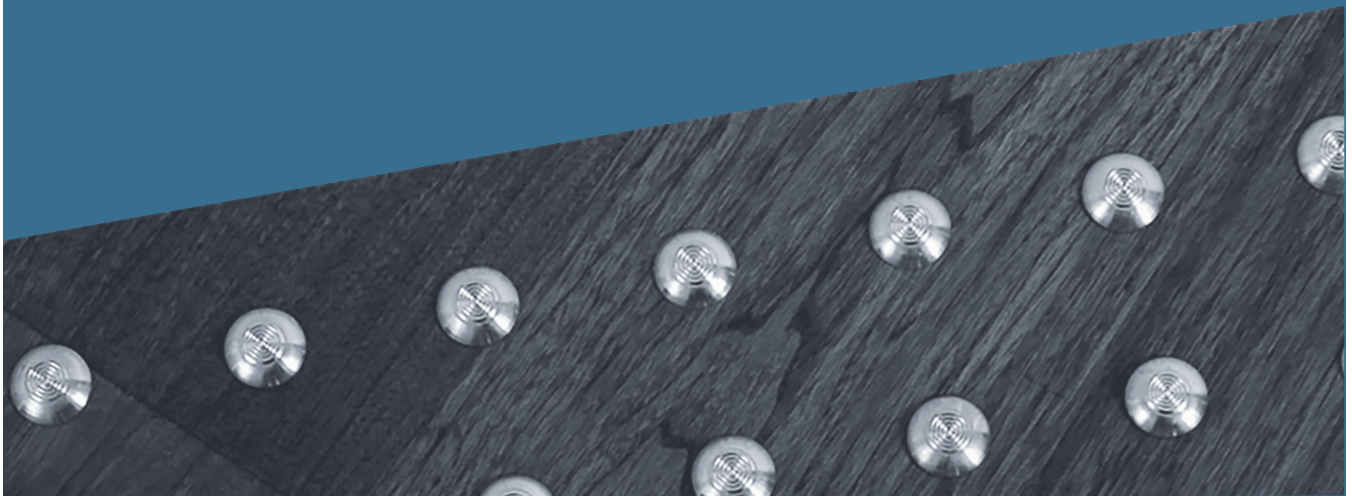




Clearing Our Path



Clearing Our Path

Creating accessible environments for people with vision loss.

Design Needs

The technical requirements within this document are derived from a number of sources including the National Building Code of Canada, CAN/CSA B651 Accessible design for the built environment, ISO/FDIS 21542 Building Construction – Accessibility and usability of the built environment and ISO 23599 – Assistive products for blind and vision-impaired persons – Tactile walking surface indicators. Please refer to these documents for more complete technical requirements.



Design Basics

Designers should consider four fundamental elements when creating built environments to meet the needs of people with vision loss: layout, lighting, colour/brightness contrast, and acoustics.

This section introduces the benefits and potential pitfalls of various planning strategies, as well as the importance of design consistency. Lighting types, styles and placement are reviewed along with concepts for using lighting as a means to support wayfinding and orientation. Colour and brightness contrast is introduced as a critical concept in making environments safer and more usable for everyone, which has a significant impact on many elements within a built environment.

Layout

People with vision loss can more easily memorize and become familiar with a space when it's logically planned and defined. This is especially important in public spaces (e.g., street networks, transit facilities and shopping areas, including individual stores).

Use a consistent, logical and straightforward layout for both the exterior and interior of any designed environment. The main entrance should be directly accessible from the principal routes of travel from sidewalks, transit stops, parking lots, etc. Ensure that paths of travel are safe, accessible and have distinct tactile qualities where pedestrian traffic crosses through large open areas (e.g., parking lots). Distinct colour contrast should also be used between paths of travel and adjacent ground surfaces. Reception areas should be located close to the main entrance of a building.

Large open areas (e.g., reception halls, courtyards and airport terminals) can be difficult for people with vision loss to traverse without losing their orientation. Within such areas, use tactile walking surface indicators (TWSIs) or a continuous strip of material that is texturally different as well as colour contrasted to the surrounding surface, to define a safe, detectable and direct route across open areas. Further information on tactile guidance surfaces is provided in the section Tactile Walking Surface Indicators.

A well-defined space uses straight lines and consistent right angles in its layout, thereby allowing people with vision loss to maintain their orientation. Hallways and pathways should be straight and turns should ideally be close or equal to 90 degrees.

The layout of floors should be identical or as close as possible to identical.

Consider the following strategies when planning building/floor layouts:

- Halls and washrooms should be in the same location on each floor so the information someone learns on one floor can be applied to another.
- Essential features, such as washrooms, elevators and staircases, should be grouped together, wherever possible, in one central area of the building.
- Stairs and elevators should be located close to each other.
- Men's and women's washrooms should be located next to each other and, if possible, accessed from the main circulation route.
- Washrooms should be available without having to go up or down a set of stairs.

Changing the layout of a public space can present a problem for regular visitors to a public space who have vision loss and should be avoided wherever possible. For example, the frequent repositioning of tables and store fixtures in grocery and department stores is frustrating and at times dangerous for people with vision loss.

Exteriors and Interiors — Common Design Elements

This section provides details for design elements that are commonly used in both interior and exterior environments.

Design requirements for accessible paths of travel are introduced, including stairs, ramps and platform edges, with a focus on the elements that impact safety and usability for people with vision loss. Specifications for attention and guidance tactile walking surface indicators (TWSIs) are provided, along with their critical dimensional requirements.

