Concrete Step Barrier Design Guidance
Dual Concrete Step Barrier (CSB)

DRAWINGS CSB/1000 CSB/1002 CSB/1008

APPLICATIONS

- **Lighting columns**
- **Adjacent to structures**
- **Level difference between carriageways**
- **Bifurcation**

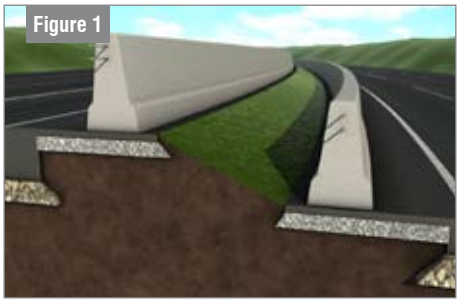
Design Guidance Notes

When equipment is located within the central reserve and space allows, the preferred solution is to provide a pair of standard CSBs either side of the obstructions. Dual barriers are also generally cheaper to construct than a Wide Concrete Step Barrier.

Dual barriers can also be a cost-effective alternative to the variable CSB (VCSB).

Dual CSB (or VCSB) may still be necessary in central reserves, even if there are no hazards to protect (see TD19[1] CL 3.63 and Fig 3-2). Typical layouts for dual barrier arrangements are shown on Drawing CSB/1008.

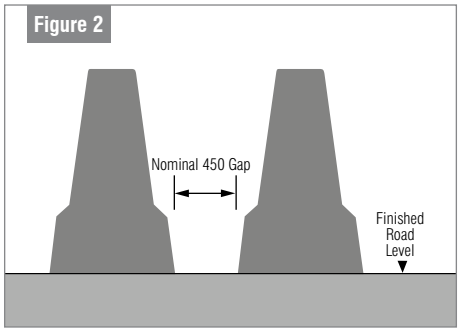
Figure 1



Dual barrier to accommodate level differences

The recommended layout consists of two standard profile concrete step barriers with a nominal minimum 450 mm wide maintenance access corridor between barrier bases (Figure 2). The minimum central reserve width for this layout is given in Table 1. The width of this access corridor should be determined with regard to the type and frequency of access required, activities to be undertaken in this zone, obstructions in the corridor e.g. lighting columns, and available space.
When a 450 mm wide access corridor is not achievable, standard profile moulds can still be used to provide dual barriers with a minimum separation of 150 mm (Figure 3).

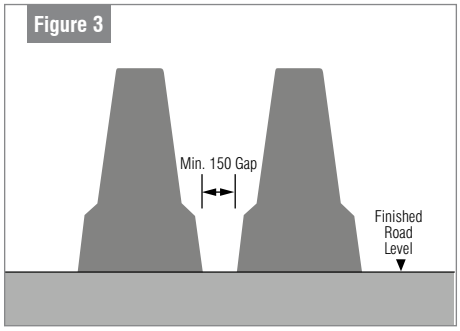
Figure 2



Dual barrier with nominal gap

This option could be used, for example, to accommodate a level difference between carriageways without use of a variable profile mould (Figure 4 overleaf).

Figure 3



Dual barrier - minimum separation for standard mould

Treatment of the area between the barriers requires consideration to avoid accumulation of debris and to ensure adequate drainage. The space between the barriers can be in-filled (e.g. with mass concrete) to avoid these issues. If no infill is provided, weep holes, typically 75 mm in diameter at a spacing of 20 m, should be provided to drain the area between the barriers. However, drainage measures should be determined by the designer on a site-specific basis.

The chosen solution for dual barrier in respect of layout, access, infill and drainage should minimise the requirement for any future maintenance in the central reserve.
When the 150 mm separation is not achievable, use of a zero clearance mould allows construction of dual barriers with the second barrier abutting the first (Figure 5). As before, the space between barriers can either be in-filled or provided with weep holes.

[1] TD 19 Requirements for Road Restraint Systems
[2] TD 27 Cross-Sections and Headroom

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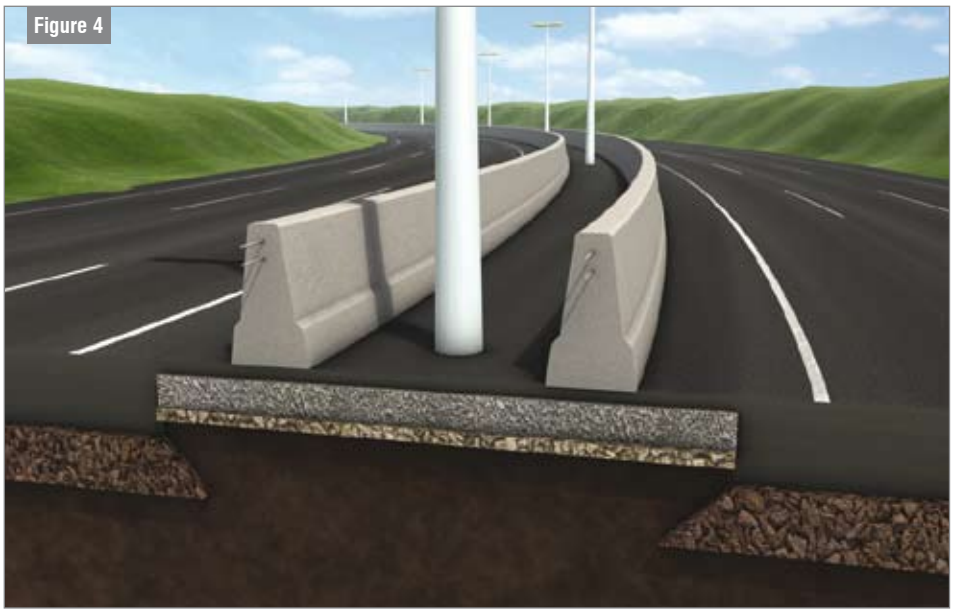
Figure 4

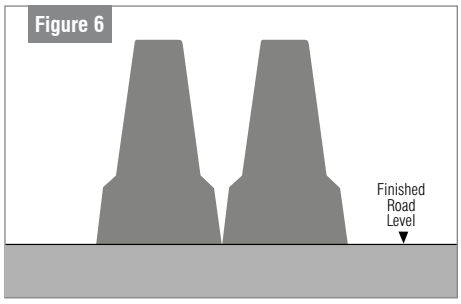


Dual barrier with lighting columns

Figure 5

Weep holes to drain area in between barriers

Figure 6



Dual barrier with "Zero Clearance"

Construction of the zero clearance option is not preferable and only possible with a specific mould.

Based on a standard minimum set-back dimension of 1.2 m from each carriageway, the minimum central reserve widths required for each layout are given in Table 1.

*Refer to TD 19[1] Figure 3-3. Minimum distance based on 1.2m set-back (TD 27[2]) and W2 Working Width Class of CSB. Lower minimum values may be attained with reduced set-back and/or Departures from Standard.

Table 1: Minimum spatial requirements for CSB in central reserve

Layout	Minimum distance between trafficked edges (m)*
Parallel standard profile CSB, 450 mm access corridor	3.934
Parallel standard profile CSB, 150 mm clearance	3.634
Back-to-back CSB, zero clearance	3.484

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