

OVER A DECADE OF DEVELOPING ACCESSIBLE INFRASTRUCTURE IN SOUTH AFRICA

(From the Tshwane-GIBB draft guideline 2011 to
the National Technical Requirements NTR 1
Tactile pedestrian crossings 2016 and today,
2022)

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ABSTRACT

Inclusive infrastructure has been a concept that South Africa has been grappling with. This uncertainty is predominantly due to a historical lack of information available, nationally. Where bits and pieces of information on disability-inclusive infrastructure exist in various documents; contradicting information, -standards, or -guidance is common. Available information is often outdated when compared to international standards and best practices. For the past decade, various parties and entities, with the help of the disability sector, have been researching and developing "accessible" infrastructure to establish guidelines and standards that designers and approving authorities should consistently and uniformly apply. The National Department of Transport (NDoT) published "National Technical Requirement 1 (NTR1) - Pedestrian Crossings in 2016" based on research findings. This paper aims to inform designers about the various stages of work developing the tactile pedestrian crossing layouts and designs. It references useful documents that were adopted and developed in the process, as well as explains the latest developed national standard for South Africa.

1. BACKGROUND

The provision of accessibly designed facilities and services is an obligation in all spheres of government, all sectors, and all services. This is due to both the Constitutional right to equality and the Promotion of Equality and Prevention of Unfair Discrimination Act. From 2000, this should have led to an overwhelming drive, requirement, expectation and the provision of a more inclusive, equitable and equal built environment experience. We would not be in the same position now, if this had happened and it did not. Unfortunately, many engineers, architects, landscape architects and other built environment professionals, remain uninformed of this legislation and the difference that could have been made.

In 2007, South Africa signed the United Nations Convention on the Rights of Persons with Disabilities (United Nations, 2006), and all its optional protocol, "*for a world without barriers*." This commits South Africa to the identification and removal of obstacles and barriers to accessibility in transportation (UNCRPD, Article 9). However, built environment professionals remain naïve to both the later international drive and earlier national drive,

for a more inclusive environment. They do not change how they design and think, in the case of transportation; of pedestrian accommodation and, specifically, people with disabilities. This frequently applies to municipalities and their internal departments, which are left behind.

The purpose of this paper is to inform all planners, engineers and architects, in both the public and private sector, of their legal obligation for universally designed infrastructure and services. Also, to update them on the decade-long processes followed to develop standards, including the National Technical Requirement 1 (NTR1) - Pedestrian Crossings. Examples from the Johannesburg Metropolitan Municipality are used to provide greater understanding.

2. THE UNIVERSAL ACCESS/ DESIGN LEGAL REQUIREMENTS

The Constitution of RSA (Act No 108 of 1996) is the highest law in South Africa; Chapter 2 of the Constitution, is the **Bill of Rights**. Organs of the state are obliged to comply with the Bill of Rights. This includes, for example, that they must not discriminate, and further, that *they must enable non-discrimination* (Act No 4 of 2000); but that they must apply just administrative action (Act No 96 of 2000), and promote a safe and healthy environment for all persons (Act No 32 of 2000), which is dignified (Act No 108 of 1996). The Constitution states that everyone has the right to freedom of movement and an environment that is not harmful to their health and wellbeing. This applies to the design of public transport and pedestrian facilities, (Act No 5 of 2009, and Act No 103 of 1977, as amended, 2008).

Chapter three of the Constitution deals with cooperative government. Organs of state must co-operate with other organs of state in mutual trust and good faith. They must co-ordinate legislation with other organs of state and avoid legal proceedings against them. Hence, each sphere of government should work together to ensure that the built environment is fully accessible and without barriers to everyone, including people with disabilities.

South Africa 'domesticated' the United Nations Convention on the Rights of Persons with Disabilities (UNCPRD) in 2016 through the White Paper on the Rights of Persons with Disabilities (WPRPD), introducing an auditing process for transport infrastructure including non-motorised transport (NMT); as part of the travel chain. This is a National commitment. It applies to all spheres of government and the private sector alike. The WPRPD through the UNCRPD, commits South Africa to far more than just building roads and public transport that is accessible. It requires equal access to justice, education, health, work and employment. It requires an adequate standard of living and social protection, habilitation and rehabilitation, participation in political and social life, as well as participation in cultural life, recreation, leisure and sport. The strategic objectives and policy statements for transport (regardless of mode) presented in the **White Paper on National Transport Policy, 2021**, now contain a national commitment to universally accessible transport.

