

PT2 – Bus Stops

Bus Stops	1	Amendments:
Placement & Location	2	
Layout	3	
Shelter or No Shelter	5	
Locating Shelters on Footways	7	
Key Dimensions	8	
Bus Boarder	9	
Bus Box	10	
Bus Stop Kerbs and Bus Laybys	11	
Turning Circles	12	

Bus Stops

Design principles

- Well located, serving trip origins and destinations and linked to walking / cycling corridors.
- Appropriate for the local context.
- Safe – protected from moving traffic.
- Secure – well lit and offering natural surveillance (or CCTV) and well maintained.
- The immediate bus stop environment and routes to the stop accessible to all.
- Informative – offering travel information and timetables.
- Well laid out with appropriate facilities for buses and passengers (e.g. Lighting, seating, litter bins, etc.)
- Ironworks should not be placed in the wheel track of a bus i.e. within 12m of the approach to the bus stop and 5m after the bus stop.

Bus stop at entrance to Waverley Station



The City of Edinburgh Council

Bus stop layout on Princes Street.



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Relevant Factsheets:

Soft Segregation : Integration with Bus Stops (C3)

Hard Segregation : Integration with Bus Stops (C4)

Cycle Lanes: Integration with Bus Stops (C2)

Street Furniture (F1)

Placement & Location

The placement of bus stops dictates how useful they are to the areas and destinations they serve. It also determines how well bus stops integrate with other street functions such as building frontages, parking and pedestrian crossings.

Design principles

- Bus stops should be spaced approximately every 400m along a route, although closer spacing may be appropriate in town centres or to meet special needs (e.g. sheltered housing complex). If the existing spacing does not align with this guidance, designers should consider altering it in consultation with key stakeholders.
- Bus stops should be located at or near road junctions (or other pedestrian/cycle routes) to maximise route choice to the stop. This placement can help buses enter/exit the stop without being impeded.
- All new stops require consultation with nearby residents and businesses. Stops should not obstruct frontages, the use of shop blinds, or impact on key views.

- Bus stops must have adequate space for waiting passengers. Usually a shelter will be required. The space needed will depend on likely demand for the stop, but should be balanced with pedestrian flow on the footway and any cycle infrastructure.
- Bus journey times are affected by the number of stops on a route, so a careful balance must be achieved.
- Bus access to stops should not be obstructed by trees which must be considered when drawing up the landscaping design. Trees should also not be planted where they will grow over shelters or obscure bus stop flags.

Service frequency

- Where more than 25 buses per hour serve a location, consideration should be given to splitting bus stops (in consultation with operator(s)). This enables buses on different routes to serve separate stops.
- Bus routes with common destinations should share the same stop.

Relevant Factsheets:

Bus Priority: Signalised Priority (PT3)
Street Trees (F5)

Access to Bus Stops

The accessibility of the whole journey should be considered. Adequate dropped kerb crossings and/or controlled crossing facilities within 50 metres of the stop should be considered as part of any bus stop improvements.

Where possible, crossings should be sited upstream of a Bus Stop. Pairs of Bus Stops should therefore be staggered, so that both are downstream of a single crossing. This arrangement means passengers do not have to cross in front of the bus, and the buses' departure is not delayed by passengers who have alighted.

Split bus stops on Princes Street



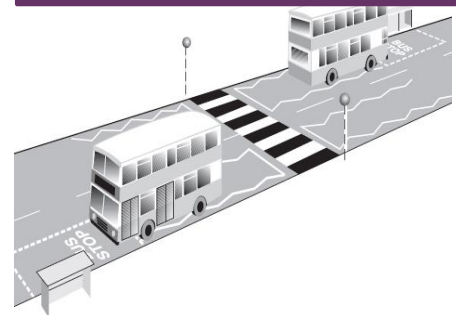
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Bus Stop Assessment Process

Once installed, a bus stop is considered a permanent fixture so should be positioned appropriately from the outset. Moving bus stops will only be considered if there would be clear benefits for passengers or the bus service.

