IPAC-23 | Requirements for Design Approval Drawings

Audience: PBS Assessors
Effective Date: 14 January 2026

This IPAC provides guidance to PBS Assessors on the requirements for Design Approval drawings. It outlines the essential elements that must be included on the drawing while avoiding unnecessary information. The dimensions on Design Approval drawings must align with the inputs used in PBS assessments.

Scope

This IPAC applies to all design and bridge drawings submitted as part of a DA application. PBS Assessors must comply with this IPAC.

Definitions

Centre of an axle group

Where an axle group includes a steerable axle in conjunction with one or more non-steerable axles, only the non-steerable axles are considered in determining the centre of an axle group.

Centreline of an axle group

The centreline of an axle group includes both steerable and non-steerable axles.

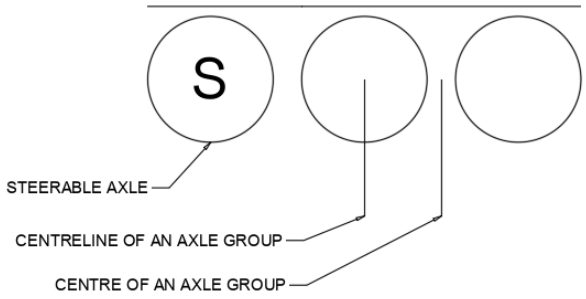

Figure 1 – Centre of an axle group vs centreline of an axle group

Design Drawing requirements

Drawing orientation

The front of the vehicle must be oriented towards the left of the page as such:

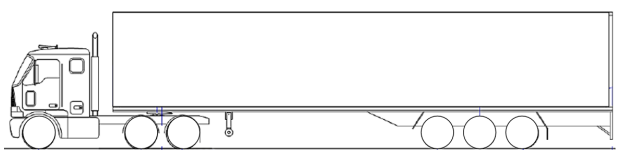

Figure 2 – Vehicle combination orientation

Drawing annotation

The drawings must clearly state if the dimensions shown are in the laden or unladen state. The only exceptions are payload heights and other payload properties, which can only be certified when laden.

E.g. the deck height shown on the drawing is indicated to be no greater than 1400mm; however, it is unclear whether this measurement applies to the laden or unladen state. The vehicle must not exceed a deck height of 1400 mm under all load scenarios.

The drawings may include provisions to show dimensions for both laden and unladen states.

- E.g. the deck height on the drawing is shown to be no greater than 1400mm when laden. Annotation on the drawing also states that all heights, except for the overall height, may be up to 15mm higher when certified as unladen.

Drawing dimensions

Dimension landings shall be aligned as accurately as possible to the feature/object of measurement.

Where dimension landings do not clearly align with the vehicle feature and/or are not accompanied by annotation for clarification, assessors will be requested to amend the provided drawings.

i.e. Prime mover wheelbase measurements are between the centreline of the 1st steer axle and drive axle group. Dimension landings shall reflect the measurement axes or include additional annotation. See following headings for clarification on placement requirements.

Front Overhang

The Front Overhang (FOH) must be shown for all vehicle units. The dimension must be measured from the centreline of the 1st steer axle to the front end of the vehicle. For semitrailers, an equivalent swing radius should be nominated from the front articulation point. For dog trailers, an equivalent swing radius should be nominated from the centreline of the front axle group. For payload protrusions, a separate FOH dimension including the payload protrusion must also be shown. If applicable, special profiles and tapers must also be included.

Wheelbase for hauling units

The Wheelbase (WB) must be shown for all hauling units. The WB must be measured from the steer axle to the centre of the drive axle group. For a twin steer hauling unit, the dimension must be measured from the 1st axle of the twin steer axle group to the centre of the drive axle group.

Fifth Wheel Offset for hauling units and trailers

The Fifth Wheel Offset (FWO) must be shown for all hauling units and trailers fitted with a fifth wheel. The following FWO convention must be used on all drawings.

- E.g. for a FWO forward from the centre of the rearmost axle group must be clearly labelled as a 'lead'. E.g. a FWO that spans 200mm forward should be labelled 'lead 200'
- E.g. for a FWO rearward from the centre of the rearmost axle group must be clearly labelled as a 'lag'. E.g. a FWO that spans 100mm rearward should be labelled 'lag 100'
- E.g. for a FWO range forward and rearward from the centre of the rearmost axle group must be clearly labelled as both 'lead' and 'lag'. E.g. a FWO that spans 200mm forward and 100mm rearward should be labelled 'lead 200 – lag 100'

Fifth Wheel Offset for dollies

The FWO must be shown for dolly units fitted with a fifth wheel. The following FWO convention must be used on all drawings.