The Promotion of Equality and Prevention of Unfair Discrimination Act, 2000 (Act No 4 of 2000). Also known as the Equality Act, it takes away the rationale that existing infrastructure is excluded from improvements, let alone new infrastructure. A service user (pedestrian or person with a disability) can take, and have taken; the service provider (developers and government) to the Equity Court. All court cases that service users have taken have been found in favour of the service user. Chapter 1 Section 5 states that the Act '**binds the State and all persons**'. Also that, 'if any conflict relating to a matter dealt with in this Act arises between this Act *and the provisions of any other law, other than the*

Constitution or an Act of Parliament expressly amending this Act, the provisions of this Act must prevail. Chapter 2 Section 9 states that discrimination against people with disabilities means:

- Denying or removing from any person who has a disability, any supporting or enabling facility necessary for their functioning in society.
- Contravening the code of practice or regulations of the South African Bureau of Standards that govern environmental accessibility.
- Failing to eliminate obstacles that unfairly limit or restrict persons with disabilities from enjoying equal opportunities or failing to take steps to reasonably accommodate the needs of such persons.

In relation to SABS documents, the words “Code of Practice” are used rather than 'Minimum Standards'. The Equality Act does not refer to those related to the Building Regulations alone, but to any that SABS publishes. Aside from the National Land Transport Act (Act No 5 of 2009), the provision of an accessible NMT environment is affirmed in many laws and policy documents for transport for example;

- The Integrated National Disability Strategy White Paper, 1997; providing the baseline assessment of the inaccessibility of South Africa, including transport.
- The Public Transport Strategy and Action Plan, 2007; incrementally achieving universally accessible in transport. New systems must reach universal access from the outset, with existing services upgraded to the same standard within a similar timeframe. Also the Accessible Transport Strategy, 2009: with a ‘travel chain’ approach and the Rural Transport Strategy, 2007, to promote accessible NMT.
- The Draft National NMT Policy Document, 2013: increasing the role of NMT as a basic transport mode, as a primary objective.
- The NMT Facility guideline, 2014, providing guidelines for walking, cycling, and NMT in urban and rural areas. Chapter 4 provides information for universal access.
- The National Land Transport Strategic Framework, 2017 to 2022 (NLTSF), with safe NMT facilities; conflict with road users identified as the lead cause of fatalities.
- The Department of Environmental Affairs national greening programme (2010): including guidance on NMT and universal design.
- The Council for the Built Environment (CBE) 2019: Transformation Charter on universal design and universal access, signed by professional bodies.

Other departments, the Department of Trade and Industry (DTI), the Department of Social Development (DSD), the Department of Education (DE), and the Department of Public Works (DPW) have a specific focus of ensuring accessibility and inclusion. All departments should be working together to move the country towards inclusive villages, towns and cities; for buildings, public space, housing, education and access to information and other services. National law and policy already support wider national and international commitments, the (National Development Plan RSA, 2011), the United Nations Sustainable Development Goals (United Nations 2015) and the New Urban Agenda, (United Nations 2017).

A **universal design** approach to the built environment results in the necessity to remove or neutralise obstacles that can hinder the progress of people, regardless of their age, capability or status in life; people pushing a trolley or a pram, people with a temporary disability or injury, and people with any disability, be it visual, mobility or hearing or other. This applies to any trip hazard on footway surfaces, level difference between two surfaces, a flight of stairs, or even a single stair or step. Uneven footways, kerbs, bollards, steep

gradients or street clutter hinder movement. Incorrectly Planned, designed and constructed pedestrian ramps also obstruct the continuous accessible path of travel.

Since 1993, controversy and confusion has been created by government about the correct design and construction of accessible tactile pedestrian ramps at road intersections. There has been a lack of information, contradicting or outdated information; or information passed off as international best practice with no supporting research and a basic lack of evidence.

3. ASSESSMENT OF THE OLD STANDARD TACTILE PEDESTRIAN CROSSINGS

3.1 The Brief History of the Old Bubble Block/Tactile Indicators in SA

In public spaces, pedestrians are in danger from vehicles unless protected through a physical intervention such as a raised kerb. This forms the Footway (sidewalk). In order for people using prams, wheelchairs, shopping trolleys, suitcases and walking aids to cross a road; a footway has to be dropped at an intersection or mid-block crossing, level with the roadside; or the road raised so that it is level with the footway. At the point where the dropped kerb meets the roadway, pedestrians are in danger if unaware they are entering the roadway. Being 'unaware' is not a danger for people who are blind alone. Many pedestrians are unaware, if not warned. In theory, the dropped kerb provides a guide to the safest place to cross the road, which is helpful or should be helpful, for teaching children basic road safety.

The first appearance of a sort of a tactile or ground surface indicator block in South Africa was the use of the bubble blocks on narrow pedestrian ramps or kerb ramps, often placed at 45° angles to the pedestrian crossing at intersections (Figure 1). It did not lead people to the safest place to cross the road. It led them into the middle of the intersection.



