Zambia Non-Motorised Transport Strategy

Ministry of Transport & Communications
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Contents

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Definitions

- **Accessibility**: Facilities offered to people to reach social and economic opportunities, measured in terms of the time, money, comfort, and safety that is associated with reaching such opportunities.
- **Average trip length**: The average distance covered by a transport mode for a trip, measured in kilometres.
- **Bus rapid transit (BRT)**: High quality bus-based mass transit system that delivers fast, comfortable, reliable, and cost-effective urban mobility through the provision of segregated right-of-way infrastructure, rapid and frequent operations, and excellence in marketing and customer service.
- **Complete streets**: Streets that are designed for all users, including pedestrians, cyclists, public transport passengers, and personal motor vehicles, including all modes of mobility as well as street vending, trees, street furniture, and other elements.
- **Greenway**: A waterway or strip of land with exclusive facilities for cycling and walking.
- **Mobility**: Conditions under which an individual is capable to move in the urban environment.
- **Mode share**: The share of total trips carried out by a particular mode of urban transport, including walking, cycling, bus, paratransit, rail, two-wheeler, or car.
- **Non-motorised transport (NMT)**: Human-powered transport such as walking and cycling.
- **Nationally Determined Contribution (NDC):** National pledges to reduce greenhouse gas emissions per the provisions of the 2015 United Nations Framework Convention on Climate Change Conference of the Parties in Paris.
- **On-street parking**: The space occupied by vehicles to park along the edge of the street.
- **Paratransit**: Service operated by the private sector on a shared or per seat basis along informally organised routes with intermediate stops. The service may or may not have a predefined fare structure.
- **Public transport (PT)**: Shared passenger vehicles that are publicly available for multiple users. In this document, the term “public transport” is used to refer to paratransit and formal road-based public transport services.
- **Parking management**: Pricing, enforcement, and other mechanisms used to guide parking operations to ensure the efficient use of street space.
- **Right-of-way (ROW)**: The width of the road, taken from the compound wall/property edge on one side of the road to the compound wall/property edge on the other side of the road.
- **School zone**: All streets and greenways within a 200 m radius of a school.
- **Sustainable transport modes**: The following modes are categorized as “sustainable modes” of urban transport because when compared with personal motor vehicles, they consume the least amount of road space and fuel per person-km and also entail lower infrastructure costs: walking, cycling, and public transport (including a regular bus service as well as BRT systems).

- **Traffic calming**: Traffic calming measures ensure pedestrian safety by reducing speed and potentially also the volume of motor vehicles. Traffic calming slows down vehicles through vertical displacement, horizontal displacement, real or perceived narrowing of carriageway, material/colour changes that signal conflict points, or the complete closure of a street.
- **Vehicle kilometres travelled (VKT)**: Vehicle kilometres travelled by all the personal motor vehicles (in a city) in one day.

Abbreviations

Table 1: Abbreviations

BRT	Bus rapid transit
DPR	Detailed project report
ECS	Equivalent car space
KCC	Kitwe City Council
NCC	Ndola City Council
LCC	Lusaka City Council
MOLG	Ministry of Local Government
MOHID	Ministry of Housing & Infrastructure Development
MOTC	Ministry of Transport & Communications
MRT	Mass rapid transit
NDC	National Determined Contribution
NMT	Non-motorised transport
RTSA	Road Transport and Safety Agency
RDA	Road Development Agency
SPV	Special purpose vehicle
TDM	Travel demand management
TOD	Transit-oriented development
VKT	Vehicle kilometres travelled
ZRA	Zambia Revenue Authority

1. Introduction

Non-motorised transport (NMT) offers basic mobility, affordable transport, access to public transport, and health benefits. Improving the convenience, comfort, and safety of walking and cycling reduces the demand for travel by personal motor vehicles, helping to alleviate the critical traffic challenges facing many cities. Despite a high level of reliance on NMT, many streets in cities in Zambia are not designed for people to walk or cycle. As many cities around the globe have realised, street designs that focus on vehicle movement rather than mobility for people undermine quality of life and the character of public spaces. Urgent steps are needed to ensure more equitable allocation of road space by focusing on walking, cycling, and public transport in the planning, design, construction and management of transport systems.