Edinburgh Council's Public Transport team has an established mechanism for considering new or relocated Bus Stops, which must be followed in all cases. Details can be obtained from the Council's Public Transport team.

Image: CEC Bus Friendly Design Guide



Crossings (G4)

Bus Routes (PT1)
Bus Stops: Layout (PT2)

Layout

The layout of a bus stop will balance the needs of bus users and its impact upon the street/footway to ensure the stop environment is accessible to all users, and vehicles serving the stop.

Design principles

- Bus stops to incorporate a 2mx2m clear boarding area.
- Bus stop flag to be positioned at downstream edge of boarding area.
- The arrangement of the stop should result in passengers facing on-coming vehicles when waiting.
- Where street lighting is not sufficient, lighting should be provided for security and visibility of information at the stop
- Waiting passengers should be able to see the bus driver and vice versa
- Bus Stop infrastructure must not conflict with minimum sight distances. New road signs should not conflict with an existing bus stop – existing signs should be relocated.
- Adequate space should be provided downstream of the bus stop pole for waiting passengers to queue.

Utility access

Service covers should not be obstructed. No service covers should be present in the boarding area.

No stop furniture should be placed within 2m of an existing fire hydrant or obscure a fire hydrant sign.

Construction sequence in new developments

When development construction is based on several phases, after completion of the first phase and where possible, bus access should be facilitated without mixing with construction traffic during later phases.

Existing bus stops affected by nearby construction

Obstruction of passenger waiting areas and the boarding area by skips, scaffolding or other building equipment will not be permitted. Permits will not be granted in such circumstances.

Developers will be required to provide a re-sited temporary bus stop where absolutely necessary, restoring the original site on completion of the works.

During phased construction, bus access should be facilitated as soon as possible, without mixing with construction traffic during later stages.

Relevant Factsheets:

Placement & Location (PT2)
Locating shelter on footway (PT2)

Bus Boarders (PT2)
Bus Boxes (PT2)

Bus Stop Kerbs (PT2)
Bus Laybys (PT2)



The City of Edinburgh Council

**2m x 2m
boarding
area, free
of service
covers
and
obstacles**

Footway condition

The footway must be of sound materials in satisfactory condition, with no trip hazards

Where no made up footway exists, an area of hardstanding is to be constructed to accommodate the shelter and boarding area.

No stop is to be located where there is an unrestrained rainwater outfall at the rear of the footway.

A crossfall gradient of less than 4% (1 in 25) is suggested. Existing footways may need to be re-graded.

Any changes to footways should consider impact on drainage and adjacent properties.

Clear Footway Width vs Shelter Provision – Factors to Consider

- Pedestrian flow vs volume of waiting bus passengers
- Can a bus boarder be provided and what is the impact of this on cyclists?
- Can the footway be widened?

Clear footway width

Clear Walking Zone

3.0m	Preferred on <u>busy routes</u>
2.0m	Preferred
1.0m	Absolute minimum, exceptionally allowed if shelter <6m long

For existing bus stops where no work involving complete footway reconstruction is scheduled, the absolute minimum clearance between a bus shelter and the rear of footway is 1.0m.