Figure 1: First Bubble Block Profile used in SA



Figure 2: Old Standard Tactile Pedestrian crossing

The technical details of these blocks first appeared in the “RR92/126 *Pedestrian Facility Guidelines: 1993, manual to plan, design and maintain safe pedestrian facilities*”, published by the Chief Directorate National Roads. Like Gautrans, many municipalities started to adopt the old bubble blocks or dome-shaped tactile tiles on their kerb ramps. (Figure 3).

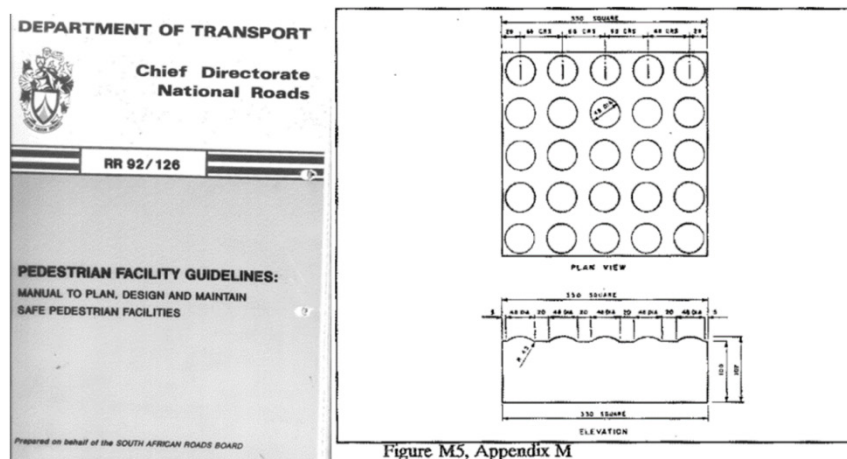


Figure M5, Appendix M

Figure 3: Extract of the tactile “bubble” block as indicated in the RR92/126 Pedestrian Facility Guidelines: 1993, Manual to plan, design, and maintain safe pedestrian facilities

The adoption of this tile was based on unverified tests quoted in *RR92/126*. *RR92/126* states that this block was tested at the Transport Research Laboratory in the United Kingdom ‘with great success’. However, the block was never adopted in the United Kingdom in its own standards. From sources in the disability sector, the bubble paving was never sufficiently researched. Stakeholder engagement and testing with disability user groups nationally were lacking before adoption.

About fifteen years ago, the dome-shaped bubble blocks and their installation in figures 1 and 2, were officially highlighted as obsolete in South Africa; due to the problems and shortcomings with the tactile layouts, profile, ramp gradients, ramp positioning and orientation, identified prior to the 2010 FIFA Soccer World Cup. FIFA, the international governing body, raised concerns about the inclusion of people with disabilities attending soccer matches. A similar concern was raised pre-Gautrain construction. From comments made by persons with disabilities, experts and municipal officials during SABS technical committee working group meetings on SANS 10400-S for the document’s predecessor, SANS 784 2007; and SANS 10400-S, and complaints received, the old bubble blocks and kerb ramps at crossings had the problems listed below:

- Slip-resistance is insufficient in all weather conditions.
- It is cumbersome to detect the tiles underfoot while using a guide dog or white cane.
- Some white cane users reported that the cane gets stuck on the dome profiles.
- Significant discomfort is caused to people in wheelchairs, buggies, prams, trollies, or people with ambulant disabilities due to the uneven surface / large-profile domes.
- People who are blind or partially sighted cannot detect the crossing position.
- An inability to guide a blind or partially sighted person across the road safely to the opposite pedestrian kerb ramp position.
- No integration or relationship with pedestrian push buttons for traffic signal operation.
- Concerns were raised with the narrow dropped kerbs/ramps (1m wide), within the 2,4m wide crossing. The transitions and raised kerb portions result in trip hazards.
- Narrow kerb ramps result in competition at dropped kerbs within the roadway between people with disabilities and others; such as prams and trollies. They are not safe and do not promote equality and equity, allowing one facility to be used by all users.

- Narrow kerb ramp makes it challenging to sufficiently direct a pedestrian to the opposite kerb ramps. It is equally difficult to reach, after a long road crossing where the roadside is made wider rather than narrower; a blind person is prone to veer off to the left or right. Making the target smaller makes it more difficult to hit.

This is reconfirmed through other research (IATSS, 2008, Tokuda Katsumi et al. 2008 University College London, 2010 and Childs et al., 2010). Nationally, the problems listed above sparked the adoption of a “newer” standard, **the Australian/ New Zealand (AU/NZ) Standard; SANS 784: 2008 “Design for access and mobility-Tactile indicators”**. However, as a result of gathering hostilities towards the Part S committee at working group meetings, and with complaints received, SABS rushed the process. Some disability organisations were of the opinion that they had not been appropriately consulted.

Upon adoption, this 14-year-old standard was already outdated. The Australian/New Zealand version was dated 2002. When South Africa adopted it, Australia/New Zealand was already updating it and published a revised version in 2009, a year after South Africa adopted the 2002 version. Figure 4 shows examples of the SANS 784 crossings.