Toward this end, the Ministry of Transport and Communications (MOTC) has developed an NMT Strategy to guide the implementation of high quality non-motorised transport systems in Zambia. The aim of the NMT Strategy is to achieve improved access through sustainable transport modes including walking, cycling, and public transport. The NMT Strategy for Zambia is consistent with the National Road Traffic Safety Policy and Action Plan, which envision "a safe road network for all road users" in line with the United Nation's Decade of Action for Road Safety, which declared a goal of reducing road fatalities by 50 percent by 2020.[1]

The NMT Strategy has been developed following extensive consultations including stakeholder meetings, capacity building workshops, and an online survey. Successful implementation of the NMT Strategy will be determined by the joint efforts of concerned stakeholders to develop a transport system that provides safe, equitable access for all road users.

2. Emerging urban mobility challenges

Zambia, officially the Republic of Zambia, was home to 13.7 million people as per the 2011 census, with the population expected to grow to 17.9 million in 2020 and 23.6 million by 2030.[2] The urban population was 5.6 million in 2011 and is expected to grow to 7.8 million by 2020.[3] Per these estimates, forty four percent of Zambia's population will be urban in 2020, making it one of the most urbanised countries in sub-Saharan Africa.

Table 2: Ten key cities and towns in Zambia and their populations.[4]

City	Population
Lusaka	1,267,440
Kitwe	400,914
Ndola	394,518
Kabwe	188,979
Chingola	148,564

[1] Ministry of Transport and Communications. (2016). National Road Safety Policy Strategy and Action Plan.
[2] Central Statistical Office. (2013). Population and Demographic Projections 2011-2035. Retrieved from https://www.zamstats.gov.zm/phocadownload/Zambia%20Census%20Projection%202011%20-%202035.pdf
[3] Ibid.
[4] Geonames. (2019). Retrieved from https://www.geonames.org/search.html?q=zambia&country= on 26 April 2019.

City	Population
Mufulira	120,500
Luanshya	113,365
Livingstone	109,203
Kasama	91,056
Chipata	85,963

Rapid urbanisation has come with development challenges that impact living conditions, human dignity, and environmental sustainability. Due to ineffective urban planning and weak legal and policy framework, investments in urban infrastructure have not matched the population growth resulting in inadequate access to housing, and efficient transport services among others. It is necessary that appropriate policies and strategies are developed to facilitate leverage on available opportunities while overcoming the emerging challenges.[5]

The majority of trips in Lusaka are made by walking, followed by public transport, and with only around ten percent of trips made by car. Despite low car ownership, Lusaka and other Zambian cities are experiencing increasing traffic congestion, making it difficult for residents to access economic and educational opportunities. Increasing congestion is therefore a major impediment to economic growth, competitiveness, and poverty alleviation. Vehicle pollution also contributes to respiratory ailments and climate change.[6] To overcome such challenges, cities need to adopt urban planning strategies and transport system interventions that promote a shift to sustainable modes, including efficient public transport, walking, and cycling.

Figure 1: Lusaka mode split.[7] (left). Traffic jam in Lusaka (right).

Unfortunately, as is common in cities around the world, the priorities on the street do not serve the needs of the majority. Some well maintained, wide footpaths are present on a few streets in Lusaka, particularly in the central business district (CBD). A couple of streets have shaded median walkways,

[5] Ministry of National Development and Planning. 7th National Development Plan 2011 to 2035.
[6] World Bank. (2015, 6 Apr.) Urban Transport. Retrieved from http://www.worldbank.org/en/topic/transport/brief/urbantransport
[7] Japan International Cooperation Agency. (2009). The Study on Comprehensive Urban Development Plan Urban (Final Report Volume II). Retrieved from JICA Report website: http://open_jicareport.jica.go.jp/

offering a very high quality walking environment. However, despite the critical role of NMT in providing access for most residents of the city, many streets in Lusaka lack proper footpaths. A notable effort to improve the walking environment was observed in the city of Kitwe, where the city council has developed high-quality footpaths along President Avenue as part of the Pave Kitwe project. Few formal pedestrian crossings were observed in any of the cities, even on high-speed corridors such as Great East and Mumbwa Roads. In some cases, barriers have been erected along the median to prevent pedestrians from crossing.

3. Assessment of walking & cycling environment

Key to developing an effective non-motorised transport (NMT) strategy is having an in-depth understanding of the existing walking and cycling environment, and the extent to which it provides safe, convenient access for NMT users. During site visits in Lusaka, Ndola, and Kitwe, ITDP noted the existing walking and cycling environment as well as user behaviour. The following is an account of key observations by the team.