In addition to tactile and colour contrasted elements such as attention and way finding TWSI, accessible signage can greatly enhance accessibility to the built environment for people with vision loss. The online version of www.clearingourpath.ca provides CNIB's guidelines on the technical requirements for sign size, configuration and location, and requirements for readability using sight, touch and hearing. The guidelines also describe some of the technical requirements for information and communication systems that are usable by people with vision loss, including information desks and kiosks, public address systems and building directories.

For more information, refer to the sections on Exterior Design Elements and Interior Design Elements at www.clearingourpath.ca.

Paths of Travel

A path of travel is any space in a public facility where people might reasonably be expected to move from one point to another. It's essential to pay attention to the design of paths of travel when considering people with vision loss. An accessible route will allow them to navigate public spaces safely and independently.

An accessible path of travel should ideally be straight, with turns as equal to 90 degrees as possible. Ensure the path's surfaces are firm, stable, slip resistant and free of glare. Avoid using busy and heavily patterned surfaces, which can result in visual confusion and disorientation.

Pedestrian paths of travel should be designed to intersect as close to a right angle as possible, and the intersecting paths should continue in straight lines.

A straight path is easier to follow for people with vision loss. Curved or winding paths are more difficult to detect, more difficult to describe when giving verbal directions and more difficult for frequent users to memorize. Primary paths of travel that are clearly differentiated from the surrounding area are much easier to navigate. In large open outdoor and indoor areas, consider using textured surfaces to differentiate paths of travel from adjacent areas.

Tactile Walking Surface Indicators

TWSIs, also known as detectable warning surfaces or tactile attention indicators, are standardized walking surfaces that convey information to people with vision loss through texture and, occasionally sound.

They are typically made from inserts (e.g., metal, rubber, stone or plastic) or can be built directly into ground surfaces made of concrete. TWSIs should have a texture that can be felt underfoot and detected by a long cane. Their edges should be bevelled to decrease the likelihood of tripping.



Advantage® One domes consisting of raised truncated domes arranged in a square grid pattern.



There are two types of TWSIs:

- Attention TWSIs - sometimes called warning TWSIs, call attention to key hazards such as the start of a staircase or the edge of a platform.
- Guidance TWSIs - also known as wayfinding TWSIs, provide information about the direction of travel through open spaces. They are designed to guide a person on a designated path of travel.

TWSIs should be colour contrasted to the surrounding walking surface. The preferred colour for attention TWSIs is safety yellow (Munsell Colour System: hue 5.0, chroma yellow 8.0/12). Also effective is using a light colour on a dark ground surface or a dark colour on a light ground surface. To clearly differentiate warning information from guidance information, safety yellow should not be used for guidance TWSIs. **For more information, refer to the section Colour and Brightness Contrast at www.clearingourpath.ca.**

When TWSIs are installed as pre-manufactured panels or surface-mounted onto an existing ground or floor surface, the panels should have bevelled edges. The base surface of the TWSI panels should be no more than three millimetres above the existing surface. Surface-mounted installations are not ideal and should only be considered when cast-in-place or recessed installations can't be achieved.

TWSIs should always be attached firmly to prevent edges from lifting.

Attention Tactile Walking Surface Indicators

Attention TWSIs provide critical safety information to everyone at potentially dangerous locations, and particularly to people with vision loss. They should only be used to identify potential hazards.

It's important to provide consistent safety information so that people with vision loss will recognize potentially dangerous situations in any town or province.

Attention TWSIs should consist of circular, flat-topped, truncated domes or cones installed on a walking surface.



Armor Tile® Cast in Place used on curb ramps at an intersection. It is bright yellow, in contrast to the adjacent concrete and asphalt ground finishes.



Attention TWSIs should have the following specifications:

- Flat-topped truncated domes or cones should be used, arranged in a square grid pattern, parallel or diagonal at 45 degrees to the main direction of travel.
- The height of the flat-topped domes or cones should be four to five millimetres. In interior environments with exceptionally smooth surfaces, such as polished concrete or terrazzo, the minimum height of four millimetres is preferred.
- The diameter of the top of the flat-topped domes or cones should be between 12 and 25 mm.
- The diameter of the lower base of the flat-topped domes or cones should be 10 mm (+/- 1 mm) more than the diameter of the top.

The spacing between adjacent flat-topped domes or cones should be adjusted depending on their size, as shown in the table below. The larger the individual domes/cones, the more distant the space between them:

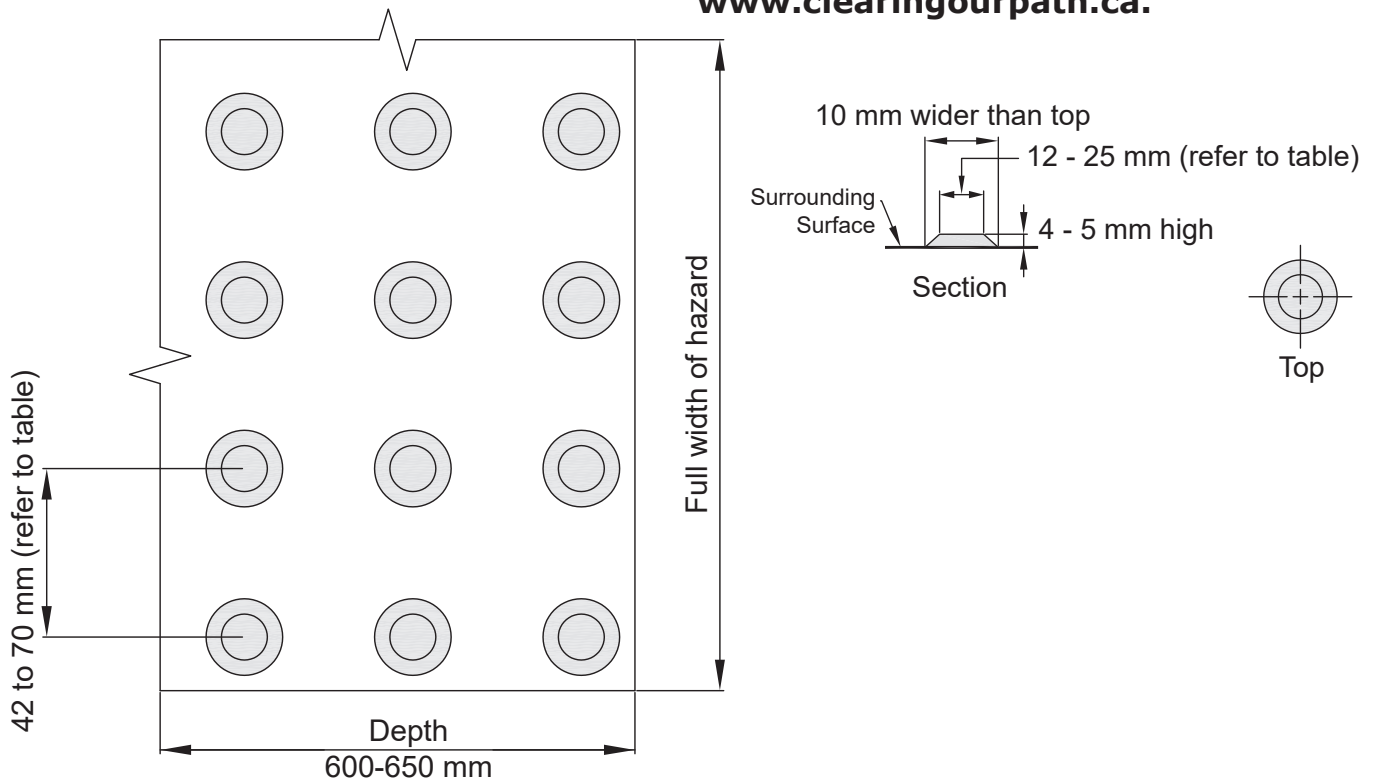
A table showing the spacing between domes/cones, based on their top diameter.	
Top diameter of flat-topped domes or cones (mm)	Spacing between the centres of adjacent domes or cones (mm)
12	42 to 61
15	45 to 63
18	48 to 65
20	50 to 68
25	55 to 70

A top diameter of 12 mm is the optimal size of domes or cones for people with vision loss to detect and distinguish through the soles of their footwear.

Attention TWSIs should be used at the following locations:

- Platform edges
- Ferry dock edges
- Edges of reflecting pools and fountains that are unprotected at ground level
- Tops of stairs, at landings where there is a door leading onto the landing
- At landings longer than 2,100 mm where there are no continuous handrails
- Both sides of ground-level railway crossings
- Curb ramps and depressed curbs
- Unprotected edges with a drop-off greater than 250 mm in height
- Unprotected edges where the slope down is greater than 1:3 (33 per cent)
- Entry points to vehicular routes where no curb or other element separates pedestrians from vehicles
- At the beginning of ground-level moving walkways (e.g., used in airport terminals)
- Attention TWSIs used on platforms, ferry docks and other drop-offs should be:
 - 600 – 650 mm deep
 - Located at the edge of the drop-off
 - Running the full length of all unprotected platform/dock edges that border the drop-off

For more information, refer to our sections on Platform Edges and Transit Facilities at www.clearingourpath.ca.



At stairs, attention TWSIs should commence one tread depth back from the leading edge of the nosing at the top step and extend across the width of the stairs. The attention TWSI alerts a person with vision loss that there is a set of stairs ahead and to seek the support of a handrail for safe navigation. The depth of the TWSIs used at the top of stairs should be 600 – 650 mm. **For more information, refer to our section on stairs at www.clearingourpath.ca.**

At railway crossings, attention TWSIs should be located so that the edges of TWSIs are 1,800 – 4,600 mm from the centre line of the nearest rail. Attention TWSIs should be installed in addition to any mechanical barriers that are activated with the arrival of trains.

Attention TWSIs should be provided across the entire width of a curb ramp or depressed curb (exclusive of flares). They should be set back 150 – 200 mm from the curb's edge and extend 600 – 650 mm in the direction of travel. For more information, refer to the section Curb Ramps and Depressed Curbs. **Guidelines on TWSIs can be found in the section Escalators and Moving Walkways at www.clearingourpath.ca.**

Guidance Tactile Walking Surface Indicators

Guidance TWSIs should consist of a pattern of parallel, flat-topped, elongated bars that extend in the direction of travel.

