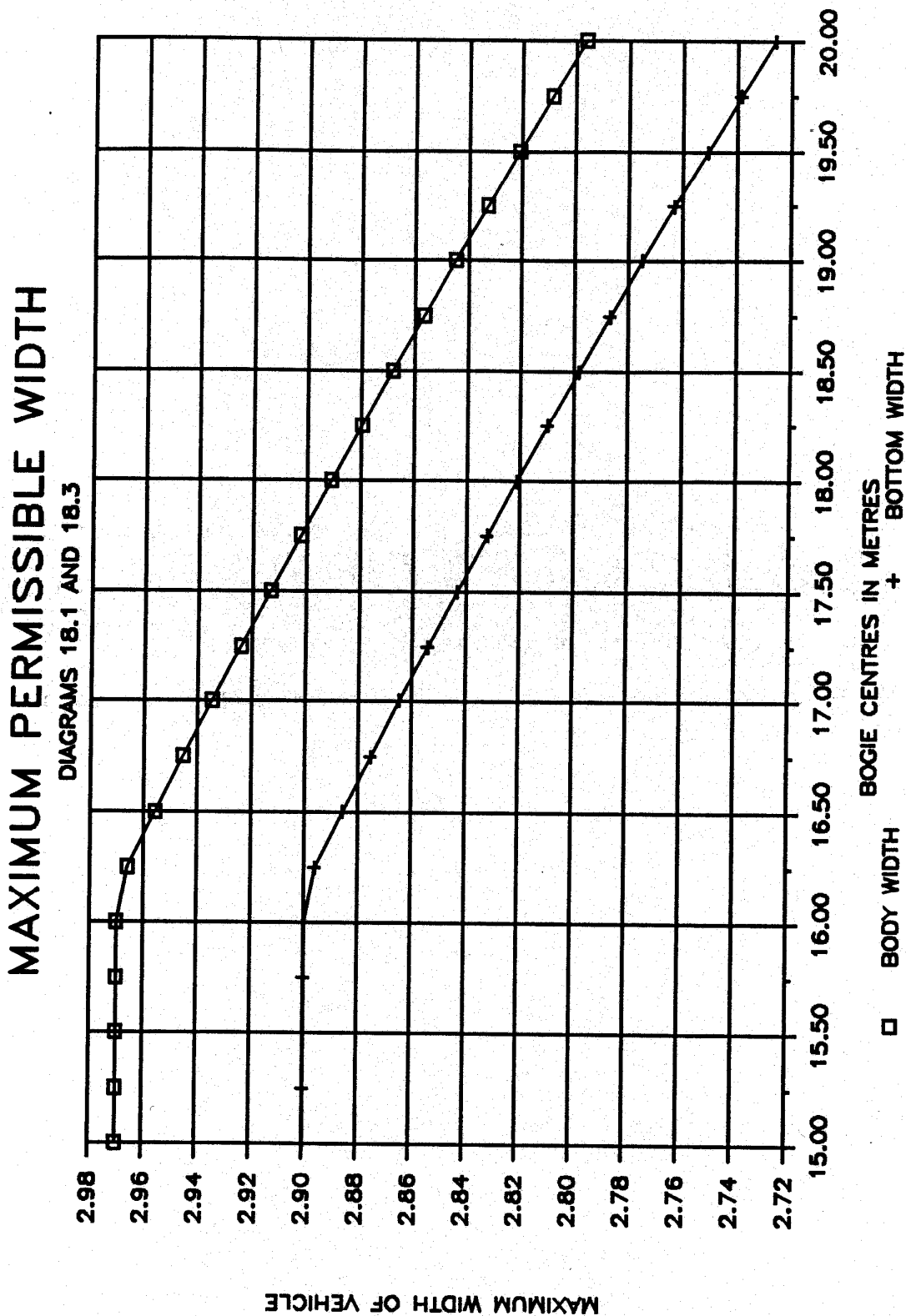


DIAGRAM OF 25.9m CONVENTIONAL VEHICLE

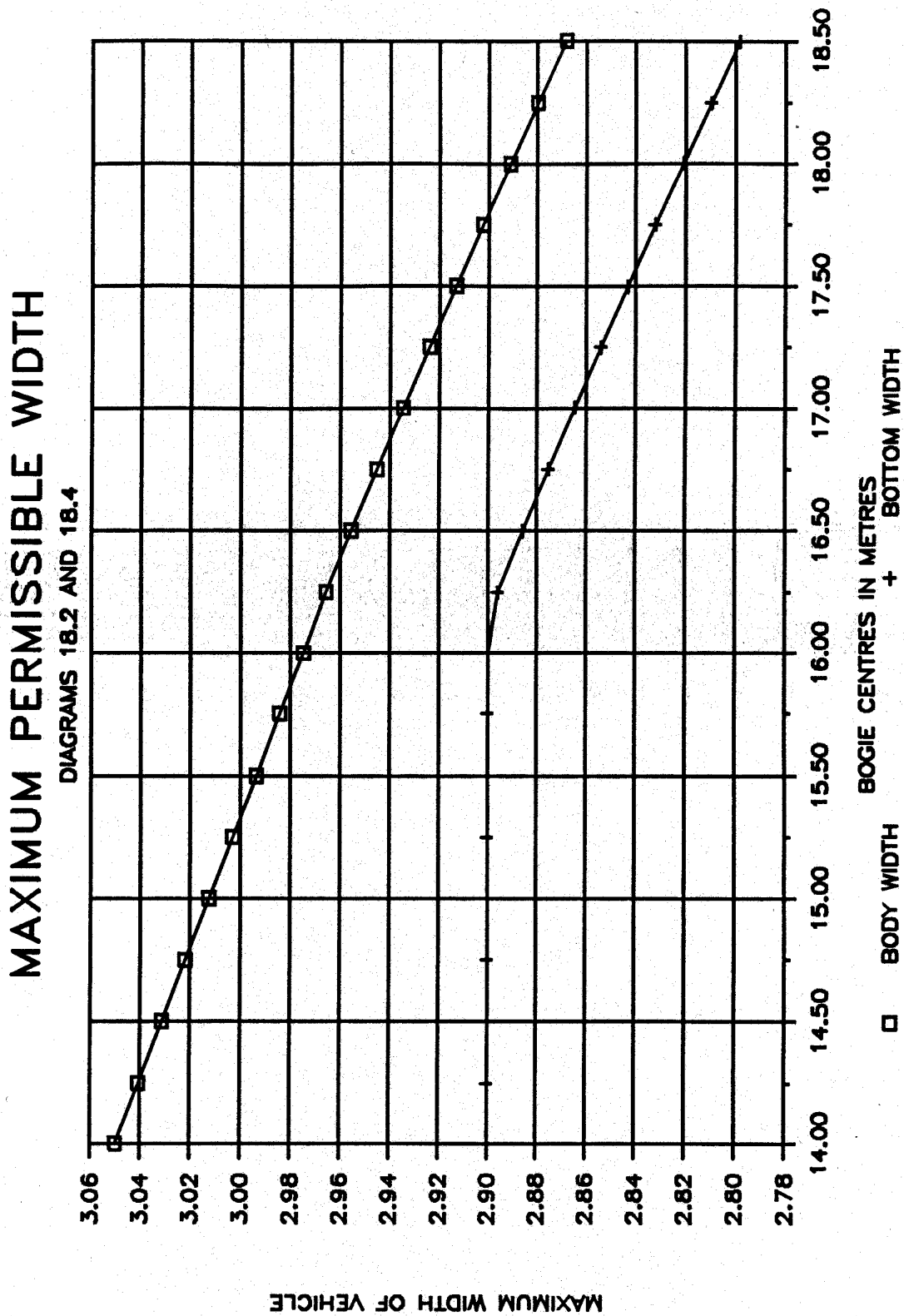
NOTES:

1. FOR INTERCHANGE OF ROLLINGSTOCK ON ALL STANDARD GAUGE LINES & BROAD GAUGE LINES OUTSIDE VICTORIA THIS PROFILE CANNOT BE INFRINGED IN ANY WAY.
2. THIS DIAGRAM APPLIES ONLY TO VEHICLES IN WHICH THE CENTRE PLATE LATERAL MOVEMENT (EXCLUSIVE OF FLANGE TO RAIL CLEARANCE) IS LIMITED TO 20mm EITHER SIDE OF THE LONGITUDINAL CENTRELINE.
3. THE DISTANCE BETWEEN BOGIE PIVOTS IS NOT TO BE INCREASED ABOVE THAT SHOWN UNLESS ADEQUATE ALLOWANCE IS MADE BY A REDUCTION IN THE WIDTH 3200 TO COMPENSATE FOR THE INCREASED CENTRE AND END THROW ON A CURVE OF 100 METRES RADIUS.
4. THE BOTTOM OF SIDE HUNG DOORS WHICH SWING OUTWARDS SHALL HAVE A MINIMUM HEIGHT ABOVE RAIL OF 1120mm UNDER ALL CONDITIONS.
5. THE CLEARANCES ABOVE RAIL MUST BE PRESERVED UNDER ALL CONDITIONS OF OPERATION, LOADING & MAINTENANCE OF A VEHICLE ON LEVEL TRACK.

MAXIMUM WIDTH AT CENTRE OF VEHICLE FOR VARIOUS BOGIE CENTRES
UNRESTRICTED AND PRINCIPAL ROLLING STOCK OUTLINES



MAXIMUM WIDTH AT CENTRE OF VEHICLE FOR VARIOUS BOGIE CENTRES
ALTERNATE UNRESTRICTED AND PRINCIPAL ROLLING STOCK OUTLINES



MAXIMUM WIDTH AT CENTRE OF VEHICLE FOR VARIOUS BOGIE CENTRES
INTERIM AND ULTIMATE ROLLING STOCK OUTLINES