3.1 Footpaths

Footpaths are multifunctional spaces that typically include space for walking, street furniture, street lighting, utility boxes, and green infrastructure. Accessible and convenient footpaths should enable continuous and unobstructed mobility even during peak hours. This is best achieved when footpaths include a designated space free of fixed objects, major gaps or deformities. This usable space is referred to as the clear width, to be contrasted with the total footpath width from the building frontage to the kerbside. Streets should be designed with a minimum clear width of 2 m so that two wheelchairs can pass each other.

There are a well maintained, wide footpaths on a few streets in Lusaka, particularly in the central business district (CBD). A couple of streets have shaded median walkways, offering a very high quality walking environment. However, despite the critical role of NMT in providing access for most residents of the city, many streets in Lusaka lack proper footpaths. A notable effort to improve the walking environment was observed in the city of Kitwe, where the city government has developed high-quality footpaths along President Ave as part of the Pave Kitwe project.

Figure 2: Well-maintained, wide footpath in the Lusaka CBD (left) and a new footpath created under the Pave Kitwe project (right).

Figure 3: Lack footpaths on some busy streets forces pedestrians to walk in the carriageway or on unpaved road margins.

Figure 4: Wide intersections encourage speeding by vehicles.

In an attempt to increase motor vehicle speeds, at-grade pedestrian crossings have been replaced by foot over-bridges at Manda Hill Mall and the University of Zambia. Since these facilities are inaccessible to many people including those disabilities and those carrying loads, they should be avoided as much as possible. Footbridges facilities typically increase pedestrian travel distances and times, thereby inconveniencing all users and discouraging walking. Stakeholders acknowledged that the Manda Hill footbridge has become a “white elephant” and that alternate crossing designs should be pursued going forward.

Figure 5: Footbridge at Manda Hill Mall in Lusaka. (left) High quality pedestrian crossings, such as the table-top crossing at Manda Hill Mall, reduce the speed of motor vehicles and provide universal access. (right).

3.2 Cycle facilities

Despite the presence of a considerable number of cyclists, cycle tracks are largely absent in Zambian cities. Cyclists are often observed riding on pedestrian walkways—both paved and unpaved—in order to avoid motor vehicle traffic.

Figure 6: The lack of dedicated cycling facilities results in cyclists using road shoulders or pedestrian walkways.

3.3 Pedestrian crossings

Pedestrians may have difficulty crossing high-speed streets in the absence of traffic signals or physical measures to reduce vehicle speeds. As crossings are a primary cause of pedestrian deaths, crossings should be made safer through traffic calming, signals, pedestrian islands, curb extensions that minimise crossing distances, and other pedestrian safety measures. This is particularly helpful to people who move at slower speeds, such as the elderly, people with disabilities and children. Intersection designs should be as self-enforcing as possible. Universal accessibility principles dictate

that crossings be built so that pedestrians in wheelchairs are able to cross without any detours. This can be done through ramps to bring pedestrians from the sidewalk down to the street level crosswalk, or with raised crosswalks that remain at sidewalk level across the intersection.

Few formal crossings were observed in any of the cities, even on high-speed corridors such as Great East and Mumbwa Roads. In some cases, barriers have been erected along the median to prevent pedestrians from crossing. However, the barriers have been uprooted to make way for pedestrians to cross. The team was informed by the Zambia Road Transport and Safety Agency that some of the worst black spots in Lusaka are located along Mumbwa and Kafue Roads.

Figure 7: Lack of safe pedestrian crossings in Lusaka (left) and Ndola (right) exposes pedestrians to safety risks.

3.4 Parking management

The number of vehicles on Zambia's roads increased by 280 percent to 700,000 in the ten years up to 2016, with nearly half of those vehicles registered in Lusaka.[8] The rapid influx of vehicles has resulted in growing demand for parking. Within the Lusaka CBD, on- and off-street parking is managed by Parkrite Zambia Limited under a contract with the Finance Department of the Lusaka City Council. Vehicles are charged ZMW 5 per hour and fees are collected through a manual system which is susceptible to revenue leakage. Outside of the CBD, parking in Lusaka is largely unregulated and haphazard. Vehicles often park on pedestrian footpaths, forcing pedestrians to walk on the carriageway. Since parking rules are not defined, enforcement is arbitrary. Parking outside of the CBD is free of charge.

Increasing number of private cars leads to traffic congestion as drivers often spend time on the road looking for a suitable parking near their destination. Cities such a Copenhagen and Tokyo have realised the adverse effects of excessive supply of parking on traffic congestion. Unregulated parking results in traffic congestion, air pollution and poor utilization of valuable space in cities. To overcome this challenges, urban areas should have developed parking policies and regulations that restrict parking within the cities and introduce time-based pricing mechanism for parking spaces.