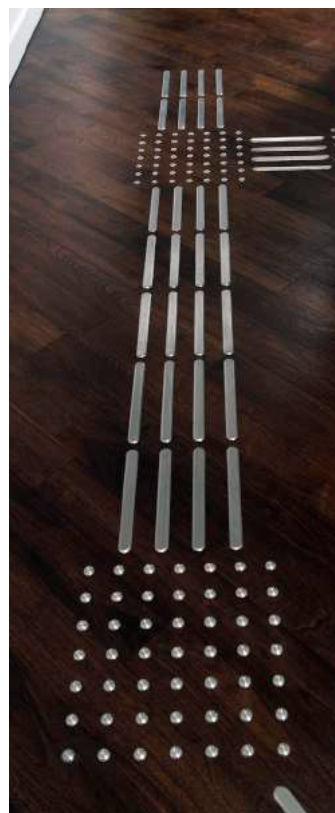
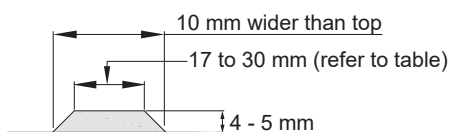
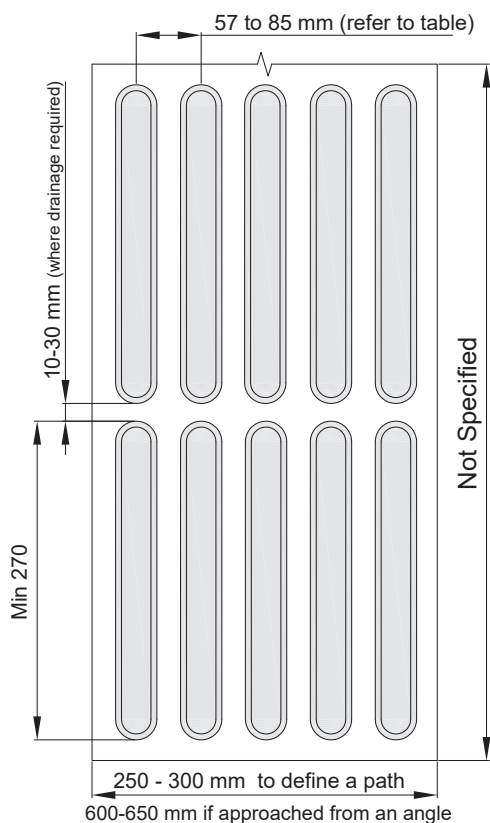
Guidance TWSIs are appropriate at the following locations:

- Transit stops
- Train stations
- Subway or light rail transit (LRT) platforms
- Airports
- Sports arenas and stadiums
- Large open spaces (e.g., public squares)
- In the door areas of expansive open areas (e.g., shopping malls)

Follow these specifications for guidance TWSIs:

- Where installed to define a route, their width should be 250 – 300 mm.
- Where installed across a route as an indicator of an amenity or diverging route, their width should be 600 – 650 mm.
- They should have a minimum continuous clearance of 600 mm on both sides.
- The height of the bars should be four to five millimetres.

- The top of the flat-topped elongated bars should have a width between 17 and 30 mm.
- The bars should be colour contrasted to surrounding surfaces to make them easily identifiable by people with low vision.
- The width of the base of the bars should be 10 mm (+/- 1 mm) wider than the top.
- The top length of the bars should be at least 270 mm. If drainage is a concern, a space of 10 – 30 mm should be provided at the ends of the bars.
- The spacing between adjacent flat-topped bars should be adjusted depending on the size of the bars, as shown in the table below. The larger the individual bars, the more distant the space between them.
- Attention TWSIs should be used along tactile guidance paths to identify turns and other decision-making points. The attention TWSIs should be raised in a square pattern centred on the guidance TWSIs, with each side of the square being 600 mm – 650mm

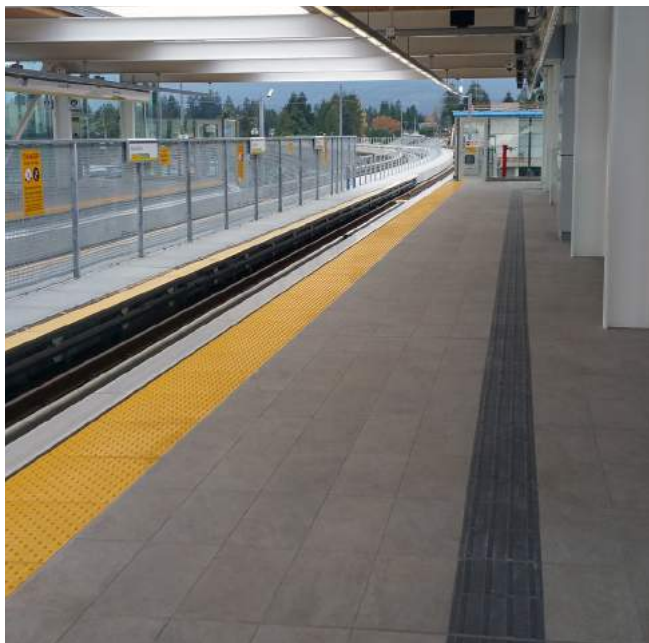


Advantage®
One dome and bars arranged in a linear pattern.