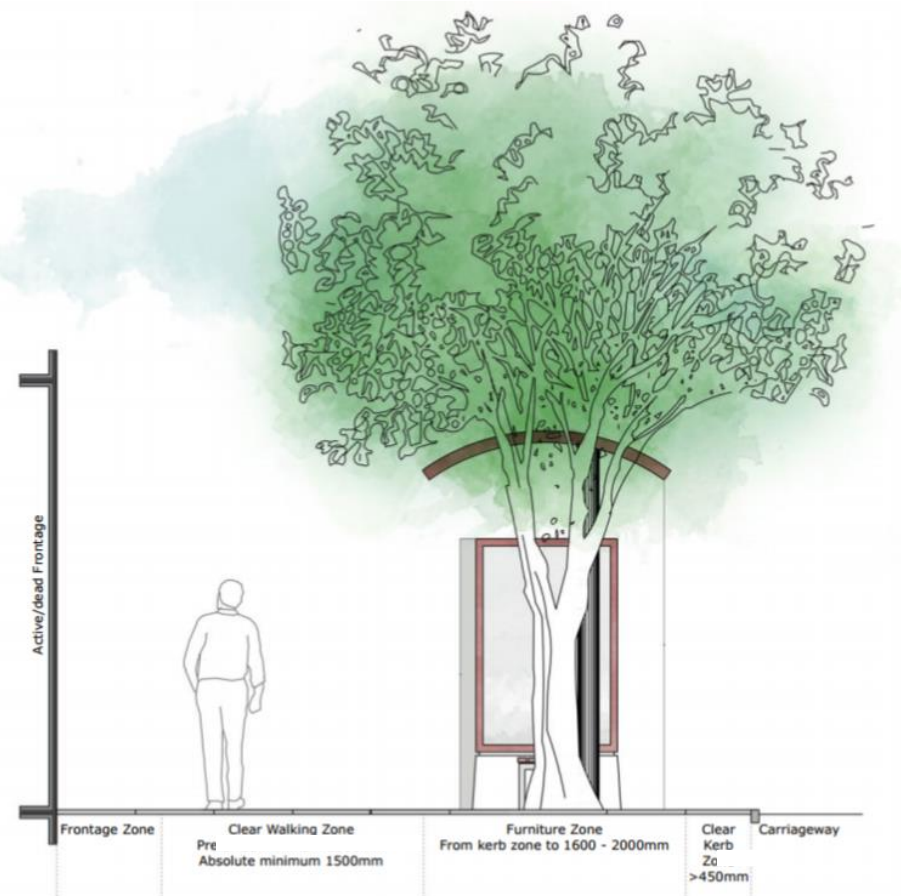
When footway construction is scheduled, every effort should be made to increase this figure towards the desirable design standards, whilst taking account for other factors, including provision for cyclists and bus priority.

Relevant Factsheets:

Placement & Location (PT2)
Locating shelter on footway (PT2)
Street Furniture (F1)

Bus Boarders (PT2)
Bus Boxes (PT2)

Bus Stop Kerbs (PT2)
Bus Laybys (PT2)



Shelter or No Shelter?

Shelter or no shelter?

Shelters for waiting passengers should always be provided unless there is no space, or minimal demand for waiting (see below).

Shelters should not be provided where the minimum clear footway width cannot be achieved, or (generally) if the 2mx2m boarding area would be impeded.

Footway widening or provision of a bus boarder should be considered before concluding a shelter cannot be provided.

Stops which are predominately used for disembarking (usually outbound stops) may not require a shelter.

Bus stop without shelter

Compulsory components:

- Pole with a flag
- Travel information
- Lighting (if existing street lighting is not adequate)
- An area of hard standing at boarding area (2mx2m)

The pole and flag should be located on downstream edge of the boarding area – providing an aiming point of the driver to stop at.

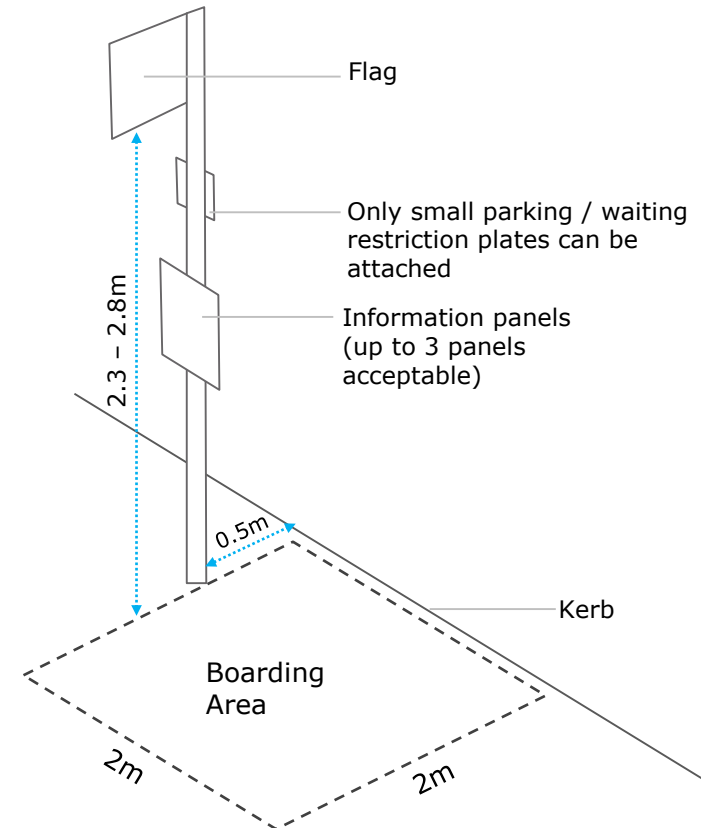
Depending on the bus's approach to the stop (i.e. Angled rather than straight on) clearance of bus stop infrastructure from kerb may need to be greater.