This new standard resulted in controversy and confusion for engineering, architectural, and municipal authorities. Outdated or not, SANS 784 provided one of the most detailed principles and standards documents for pedestrian crossing on tactile ground surface indicators (TGSi), also known as Tactile Walking Surface Indicators (TWSi).

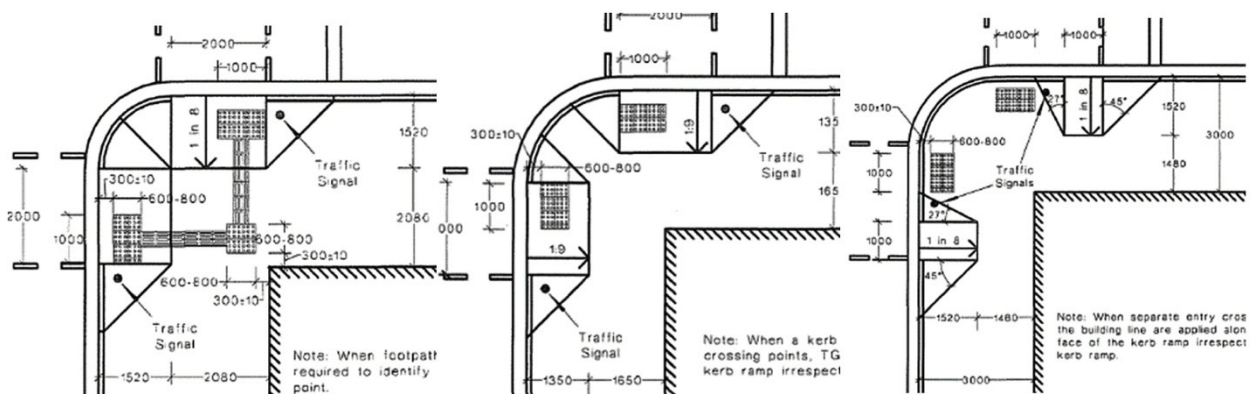


Figure 4: Examples of pedestrian ramps shown in the SANS 784:2008 Standard Document

Due to the national adoption of an obsolete document, an interrogation process has taken place through the SABS Part S technical committees and working groups, since 2011. Many of the primary design principles in the standard, such as accessible surfaces, circulation space, some gradients, and most importantly the tactile profile, still apply. However, the *layout* of pedestrian ramps and *maximum gradients* have changed, as a result of further research and development in South Africa.

4. SANS 784 TGSi Profiles

The SANS 784 specification is unambiguous. It provides allowances for minimum tolerances on some dimensions, overall tile size, nodule spacing and nodule size. Far less tolerance is allowed on other dimensions, like the nodule height. An excellent example of SANS 784 warning and guidance profile compliance, manufactured in concrete, is shown in Figure 5.



Figure 5: Correctly manufactured SANS 784 Warning and Guiding Tactile Blocks

In comparison to Figure 6 extracted from the SANS 784 document, note the required compliance of the precise, sharp edges of the top and bottom of the nodule profile. By rounding these edges, the clear, crisp tactile information a blind person needs to feel through the soles of their shoes, or by using a guidance cane, is removed. It is wasted expenditure.