An alternate type of guidance TWSI should be used on road surfaces to assist persons with vision loss to navigate complex road crossings including, but not limited to crossing at:

- Roundabouts, also known as traffic circles
- Mid-block crossings with four or more lanes
- Skewed intersections
- Offset crossings



TWSIs used on road surfaces are clearly different and distinguishable from the guidance surfaces used in pedestrian areas. Guidance TWSIs on road surfaces at pedestrian crossings should:

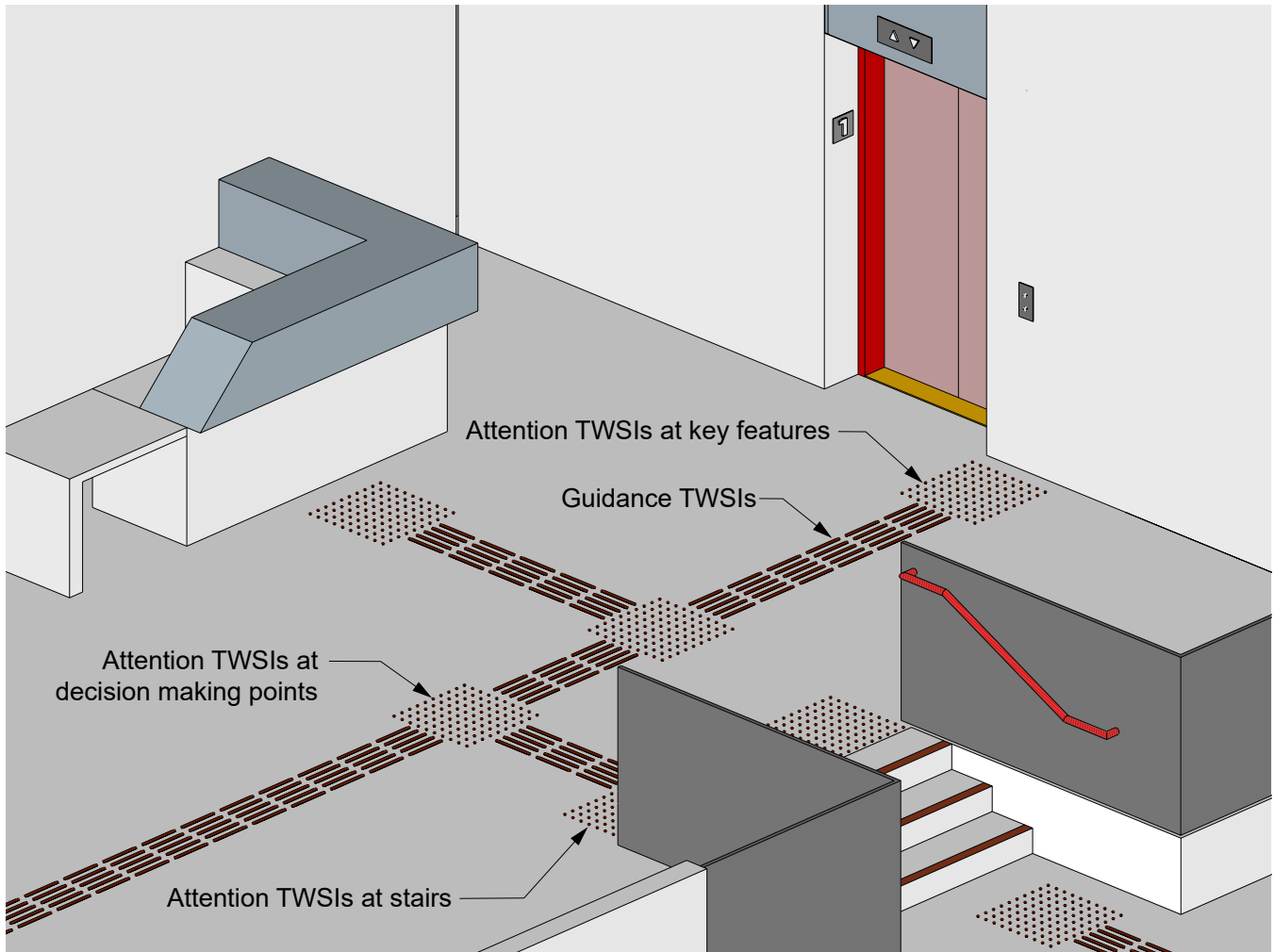
- Be configured as a straight path
- Be 250mm - 300mm wide
- Be detectable underfoot
- Be detectable with a long cane
- Be at least 50% colour/brightness contrasted with adjacent road surfaces
- Not present a tripping hazard
- Not present a barrier for persons who use wheelchairs or other types of mobility devices
- Be configured to mitigate damage from snow-plowing

Elan® porcelain tactile with wayfinding bars.



A table showing the spacing between the flat-topped bars, based on the top width of the bars.