Optional components:

- Bus Tracker (real time passenger information)



Images: The City of Edinburgh Council



Relevant Factsheets:

Placement & Location (PT2)
Bus Boxes (PT2)

Bus Boarders (PT2)
Bus Laybys (PT2)

Bus Stop Kerbs (PT2)

Bus stop with shelter

Compulsory components:

- Shelter (appropriate size and type)
- Seating or perches (if min footway widths allow)
- Roof pole with a flag
- Travel information
- Lighting (if existing street lighting is not adequate)

Optional components:

- Bus Tracker (real time passenger information)

Key considerations:

- Shelters are to be glazed (with the exception of advertising panels) to provide inter-visibility between the inside and outside of the shelter.
- Shelter should not obscure views of nearby amenities, particularly cash dispensing machines or night safes.
- Bus stop infrastructure must not be able to be used to gain access to adjacent properties (i.e. Consider the relationship between the roof and adjacent windows/roofs etc).

Types of shelter

Single sided (cantilever)



- Narrow profile (front panel only) will minimise obstruction to the footway.
- Provides limited shelter to passengers, particularly in exposed locations.
- To be used where available footway width prevents use of other shelter types.

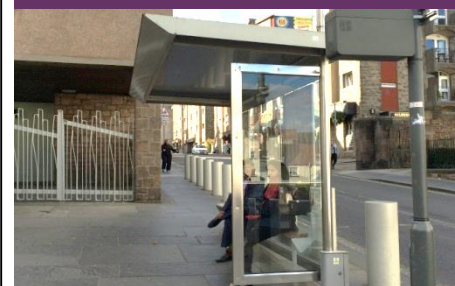
Semi- enclosed

Full width



- Shelters with a roof and one or two end panels.
- End panels can be full or partial width.
- Provide adequate shelter to passengers and are easily accessible.
- Preferred option in most locations.

Partial width



Fully enclosed

Fully enclosed



- Shelter with a roof and four sides.
- Must have at least two access points.
- Provide good shelter in exposed locations.
- Limitations on access mean they should only be used where a semi-enclosed shelter would provide inadequate protection to passengers.

Images: The City of Edinburgh Council

Relevant Factsheets:

Placement & Location (PT2)
Bus Boxes (PT2)

Bus Boarders (PT2)
Bus Laybys (PT2)

Bus Stop Kerbs (PT2)

Locating Shelters on Footways

There are three potential arrangements for bus shelters in relation to a bus stop and location on a footway:

- Back to the kerb
- Centre of footway
- Back of footway

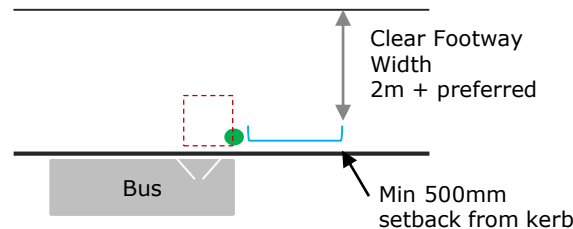
The most suitable arrangement at each location will depend on:

- Footway width
- Pedestrian flow on footway
- Adjacent frontage characteristics
- Orientation in relation to prevailing wind/weather

In all cases the absolute minimum clear footway width below must be achieved.