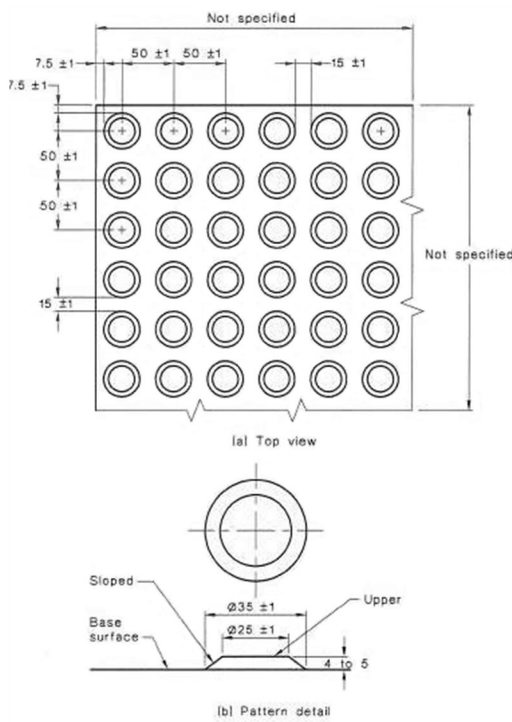


FIGURE 1 TYPICAL WARNING INDICATOR PATTERN

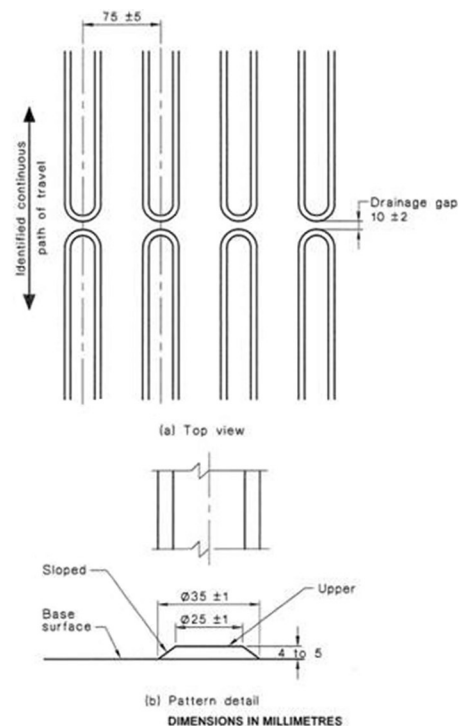


FIGURE 2 TYPICAL DIRECTIONAL INDICATOR PATTERN

Figure 6: SANS 784 Tactile Profiles

Many national manufacturers get this wrong, to such an extent that the Johannesburg Roads

Agency developed a specific standard document, “**JRA Universal Design, Tactile Ground Surface Indicator (TGSi) Technical Specification, 2020**”, to deal profile compliance. The JRA document expands on NTR 1 providing useful in-situ technical detail drawings for designers and contractors that can be used as-is for designs and product specifications. JRA also provides detail and explanation on complying with the required

tactile profiles, concrete quality, durability, dimensions, materials, skid resistance and luminance contrast.

Aside from the outdated SANS 784 document, the only other available standard or guideline was the **SANS 10400: 1990, The Application of National Building Regulations – Part S: Facilities for Persons with Disabilities**, and the **DOT Pedestrian and Bicycle Facility Guidelines: 2003**. These standards have been updated to the 2011 and 2014 versions, respectively. Both documents still lack sufficient technical detailed guidance and the information is inconsistent. Further updates are underway (2021-2022).

5. DEVELOPMENT OF NEW STANDARDS FOR TACTILE PEDESTRIAN CROSSINGS

5.1 The Tshwane/GIBB Engineering Draft Guideline, 2011

In 2010, the City of Tshwane investigated pedestrian access to their proposed median BRT stations, and realised the problems with the outdated pedestrian bubble ramps. The municipality's first draft document was the **Tshwane/GIBB** developed; "**Standard Construction Detail and Design Standards for Intersection Pedestrian Crossings affected by the Bus Rapid Transit Infrastructure: 2010**". It incorporates international best practices, stakeholder comments and inputs from NDoT, SABS, SANCB, Pioneer School for the Blind and Africa Decade of Action and universal access consultants.

At that stage (2010-2012), there was still a big difference between the tactile layout of a signal-controlled and uncontrolled pedestrian crossing. The main difference is that the controlled crossing, Figure 7, had a section of guidance tactile tiles at the back that would guide a visually impaired person to the crossing point from the back of the footway. The un-controlled crossing, Figure 8, would be a bit narrower and not have this guidance tactile tile section.