- E.g. for a FWO forward from the centreline of the dolly axle group must be clearly labelled as a 'lead'. E.g. a FWO that spans 200mm forward should be labelled 'lead 200'
- E.g. for a FWO rearward from the centreline of the dolly axle group must be clearly labelled as a 'lag'. E.g. a FWO that spans 100mm rearward should be labelled 'lag 100'
- E.g. for a FWO range forward and rearward from the centreline of the dolly axle group must be clearly labelled as both 'lead' and 'lag'. E.g. a FWO that spans 200mm forward and 100mm rearward should be labelled 'lead 200 – lag 100'

The same convention applies to dog trailers fitted with ball-race connections.

S-dimension for semitrailers

The S-dimension (S-DIM) must be shown for all semitrailers. The S-DIM must be measured from the front articulation point to the centre of the axle group. In the case of semitrailers with two axle groups, the S-DIM convention must follow the example shown within Appendix A.

Note: Where a lead/lag is present for the Fifth Wheel Offset, the preference is to represent the offset upon the 2D profile. This will assist in differentiation between wheelbase measurements and S-DIM measurements.

S-dimension for dog trailers

The S-DIM must be shown for all dog trailers. The S-DIM must be measured from the front articulation point to the centre of the rear axle group. In this context, the front articulation point is the vertical axis of rotation of the front axle group, such as a ball-race connection.

Rear Overhang

The Rear Overhang (ROH) must be shown for all trailer units except for dollies and lead trailers used to connect to subsequent trailers. The ROH must be measured from the centre of the axle group to the rear end of the vehicle. For pig trailers, however, the ROH is measured specifically from the centreline of the axle group to the rear end of the vehicle. In the case of semitrailers with two axle groups, the ROH convention must follow the example shown within Appendix A.

Rear Overhang for payload protrusions

For payload protrusions, a separate ROH dimension that accounts for the payload protrusion must also be shown. If applicable, special profiles and tapers must also be included.

Drawbar Length for dollies and pig trailers

The Drawbar Length (DBL) must be shown for all dollies and pig trailers. The DBL must be measured from the centreline of the towing pivot to the centreline of the axle group as shown in Appendix A.

Tow Coupling Overhang

The Tow Coupling Overhang (TCOH) must be shown for all units fitted with A-type couplings. The TCOH must be measured from the centre of the rearmost axle group to the centreline of the towing pivot. For semitrailers with two axle groups, the TCOH convention must follow the example shown within Appendix A.

Tow Coupling Height

The Tow Coupling Height (TCH) must be shown for all units fitted with A-type couplings. The TCH must be measured from the ground to the centreline of the towing pivot.

Axle Spread for axle groups

The Axle Spread (AS) must be shown for all axle groups. Each AS must be measured from the centre of each axle. If layout space is constrained, consider providing an axle spacing table in lieu of individual dimensions.

Overall Length

The Overall Length (OAL) must be shown for the combination. The OAL must be measured from the front end of the combination to the rear end of the combination. The OAL must include all protrusions, tapers, and profiles.

Overall Height

The Overall Height (OAH) must be shown for the combination. Where required, separate OAHs can be shown for each vehicle unit if different height limits apply. The OAH must be measured from the ground to the highest point of reference.

Payload related dimensions

All payload related dimensions must be shown for all load carrying vehicles. These dimensions are dependent on the vehicle body type. These include but are not limited to:

- Payload heights, measured from the ground
    - For all heaped loads, the base of the heap must also be shown.
- Body heights, measured from the ground
- Deck heights, measured from the ground
- Floor heights, measured from the ground
- Barrel heights, measured from the ground
- Twist-lock heights, measured from the ground
- For drop-deck/step-deck vehicles
    - Either the load-carrying length for each deck must be shown, or a weighted average deck height must be shown.

For dimensions that allow a weighted-average value, this must also be indicated on the drawing or provided within an annotation, and must be included as a condition in Part B for the certifier to calculate and confirm.

Other features affecting vehicle performance

All other features affecting vehicle performance must be included on the drawing.

These include but are not limited to:

- Position of steerable and lift axles
- Axle group/single axle mass limits
- Axle configurations that deviate from the norm e.g. mix of driven and undriven axles in the drive group, drive steer axles, etc.
- Tyre configurations that deviate from the norm e.g. single tyre arrangement, mixed tyre arrangement, etc.
- Position of any innovative features e.g. i-Corner, self-tracking axles, etc.

Interrelationships of parameters on drawings

Interrelationships that apply to parameters shown on drawings must be clearly shown on the drawings. These interrelationships must also be included in the Part B.

Any interrelationships, regardless of them being on a drawing, must be in the Part B in the 'special requirements' section for certification purposes.

For example, when the front overhang of the prime mover is limited by the wheelbase of the prime mover.

