

# URBAN DESIGN PRINCIPLES

# UNDERPASSES



## UNDERSTANDING THE ISSUES

At grade crossings are preferred by pedestrians and cyclists as they provide continuity of route, minimum change of level, greatest visibility and perceived safety. Whenever possible, they should be chosen in preference to grade separated options. However, there are situations where this is not possible and an underpass provides the most suitable choice for a pedestrian and cycle link.

The issues usually associated with poor underpass design are related to personal safety, amenity (dark, uninviting and poorly maintained facilities), and the physical obstacle created by the change of level. These can be avoided by considering the underpass location and design in the early phases of a transport project. A well thought out and designed underpass can:

- // Make it easier and safer for people to cross the road. Reduce travel time for pedestrians and cyclists if the underpass provides a direct route.
- // Be easier to negotiate than an over-bridge due to smaller level difference.
- // Lead to positive outcomes for pedestrians, cyclists and road users alike.

## UNDERPASS DESIGN

The following principles should guide the location and design of underpasses:

- // **PLANNING:** Underpasses must be integrated in the planning of the wider transport project. They must have appropriate design and capital budgets. On-going maintenance costs must be factored into the design and benefit / cost ratio.
- // **INTEGRATION:** The underpass must be integrated with the wider transport network, for pedestrians and cyclists, and with the adjacent land uses. The design of the underpass must integrate with the landscape, stormwater and public art proposals of the wider transport project.
- // **LOCATION:** An underpass must be located to serve an identified desire line and it must be designed in a way that encourages people to use it; secluded locations should be avoided. There should be no time difference in travel via the underpass and the equivalent at grade crossings.
- // **SAFETY:** The walls of the underpass should not have recesses where litter might accumulate or someone might hide.

- // **ALIGNMENT:** Underpasses should offer a straight route so that one end of the underpass is visible from the other. Bends and angles in the underpass should be avoided as they create hidden places which encourage vandalism, crime and anti-social behaviour.
- // **SURVEILLANCE:** The design of an underpass should allow people to see activity within the underpass from the outside. Where possible the entrances of the underpass should be overlooked by adjacent buildings. CPTED principles should guide the design and location of underpasses.
- // **DIMENSIONS:** Underpasses should be as wide and high as possible to maximise light penetration, visibility and amenity. The tunnel effect should be minimised. To provide pleasing proportions, the underpass should have a height approximately two-thirds of its width.
- // **MULTI-MODE:** Underpasses should provide for multiple modes such as pedestrian, cycle and where possible car movement. As long as the safety of pedestrians and cyclists is not compromised, low speed car movement will add activity and surveillance in the underpass. Pedestrians and cyclists should be separated in the underpass due to their different travel speeds.

- // **LIGHTING:** Good lighting must be provided both inside and at the entrances of the underpass. Median skylights should be considered to provide daylighting midway through the underpass.
- // **APPROACH:** The paths leading to the underpass must be direct and straight so that the underpass is clearly visible. The underpass should be at grade with the surrounding land. If necessary, the road above should be elevated to minimise the change of level in the underpass. The approach ramps must be gradual enough to accommodate wheelchair users. Planting around the underpass entrances should not obscure sightlines to and from the underpass.
- // **MAINTENANCE:** Robust, long-life, vandal-proof materials and lighting should be used in the underpass to minimise maintenance.
- // **INTERIOR:** Murals, art, backlit advertisement boards and feature paving, lighting and surface treatment should be considered to create a pleasant environment in the underpass and should complement any external components.
- // **DRAINAGE:** A good drainage system must be provided to allow for satisfactory disposal of run-off and prevent flooding and pooling.



**APPROACH**



**LIGHTING**



**SURVEILLANCE**



**INTERIOR**