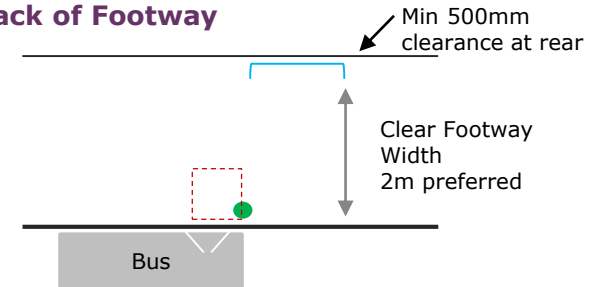
Clear footway width	
3.0m	Preferred on <u>busy routes</u>
2.0m	Preferred
1.0m	Absolute minimum, exceptionally allowed if shelter <6m long

Back to the kerb



Preferred option for NARROW footways (less than 3.3m)

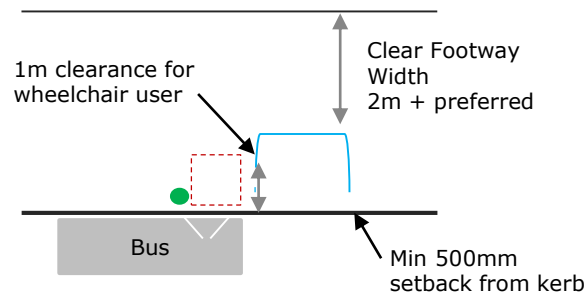
Back of Footway



Preferred option for footways between 3.3m and 4.5m where:

- There is no active frontage (walls, hedges, etc.)
- There is a high pedestrian flow on footway

Centre of Footway



Preferred option for WIDE footways (more than 4.5m)

Legend

	Kerb
	Back of Footway
	Boarding area
	Pole & Flag
	Shelter
	Bus

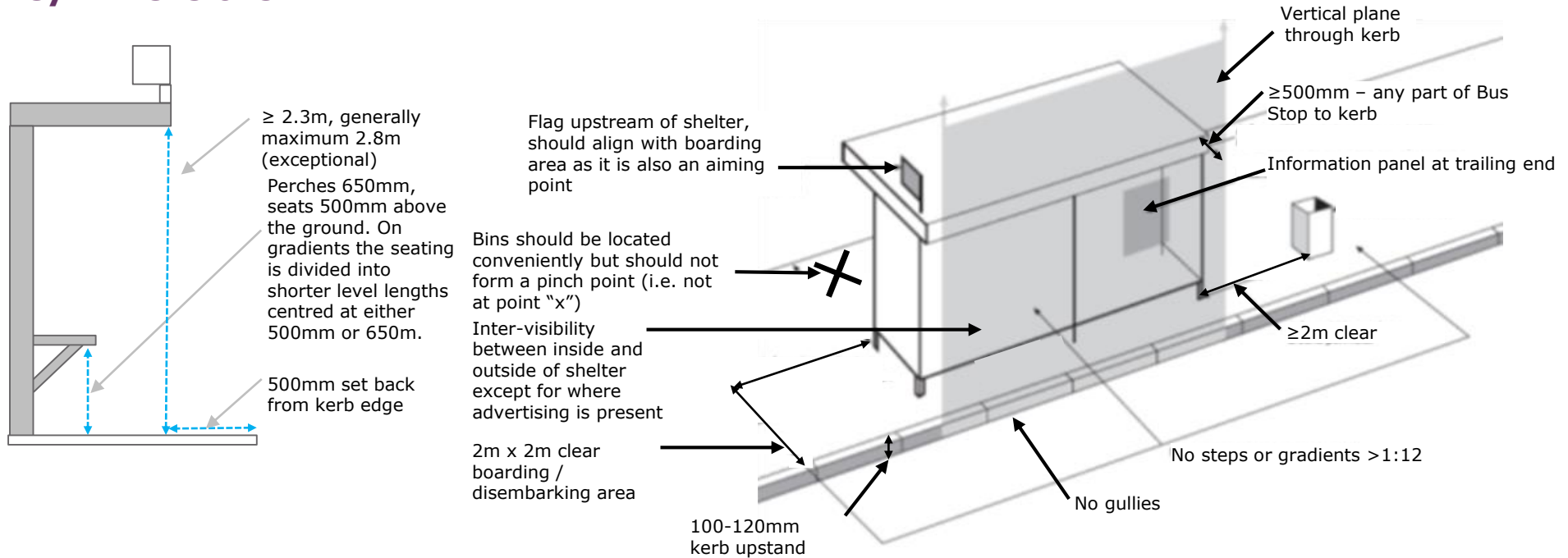
Relevant Factsheets:

- Placement & Location (PT2)
- Segregated Cycle tracks: Integration with Bus Stops (C4)

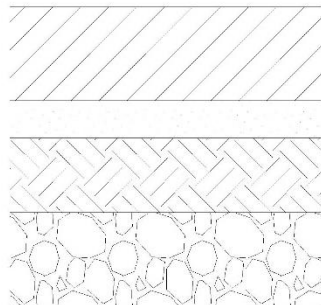
- Bus Boarders (PT2)
- Bus Laybys (PT2)

- Bus Stop Kerbs (PT2)
- Bus Boxes (PT2)

Key Dimensions



Strengthened carriageway make up at bus stops



Surface course: 150mm thick 55/10 F surf 40/60 des

Binder course: 60mm thick AC 20 dense bin 40/60 rec

Base course: 120mm thick AC 20 dense bin 40/60 rec

Sub-base: 80 - 150mm thick Type 1 Mixture

Relevant Factsheets:

Segregated Cycle Tracks: Integration with Bus Stops (C4)
Bus Stop Kerbs (PT2)

Placement & Location (PT2)
Bus Boxes (PT2)

Bus Boarders (PT2)
Bus Laybys (PT2)

Bus Boarder

Bus boarders are built-out footways, (usually between on-street parking bays) offering an advantage to bus services by:

- Allowing buses to approach the stop straight-on.
- Improving boarding/alighting with a platform.
- Providing a wider footway near a stop.
- Reducing the length of protection from obstruction required for the Bus Stop approach.

All boarders:

- Should facilitate provision of a shelter at the stop (on or off the boarder).
- Should be protected with a bus box.

Boarder width

Narrow boarders (<2m) are to be installed by exception only, noting the risk that:

- Parking may not be deterred, and vehicles may encroach on carriageway.
- Buses may have difficulty stopping adjacent to boarding area.

Boarder length

- Boarders should be no longer than necessary (generally 3-5m), to mitigate loss of parking capacity.
- The relative benefits of placing the shelter on the boarder (reducing obstruction to the footway but requiring additional length) should be considered.