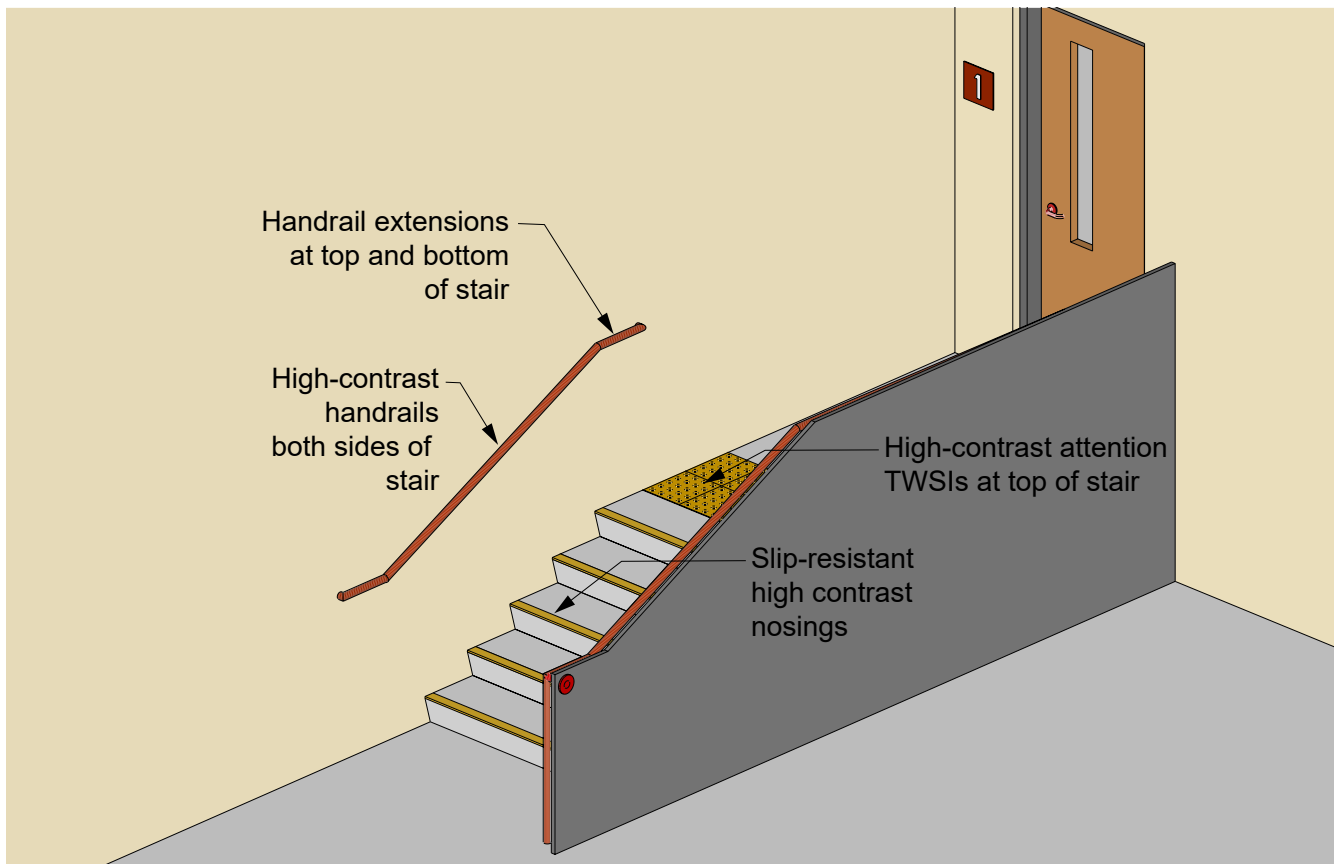
Top width of flat-topped bars (mm)	Spacing between the centre of adjacent (mm)
17	57 to 78
20	60 to 80
25	65 to 83
30	70 to 85



A drawing of a TWSI installation incorporating both guidance and attention TWSIs. Guidance TWSIs provide information to locate a reception desk, stair and elevator. Attention TWSIs are used at changes in direction along the guidance path, as well as at the top of the stairs.

Stairs

These stair guidelines supplement the standards in both the national and provincial building codes.



A drawing showing key requirements for the design of stairways that address the needs of individuals with vision loss.

Location

Stairways need to be clearly marked and easy to find without posing an unnecessary danger. Place stairways near main circulation routes so that they are accessible. They should also be offset from the direct route of travel to reduce hazards. The top of a stairway should be identified with an attention TWSI.

In a building with more than one level, stairways should be placed consistently in relation to other repeated building elements (e.g., always across from drinking fountains or washrooms). Stairs should not be placed in unexpected locations, which could easily disorient a visitor with vision loss.

Treads and Risers

Stairways that require the user to step unevenly (e.g., two steps forward followed by one step up) can be confusing and sometimes dangerous for people with vision loss. Treads and risers on stairs should be arranged so that users can maintain a consistent climbing rhythm.

Follow these guidelines for treads and risers:

- A flight of stairs should have uniform riser heights and tread depths.
- Risers should be a maximum of 180 mm high.
- Treads should be at least 280 mm deep from riser to riser.
- Risers should be closed, not open.
- Treads should be covered with, or made from, a slip-resistant textured surface extending the full width of the tread. This surface should cover at least half the depth of the tread starting at the nosing.
- Carpeting with bold patterns should not be used. Bold patterns can cause perceptual problems and obscure the edges of the treads.

Nosings

Follow these guidelines for stair nosings:

- Nosings should project no more than 25 mm.
- Where nosings project, they should be sloped to the riser at an angle greater than 60 degrees to the horizontal.
- For rounded nosings, the radius of curvature at the leading edge of the tread should be a maximum of 13 mm.
- Steps should be made of slip-resistant material and have nosings or inserts made of non-slip material.
- Stair nosings should have a colour/brightness-contrasted strip across the leading edge of the tread that is 40 – 60 mm deep. The colour/brightness between the contrast strip and the surface of the tread should be at least 50 per cent. The contrast strip should extend to the front edge of the nosing. It should not extend down the front face of the nosing/riser by any more than 10 mm. On stairs, light-coloured strips used on dark treads are preferable to light-coloured treads used on dark strips. People with vision loss don't easily notice dark strips on nosings.