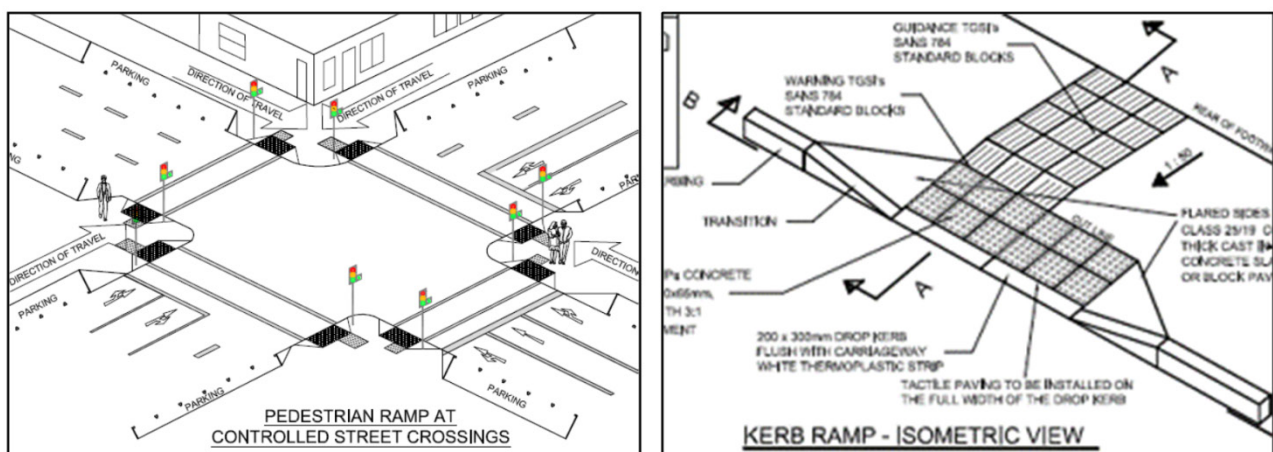


Figure 7: Pedestrian ramps at controlled street crossings, with guidance tail

GIBB updated this document for the COJ Complete Streets Guideline, 2013; it can be found in the Appendix. It was widely promoted by the NDoT for use in all thirteen of the IPTN infrastructure developments. At the time of development in Tshwane, the SABS committee was investigating changes to SANS 784; consultation with disability groups was underway. Based on the outcomes and recommendations from disability organisations and feedback from individuals sampling tactile pedestrian crossings layouts, NDoT consolidated the findings. Through Public Transport Network Development, NDoT

published a “**Position paper on tactile pedestrian crossings: 2016**”, to summarise these findings.

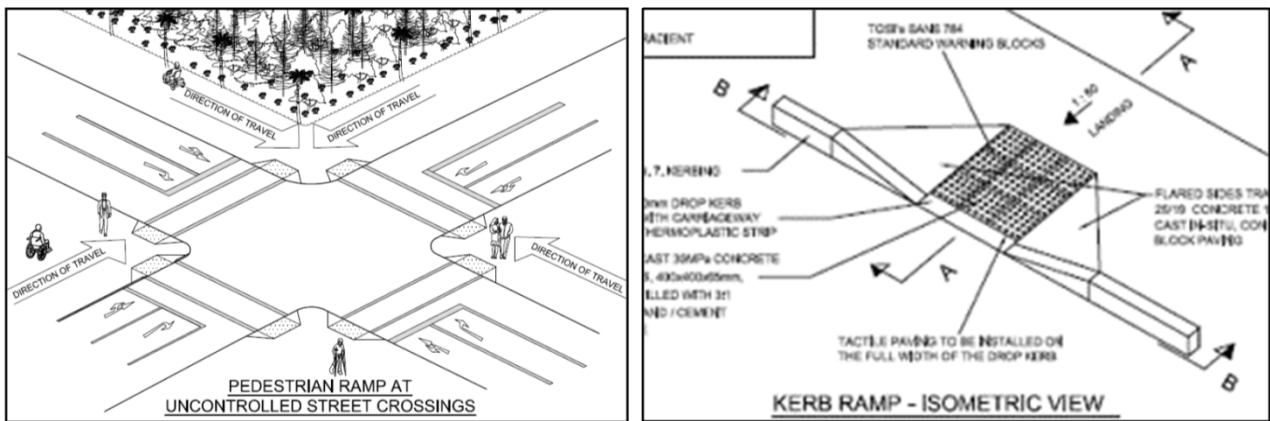


Figure 8: Pedestrian ramp at un-controlled street crossings, without guidance tail

Figures 9 and 10 are extracted from the Position Paper. The results of the stakeholder engagement and research can now be seen. The previous two different tactile layouts for differently controlled pedestrian crossings, were changed to have only one **L-shaped** layout that can be applied consistently on all pedestrian crossings. The one layout applies to all control scenarios; the only difference could be the width application.