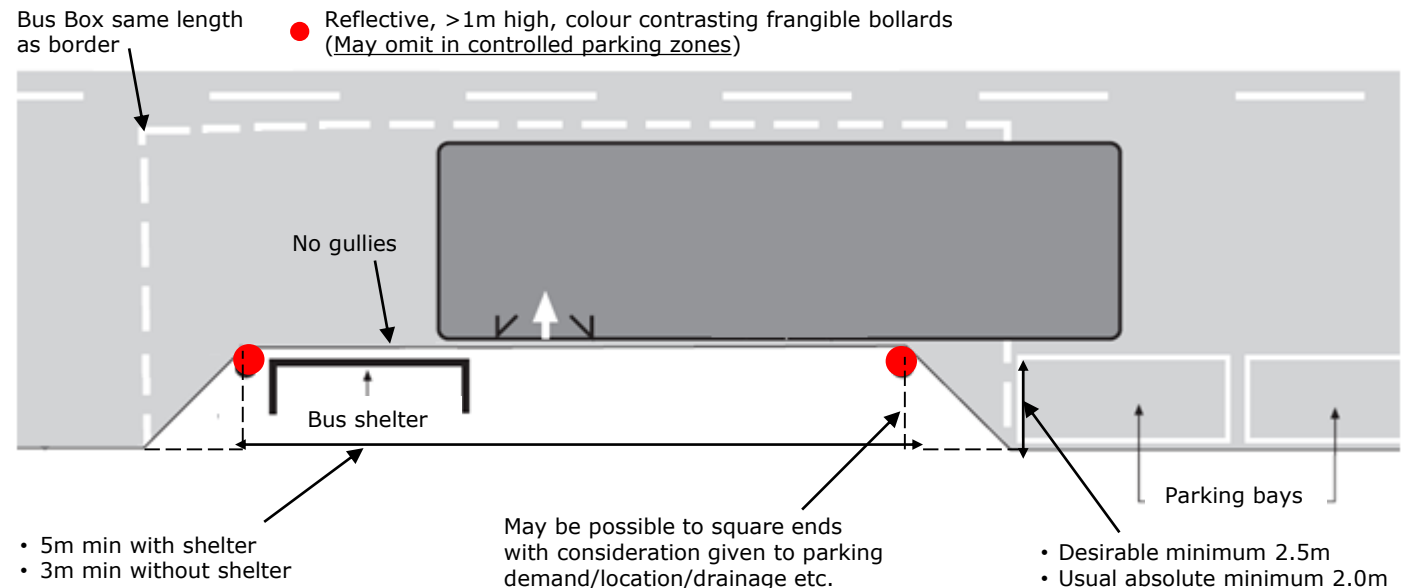
- On routes where buses with a middle door operate, boarders should be an appropriate length to accommodate them.

Boarder and cyclists

- Boarders should not break or obstruct a cycle lane.
- Consider a 'floating bus stop'.



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Relevant Factsheets:

Soft Segregation: Integration with Bus Stops (C3)
 Hard Segregation: Integration with Bus Stops (C4)
 Cycle Lanes: Integration with Bus Stops (C2)

Bus Boxes (PT2)
 Bus Stop Kerbs (PT2)
 Placement & Location (PT2)

Bus Box

A bus box indicates and protects the area of carriageway to ensure a bus can approach, straighten up, stop and exit a bus stop.

- Buses should be able to pull up within 200mm from the kerb.
- Bus box locations are calculated relative to the bus stop 'aiming point' – the boarding area and bus stop flag.
- Bus box marking should be renewed as part of regular road maintenance.

Recommended dimensions

- Marked according to TSRGD Diagram 1025.1.
- Maximum length 37m, and generally no less than 19m dependant on alignment on approach/exit (see Bus Boarders).
- Standard 25m bus box suitable for a single stop only. Where service frequency demands two or more stops, the box should be extended accordingly to ensure approach and exit manoeuvres are accommodated.

- Consider extending box upstream if it is expected to be common for 2 or more buses to queue.
- Usually 3m wide, minimum 2.7m (by exception).

Shorter boxes at junctions and crossings

Where a bus stop is sited immediately upstream or downstream of a pedestrian crossing, road junction, or similar feature, the crossing/zigzags and other parking restrictions may protect the bus stop exit or approach from parked vehicles, allowing a shorter bus box to be provided.

'No Waiting' parking restrictions (Single/Double Yellow lines) must be accompanied by a 'No Loading' restriction if a shorter bus box is to be considered.

Relevant Factsheets:

Soft Segregation: Integration with Bus Stops (C3)
 Hard Segregation: Integration with Bus Stops (C4)
 Bus Stop Kerbs (PT2)

Example of a standard mid link bus box



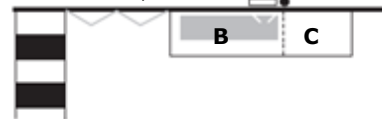
Standard Bus Box

A = 7.6m, B = 13.4m, C = 4m, A + B + C = 25m

Examples of Bus Box Approach Protected by Other Features (Equivalent to 25m box)