For more information, refer to the section Colour and Brightness Contrast at www.clearingourpath.ca.



A good example of universal design for stairs. Nosings incorporate good colour contrast.



An example showing poor use of stair nosings. The light-coloured treads with black strips on the nosing create a marking pattern that is not perceived well by people with vision loss.



A steel staircase with colour-contrasted nosings provides an example of good stair design. The design would have been even more accessible for people with vision loss if colour contrast had been applied to the handrails.



An example of poor stair design – black stairs with no colour contrast on the nosing.

Tactile Walking Surface Indicators

TWSIs for stairs should meet the general guidelines described in the section Tactile Walking Surface Indicators.



TWSIs on stairs should:

- Be placed on landings at the top of stairs and on landings where there is an entry to the stair system.
- Be placed at the top of each flight of stairs at landings longer than 2,100 mm that do not incorporate continuous handrails on both sides.
- Be placed at locations where the regular stairway pattern is interrupted.
- Commence one tread depth back from the front edge of the nosing of the top step, extending the full width of the stairs for a depth of 600 – 650 mm.
- Consist of truncated domes or cones that contrast in colour and brightness.

Advantage® One plate with domes are located at the top, starting one tread length back from the leading edge of the nosing at the top of the stairs.



Handrails

Handrails along the sides of staircases prevent accidents by providing support and serve as visual and tactile guides for people with vision loss. Where possible, use handrails continuously throughout a stair system, along both sides of a staircase and continuing along the sides of all adjoining landings.



Stairway handrails have been retrofitted with a colour/brightness contrasted strip at the top and bottom of the railing system. This is a good alternative when the entire handrail can't be colour contrasted to the surrounding wall surface.

Follow these guidelines for handrails used in stairways:

- Handrails should be mounted between 865 and 920 mm, measured vertically from the leading edge of the tread.
- At the top of staircases and ramps and at the bottom of ramps, handrails should extend at least 300 mm parallel to the floor surface.
- At the bottom of staircases, handrails should continue to slope for a distance equal to the depth of one tread and then extend parallel to the floor surface for at least 300 mm.
- The ends of handrails should be returned to the wall or floor, or to a post, to avoid hazards for pedestrians.
- Handrails should have continuous gripping surfaces that aren't interrupted by construction elements (such as newel posts) or obstructions that can break a hand hold.
- Handrails should be free of any sharp or abrasive elements.
- Handrails should have a circular gripping surface, 30 – 40 mm in diameter.

- There should be a clear space of at least 50 mm between the handrail and the wall. Increase the space to at least 60 mm when the wall has a rough surface.
- The handrail's colour should contrast to the surrounding wall surface with a colour/brightness contrast of at least 50 per cent. These handrail requirements apply to ramps as well as staircases.

Further information is provided in the section Colour and Brightness Contrast at www.clearingourpath.ca.

Underside of Stairs

If a route of travel exists underneath a staircase, you must ensure that a person can't accidentally bump into the underside of the stairs.

Space underneath the stairs should be at least 2,030 mm high from the finished walking surface. If this is not possible, consider installing architectural detailing, plants or guardrails that can be detected by people who use long canes or guide dogs. This will help prevent accidental access to the underside of the stairs.

Lighting

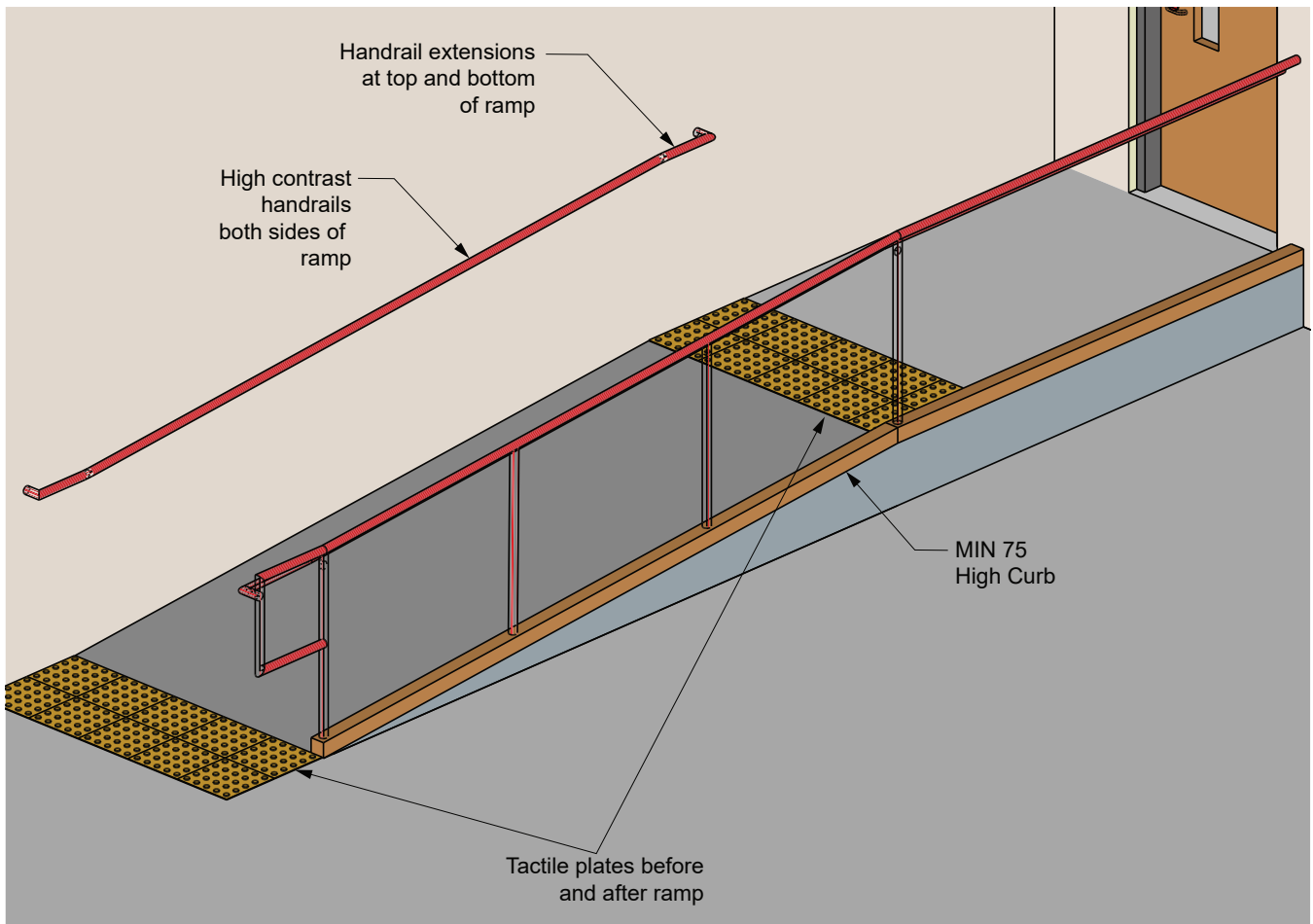
Lighting systems for stairs should be positioned so that they don't produce shadows or glare across the steps. Also avoid lighting that casts shadows from outdoor objects (e.g., canopies) across the stairs.