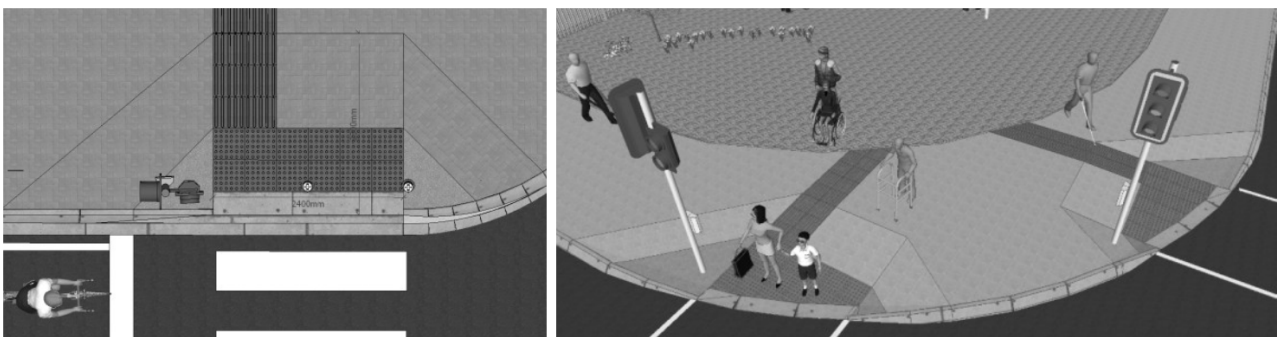


Figure 9: Pedestrian ramp at Controlled street crossings, with guidance tail

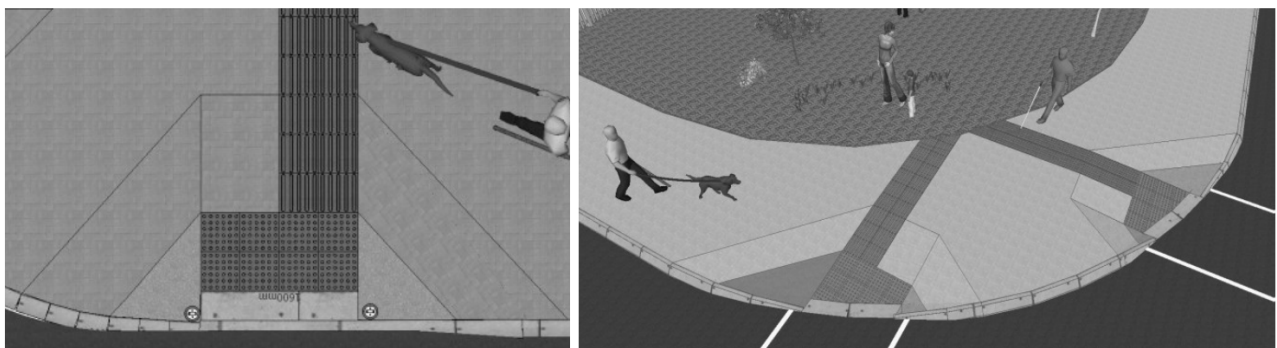


Figure 10: Pedestrian ramp at Un-Controlled street crossings, with guidance tail

The **Position paper on tactile pedestrian crossings: 2016** led the way for an official project, launched and funded by the NDoT, through NTR 1. It included a completely inclusive approach to research with people with disabilities, as required by the WPRPD. The background videos and final documents were published on the Department’s website.

5.2 National Technical Requirement 1: - Pedestrian Crossings (NTR1), 2016

The development of NTR 1 resulted in a significant amount of more detailed, official research than conducted for RR/126 and indeed, for SANS 784. Interestingly through this research, little changed from the **Position paper on tactile pedestrian crossings: 2016** which is reassuring of the accuracy and relevance of the earlier work.



Figure 11: Research being conducted including various user groups, including the South African Council for the Blind (SANCB) in South Africa

In Figure 11, user group research is conducted. The research included different stakeholder groups with various forms of disabilities. People who are blind and partially sighted, wheelchair users, Orientation and Mobility experts, Universal Design Experts, and other interested parties. Similar to the NDoT position paper, users were consulted on a range of different tactile applications in Ekurhuleni and Tshwane. Their feedback, comments, recommendations for optimum application, use and functionality were incorporated into the final design and tactile layouts in NTR 1. Further development is to combine NTR 1 with the NDoT NMT Facility Guideline, 2014 into one consolidated document covering both footway and road pedestrian issues. The difference between the unsubstantiated claims in the RR92/126 1993 document and the NTR 1(2016) cannot be over-stated.

NTR1 is in two parts. Part 1 covers the background research on policy, legislation, guidelines and standards. Part 2 contains the technical component with drawings. The development and adoption of only one standard is crucial to ensure consistency and uniformity for people who are blind and partially sighted, which is an important principle. The *National Land Transport Act, 2009 (NLTA)* requires that single researched functional standards/requirements are nationally prescribed. Chapter 1, Section 2c states that Government needs “to prescribe national principles, requirements, guidelines, frameworks and national norms and standards that must be applied uniformly in the provinces and other matters contemplated in section 146 (2) of the Constitution.” Section 146 (2) of the Constitution ensures that there is no conflict between national and provincial within a functional area. It states “(2) National legislation that applies uniformly with regard to the country as a whole prevails over provincial legislation if any of the following conditions are met, (a) The national legislation deals with a matter that cannot be regulated effectively by legislation enacted by the respective provinces individually, (b) The national legislation deals with a matter that, to be dealt with effectively, requires uniformity across the nation, and the national legislation provides that uniformity by establishing (i) norms and standards... NTR1 will fall under this. Aside from the NLTA, two other relevant gazetted

documents are the minimum requirements for the preparation of Integrated Transport Plans, 2016 (ITP) and the UDA framework, gazetted in 2021.

Non-motorised transport (NMT) has a particular focus in the transport plan, because walking all the way must be possible for and accessible to everyone. Additionally, all public transport users walk during some part of their journey. As do drivers of vehicles. Within the definition of “accessible transport”, pedestrian and transport facilities are included. There NMT network must be mapped, network upgrades planned through a 5-year plan, as well as promoting behavioral change towards more pedestrianisation and public transport use, in line with international commitments. This includes the requirement for property developers to respond to public transport so that the entrances of destinations are accessible from a public transport stop, to everyone, including people with disabilities. This requires the physical implementation of accessible NMT infrastructure, year-on-year, as a minimum requirement. This, in turn, means the implementation of national standards from SABS interpreted in transport by NDoT.