Pedestrian crossing > 14m upstream

B = 13.4m, C = 4m



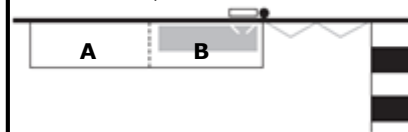
Side road > 14m upstream

B = 13.4m, C = 4m



Pedestrian crossing > 10m downstream

A = 7.6m, B = 13.4m



Side road > 10m downstream

A = 7.6m, B = 13.4m



Key

A = bus box approach

B = bus box centre

C = bus box exit

Front boarding area

Bus

Pole



Cycle Lanes: Integration with Bus Stops (C2)
 Placement & Location (PT2)
 Bus Boarder (PT2)

Bus Stop Kerbs and Bus Laybys

- Standard kerb height at bus stops: 100-120mm
- All buses on the network 'kneel' as standard operating practice and a 100mm upstand gives a gradient of 1:8 on the bus.
- Standard kerb profiles & types to match adjacent sections is preferred.
- Footway crossfall should be <math><1:25</math>. If this cannot be achieved, regrading of the footway or alternative drainage solutions should be considered .
- Carriageway crossfall should be c.2.5%. If this cannot be achieved, regrading of the carriageway should be considered.

Special Bus Stop Kerbs

Special bus stop kerbs (i.e. Kassel kerb) are no longer used in Edinburgh as they can cause issues with bus ramps. Any existing installations should be replaced during planned renewal works.



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Bus Lay-bys

Bus lay-bys can be useful on high speed roads or where buses need to wait at the terminus of a service. However they make it difficult for the bus to re-join traffic, resulting in delays.

Consequently there is a presumption against placing bus stops in laybys other than in exceptional circumstances, particularly at timing / terminating points or on high-speed rural roads. Similarly, there is a presumption in favour of removing bus laybys as part of projects affecting an existing layby.

Relevant Factsheets:

Layout (PT2)

Bus Boarder (PT2)

Turning Circles

Bus turning circles are used at bus route termini to allow buses to turn around for a return journey.

Where possible, consideration should be given to providing welfare facilities for bus drivers (e.g. toilets).

Turning circles should be constructed with high specification hot rolled asphalt surfacing on the running lanes. Monoblocks or similar materials are not recommended to be used in the running lanes due to insufficient strength.

Individual layouts are determined by the area available and the size of buses that use the terminal/turning circle.

Where more than one service is likely to use the turning circle, there should be sufficient width to allow a bus to overtake a parked bus.

There should be an area provided where a bus can park parallel to the kerb enabling boarding/alighting from the vehicle.

Where possible, consideration should be given to allowing access from all directions. This will mean that the turning circle can be used more flexibly.



Contact the Road Construction Consent team for a detailed discussion.

Image References

Bus Stops

Bus stop at entrance to Waverley Station: The City of Edinburgh Council

Bus stop layout on Princes Street: The City of Edinburgh Council

Placement & Location

Split bus stops on Princes Street: The City of Edinburgh Council

Layout

Boarding area at Princes Street bus stop: The City of Edinburgh Council

Shelter or No Shelter?

Pole with flag: The City of Edinburgh Council

Bus Tracker: The City of Edinburgh Council

Bus stop with shelter

Cantilever: The City of Edinburgh Council

Full width: The City of Edinburgh Council

Fully enclosed: The City of Edinburgh Council

Partial width: The City of Edinburgh Council

Bus Boarder

Bus Boarder: The City of Edinburgh Council

Bus Stop Kerbs

Standard kerbs at Princes Street bus stop: The City of Edinburgh Council

Kassel kerbs at bus stop: The City of Edinburgh Council

Index

Subject	Page
Access to bus stops	PT2.2
Bus boarders	PT2.9
Bus boxes	PT2.10
Bus laybys	PT2.11
Bus stops	
Design principles	PT2.1-3
Footway	PT2.4
Kerbs	PT2.11
Layout	PT2.3
Placement and location	PT2.2
Bus shelters	
Dimensions	PT2.8
Location on footway	PT2.7
Shelter or no shelter?	PT2.5
Types	PT2.6
Bus stop assessment process	PT2.2
Bus turning circles	PT2.12
Carriageway Make up	PT2.8
Utility access	PT2.3