Tolerances

Dimensional tolerances only apply for the purposes of certification, and all dimensions shown on the drawings must align with the PBS assessments and simulations conducted. If a tolerance is applied to a dimension during the PBS assessment stage, it must be reflected in the drawings. For certification purposes, the allowable tolerance is the lesser of 1% or 20mm for a given dimension.

Grandfathering

Previously accepted drawings not conforming to this protocol will continue to be accepted – Assessors are not required to amend existing drawings.

When modifying previously accepted drawings, these drawings are considered new and therefore must conform to this IPAC.

Contact

This IPAC was produced by the PBS Design Team, for queries please email pbsdesigns@nhvr.gov.au.

IPAC-23: Revision history	
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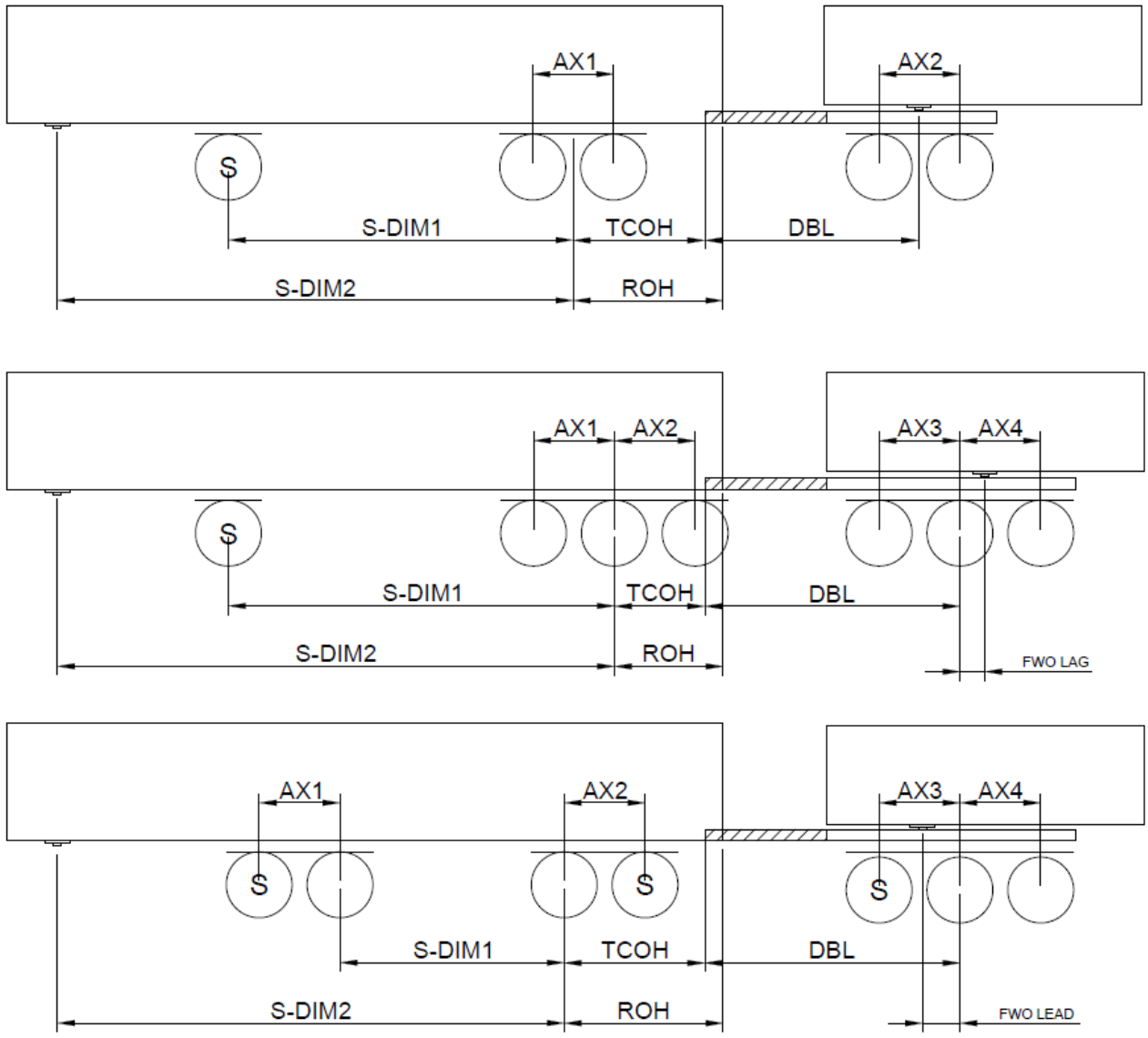
Appendix A – Semitrailer with two axle groups drawing dimensions



Note:

1. *Dimension layout is indicative for informative purposes only.*
2. *"S" denotes a steerable axle.*
3. *DBL is always measured from the tow eye to the centreline of the dolly axle group*