Revisiting the Constitution and the right to freedom of movement; the requirement for every built environment professional in any infrastructure project, to ensure it is accessibly designed and constructed, is escalated. How can it be proven in a court of law that everything possible has been done to ensure the accommodation of people with disabilities; unless it is through properly researched, government-approved guidelines and standards? By relying on information that can easily be proven to be both false and untested, the “Rational Design” route appears to be a highly risky venture. The prevailing law used in the *Government of the Republic of South Africa versus Grootboom case, October 2000*, was the Constitution, indicating that Government cannot indefinitely implement discriminatory plans. Unless government transforms, what is the motivation for the private sector to do so?

Considering the above, the application of the NTR1 on all infrastructure projects through National, Provincial and Local municipalities should be enforced. The second question will probably now be, who exactly will enforce it, and through what means and processes? Taking this responsibility at heart, the City of Johannesburg Roads Agency has started enforcing the application of universal design principles and the implementation of the NDoT Standards as per NTR1. Figure 12 shows two pictures from NTR1. The two scenarios indicate a standard kerb ramp and a narrow footway treatment where space is constrained.

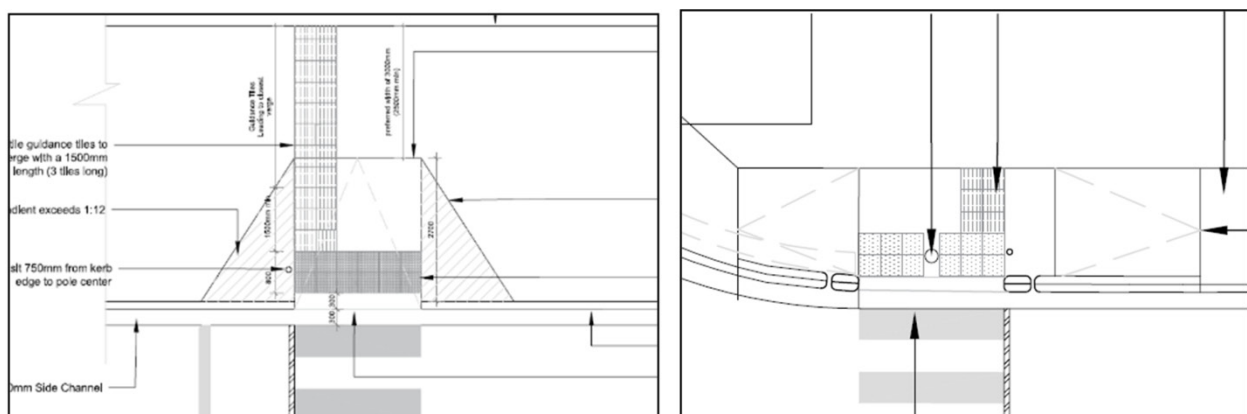


Figure 12: Tactile Indicators of a controlled pedestrian crossing, with guidance tail

Options applicable to various site conditions in NTR 1 are, however minimal. The NTR 1 tactile layout for pedestrian crossings is the **L-Shaped** design, as shown in the following two examples of tactile pedestrian crossings constructed in the City of Johannesburg.



Figures 13: Controlled, L-Shaped raised Tactile Pedestrian Crossing



Figures 14: Uncontrolled L-Shaped Tactile Pedestrian Crossing

South Africa has also conditionally approved **ISO21542: 2011, Building construction- Accessibility and usability of the built environment** as a reference standard. The primary condition was that the tactile section be updated in line with SANS 784 and NTR1. Other tactile profiles are included in ISO 21542, 2011. These do not apply, because they are a worse standard than SANS 784. The document can be used to complement and add to SANS 10400-S and NTR1 in areas not covered, and add to municipal engineering guidelines and standards. The new version of SANS 10400-S when published will incorporate the design of the SANS 784 tactile tiles to align with NTR 1 as the document was retracted prematurely by SABS. Existing developed documents, guidelines, and standards still leave South Africa with conflicting and contradicting documentation unless the principles of universal design are properly understood by built-environment professionals.

6. CONCLUSION

In conclusion, a significant amount of research and development has been completed over the last decade. Several documents on tactile pedestrian crossings are now available to respond to the unsubstantiated RR 126/99 original government standard. The latest document of significance is the **National Technical requirements (NTR1): 2016 – Pedestrian Crossings**. However, this document cannot be used in isolation as its layout options and application to different site conditions are minimal.

To bridge this gap, it is advised that designers consult universal access specialists or local municipalities that have the required capacity for guidance; in applying the correct principles and NTR 1. It is critical that municipalities require universal design and universal access within the project scope and tender documentation, as well as within the approval processes.

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