Illuminate interior stairways to a minimum level of 200 lux, and position lighting systems to avoid creating shadows or glare.

Ramps

Use ramps to provide access to different elevations of public areas of the built environment if other accessible options, such as elevators, are not available.

These ramp guidelines supplement the standards in both the national and provincial building codes.



A drawing showing key requirements for the design of wheelchair access ramps that address the needs of individuals with vision loss with top and bottom TWSI.

Width and Landings

Where the landing meets a slope change, there should be a colour/brightness contrasted TWSI across the width of the ramp. This will alert people with vision loss to the slope change. The TWSI should be made of slip resistant material and be located just before a change in pitch.

Handrails

Continuous handrails should be installed on both sides of a ramp, including at landings. Further information on handrails is provided in the stairs section.

Edge Protection

The edges of ramps and landings that are not at grade or adjacent to a wall should be protected.



Examples of edge protection are:

- A curb at least 75 mm high
- A raised barrier with a lower edge less than 75 mm above the ramp or landing surface

To address safety concerns associated with snow and ice, apply texture to the surface of ramps and use heated surfaces.

Armor Deck® Pedestrian Bridge with side railing.



Platform Edges

Platform edges including, but not limited to, those found on train platforms and ferry docks should be clearly marked with TWSIs. The TWSI should be parallel to the platform edge, extend its full length and have a depth of 600 – 650 mm. The material used for a TWSI and its placement should be consistent throughout a location. **Refer to the Tactile Walking Surface Indicators section for recommended specifications at www.clearingourpath.ca.**



A platform edge at Weston Station installed with Armor Tile® Transit – Surface Applied.

This abridged/hard copy version, whose production has been generously sponsored by Kinestik, represents only a small portion of the guidelines contained on the Clearing our Path website; www.clearingourpath.ca. These guidelines provide recommendations on not only exterior design, but indoor elements such as lighting, elevators, escalators and wayfinding to mention only a few. The guidelines are based on national and international standards but often exceed these. Our goal is to ensure that a maximum level of accessibility is achieved, which often differs from national or international standards.

While not intended to be an exhaustive guide on accessibility for all persons living with disabilities, many of CNIB's guidelines, when implemented properly, will benefit persons with other disabilities.

CNIB hopes to be able to update the content as new developments in accessibility come about and as such, we encourage you to visit www.clearingourpath.ca regularly.

While we have made every effort to ensure the accuracy of both this hardcopy as well as the online edition, we welcome any comments or suggestions as to how to make this a more useful resource. Please do not hesitate to contact us at advocacy@cnib.ca or 1-800-563-2642.

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About CNIB

CNIB is a registered charity, passionately providing community-based support, knowledge and a national voice to ensure Canadians who are blind or partially sighted have the confidence, skills and opportunities to fully participate in life and no Canadian loses their sight to preventable causes.

To learn more, **visit cnib.ca** or call us at **1-800-563-2642**.

Clearing Our Path

More than 4.4 million Canadians (one out of every seven) live with some form of disability. That's a substantial group of users you cannot afford to overlook in your building project or public space. CNIB developed the first edition of Clearing Our Path in 1998 to address the need for information on creating accessible environments for people with sight loss.

These guidelines came out of 20 years of experience providing universal design consulting in Canada, not to mention our long history, going back to 1918, of offering services and support for Canadians living with sight loss and being the only national organization to do so.

For more information, visit www.clearingourpath.ca.

