

Guidance Document

G347

Platform Accessibility Humps



**Please read the Written Notices
attached to this standard**

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1 Purpose

- 1.1 The purpose of this document is to provide guidance and advice on the experiences gained in the installation and development of platform humps, and to set out the options to deliver platform humps into service.
- 1.2 Note that platforms on the LU network have been constructed over many years using a variety of materials and sub-structures. The importance of thorough investigation prior to works is stressed highly.
- 1.3 Larger numbers of people with restricted mobility are using London Underground, for example, those with luggage or pushchairs and those who find it difficult or impossible to use escalators or stairs. Thirty million journeys per annum are made by those who are visually or mobility impaired.

2 Scope

- 2.1 This Guidance applies to platforms on the London Underground network. LU Category 1 Standard S1131 "Premises – Station Platforms" Section 3.8 titled Accessibility Humps defines the requirements for accessibility humps on LU platforms.
- 2.2 Standard S1131 "Premises – Station Platforms" Clause 3.8.2 refers to this guidance for the location of humps on platforms. Information is in Section 4.2 of this document.
- 2.3 Reference must be made to LU Category 1 Standard S1156 "Gauging and Clearances" Section 5.3.2 titled Level Access. Where reasonably practicable full-length level access shall be provided in compliance with the Railway Vehicle Accessibility Regulations (RVAR). Level Access shall be achieved by either change of Rolling Stock floor heights or adjustment to station platform heights, as far as platform construction and track renewal permit.

3 Guidance

- 3.1 London Underground has an obligation in accordance with the Railway Vehicle Accessibility Regulations (RVAR) 1998/2010 to meet defined levels of accessibility. This involves providing step free access from street level to platform and also from platform to train.
- 3.2 Several solutions exist which meet the requirements for step-free access between platform and train. These solutions are:
 - a) New rolling stock to match standard platform height for line;
 - b) Changes to track height to match sill height of rolling stock;
 - c) Changes to platform height to match sill height of rolling stock across whole of the platform;
 - d) Where platforms are non-compliant by minor horizontal gaps 10-15mm between Rolling stock floor and platforms it is proposed that a trial of hard mini rubber filler be used fixed to the platform edge.
 - e) Changes to platform height to match sill height of rolling stock across part of the platform (Nosing stone realignment or Platform 'humps').
- 3.3 Solution (a) is clearly only applicable where new rolling stock is planned to be introduced onto a line in the foreseeable future.

- 3.4 Solution (b) is most applicable to a ballasted track form where, for example, track is being relayed in the near future. Track can be replaced at a higher or lower level to match the sill height of the rolling stock.
- 3.5 Solution (c) - having level boarding along the whole train - is preferable to localised humps as passengers benefit from level access along the length of the train. This can also assist with boarding and alighting times. It may be possible to achieve this solution by raising the front edge only and providing a fall to the rear of the platform.

Note: Recently it has been found that this solution can create communication issues if other platforms on the same line have humps – e.g. Jubilee line at Green Park. Issue being reviewed and may be resolved with platform-based signage.

- 3.6 Solution (e) – humps - should only be considered if solutions A-C are not possible. Typical hump details are shown in Appendices 1 and 4.
- 3.7 This manual concentrates on the provision of platform humps when chosen as the means of creating step-free boarding of trains. In this respect, RVAR requires the step from platform to train not to exceed 50mm vertically and 75mm horizontally. In curved track platforms this may not be possible due to the geometry of the train.
- 3.8 For clarification, this document does not deal with compromise height platforms. Platforms are classified according to their current access type e.g. Level, Oversail or Compromise.

4 Accessibility Strategy

- 4.1 London Underground's line upgrades identify the optimal "Wheelchair Accessible" cars for each line. This dictates where a hump should be located or platform modifications are required on each platform.
- 4.2 In summary these are:

Line	Car	Doors	No. of wheelchair spaces
Northern (95TS)	5 Northbound, 2 Southbound	2 Centre doors	2 per car. 4 total per train. 2 in use at any one time.
Central ¹ and W&C (92TS)	Normally 4 and 5. Further humps unlikely to be required until fleet replacement.	End and adjacent centre doors	Wheelchair spaces unlikely to be fitted.
Piccadilly ² (67TS)	Car 5 Eastbound, Car 2 Westbound	2 centre doors	2 per car. 4 total per train. 2 in use at any one time.
Bakerloo	To be decided	To be decided	To be decided
Jubilee	5 & 6 Northbound/Westbound 2/3 Southbound	2 Centre doors	1 per car. Total 2 per train. 2 in use at any one time.
Victoria	4 and 5	Both sets double doors on cars 4 and 5 plus the two single doors in between (on the car 4/5 join)	2 per car. Total 4 per train. Hump installation complete (except Pimlico – exemption in place).

'S' Stock	8 car – Cars 4 and 5 7 car – Cars 3 and 4	3 rd door Car 4, 1 st door Car 5. Doors 4.3 and 4.3 and Doors 3.3 and 4.1 in opposite direction. (3 doors compliant).	Platform modifications in progress for S8 and S7.
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Note ¹ TCR has been designed with a platform hump in this location on the Central Line.
² Some stations require 2 humps to align with both cars e.g. Heathrow T4, T123) since these stations operate as “terminus” stations where the “in service” wheelchair spaces change from one car to the other.

5 Conceptual Design Considerations

5.1 Size and location of hump

- 5.1.1 The concept of platform humps is to provide a level platform for boarding on and alighting adjacent from trains at designated train door positions. To do this, the hump must be at least as long as the distance between the designated doors plus an allowance for the stopping position tolerance of the train.
- 5.1.2 It is important that this stopping position and tolerance is established early in the concept design as it significantly influences the size and gradient of the access ramps either side of the hump.
- 5.1.3 Although some stations have stop markers to indicate where the front of the train should stop, trains do not always stop at this location. For this reason, it is important that a sample of stopping positions is monitored and recorded to verify the average stopping position of the train. This position, in conjunction with the designated accessible car and train vehicle dimensions, will enable the designer to effectively locate the ramp along the platform. Vehicle dimensions are available from Train Systems Engineers.

Note: It should be noted that there is the possibility of the single train doors of adjacent carriages will open onto the ramp, rather than the raised portion of the hump.

5.2 Height of Hump

- 5.2.1 The height of the hump is dictated by the height of the existing platform relative to the known floor height of the train. Although RVAR regulations require a maximum vertical step of +/- 50mm, it may not be possible to achieve consistently level access to/from the train due to the suspension travel of the rolling stock. For this reason, the height of the hump needs to be set to accommodate the full extent of travel from crush to tare load.
- 5.2.2 Where possible, the step should always be up into the train (passenger behaviour is conditioned to always expect a step up when boarding a train). Conversely, a step up out of the train will result in an unexpected trip hazard for passengers alighting from the train.

Note: LU Cat 1 Standard S1156 A7 "Gauging and Clearances" Section 3.2 Level Access, Clause 5.3.2.9 states "The height of the Level Access Boarding Point (LABP) is dictated by the height of the existing platform relative to the known floor height of the train. The height of the LABP shall be set to accommodate the full extent of suspension travel from crush to tare load, and the step shall be up into the train for as much of the suspension range as possible. Permitted limits on wear of the rail and the effect of maintenance processes, e.g. tamping, shall also be considered in determining the height of the LABP."

- 5.2.3 A further factor to be considered in determining the height of the hump includes the permitted limits on the wear of the rail. Guidance should be sought from Track discipline engineers.

5.3 Offset of hump

- 5.3.1 RVAR regulations require the horizontal gap between train and platform to be no more than 75mm and there are two primary factors to be considered. These are:

- track curvature
- existing alignment

Clearly, this offset is related to the loading gauge of the route. Guidance should be sought from Track discipline engineers and reference made to Cat 1 Standard 1-156 "Track Clearance".

5.3.2 Curvature

If the hump is located on straight track, a stepping distance of less than 75mm can be achieved. On curved track where allowances have to be made for the end and centre throw of the coach, a compliant stepping distance should be achieved wherever possible depending on the degree of curvature. In these cases, the best achievable stepping distance should be identified during the design development process. Where it is not possible to meet the requirements of RVAR other mitigations may be possible (See S1131 Premises – Station Platforms Table 1).

5.3.3 Existing alignment -

The design alignment of platform humps is dependent on the alignment of the adjacent track and, when the track is new or has a significant residual life, the hump should be aligned parallel to the running edge of the nearest rail. However, if the track is likely to be replaced in the foreseeable future, the hump should be aligned to an approved design alignment of the new (future) track. Both situations ensure that the hump will not need modifications in the future or compromise forthcoming track works.

5.4 Ramps to humps

- 5.4.1 Ramps are required to access the humps from the existing platform surface and often from access passages to the back of the platform.

- 5.4.2 Ramps on platforms should be no steeper than a gradient of 1:20.

Ideally, the step out of a train door should be onto a level surface. However, stepping out onto a ramp is acceptable as long as the advised gradient of the ramp is not exceeded.

- 5.4.3 Ramps in access passages (adits and cross passages) should have a maximum gradient of 1:20, however this may not always be practical and steeper gradients may be necessary for short distances. Each case to be judged on its merits and the submission of a concession may be necessary.