[8] Japan International Cooperation Agency. (2009). The Study on Comprehensive Urban Development Plan Urban (Final Report Volume II). Retrieved from http://open_jicareport.jica.go.jp/

Figure 8: Disorganised on-street parking results in a poor walking environment.

Figure 9: Low parking fees encourages use of private vehicles thus contributing to traffic congestion.

3.5 Street lighting

Street lighting is generally missing on most Lusaka streets, making the streets dark and insecure for pedestrians and cyclists. Some main roads such as the Great East Road (T4) have street lights, but the lights are not functioning.

Figure 10: Street lighting is poor in most of Lusaka.

3.6 Storm water management

Due to insufficient storm water drainage, Lusaka experiences severe flooding during the rainy season. The problem is particularly acute in informal settlements. Flooded streets are inaccessible and unsafe, especially to vulnerable groups such as children, women, and persons with disabilities.

Figure 11: Inadequate storm water drainage makes for a poor walking environment and substandard living conditions.

Figure 12: Street designs that discharge storm water through the footpath result in an unpleasant walking environment.

3.7 Building design

Good quality active frontage can significantly contribute to creating a lively, and attractive public space, affecting people's perception in terms of safety, and thus encourage more walking. To develop animated streets, it is essential to assure a wide variety of uses on the ground floor, such as workplaces, storefront shops, restaurants, residences, and services. Those activities should have a visual connection with the exterior, to also promote a better perception of safety.

Outside of the central business districts in Zambian cities, formal developments in middle and upper income areas do not present a desirable level of interior–exterior interactions. Instead, many plots are lined by compound walls. At night, streets are very dark due to the lack of adjacent shopfronts. Cities should promote visually active frontages to promote more animated and secure streets.

Figure 13. Traditional developments in city centres feature buildings fronting directly on the street with active edges that promote pedestrian activity.

Figure 14: Compound walls and blank facades in many new developments prevent interaction between building interiors and public space.

4. Road safety

Road crash injury is the eighth killer of all ages globally. It is the leading cause of death for children and youth between 5-29 years globally.[9] More than 90 percent of the fatalities happen in low and middle income countries, with the highest deaths rates being recorded in Africa region.[10]

Due in part to a lack of adequate facilities for NMT, Zambia experiences a high rate of fatalities from traffic crashes. According to the WHO Global Status Report on Road Safety 2015, traffic death rate for Zambia was 24.7 per 100,000 population.[11] This rate is around the average for Africa, which is 50 percent worse than global average.[12] Road traffic crashes are third leading cause of death in Zambia after HIV/AIDs and Malaria, with majority of the victims being NMT users.[13,14,15] In addition to the human cost, the economic cost of road traffic crashes amount to 3 percent of Zambia's gross domestic product (GDP), including expenses towards importation of medicine and spare parts.[16]

According to the National Transport Policy, 2016, the number of road crash fatalities in Zambia increased by about 50 percent from 1,238 in 2008 to 1,858 in 2014. Fatalities per 100,000 persons grew by 30 percent during the same period.[17] In 2017, 1,989 people were killed in crashes.[18] Some of

[9] World Health Organisation (WHO). (2018). Global Status Report on Road Safety.
[10] World Health Organisation (WHO). (December, 2018). Road Traffic injuries. Retrieved from https://www.who.int/news-room/fact-sheets/detail/road-traffic-injuries on 16 April, 2019.
[11]World Health Organisation (WHO). (2015). Global Status Report on Road Safety.
[12] Ministry of Transport and Communication. (2016). National Road Safety Policy, Strategy and Action Plan (Final draft).
[13] Ibid.
[14] Office of the Auditor General. (2015, July). Report of the Auditor General on Government's Measures to Reduce Road Traffic Accidents. Retrieved from http://www.ago.gov.zm/
[15] Zambia Road Safety Trust. (2014, July). Zambia Road Safety Trust Strategy, 2014 – 2017 – Save Lives on Zambia Roads. Retrieved from http://zambianroadsafety.org/
[16] Ibid.
[17] Ministry of Transport and Communications. (2016). National Transport Policy.
[18] Lusaka Times. (2018, Jan 16). Close to 2,000 people died in road crashes in 2017. Retrieved from https://www.lusakatimes.com/2018/01/16/close-2000-people-died-road-crashes-2017/

the key factors contributing to fatal road crashes include high speeds by the motorised traffic and road designs with inadequate safety features.[19]

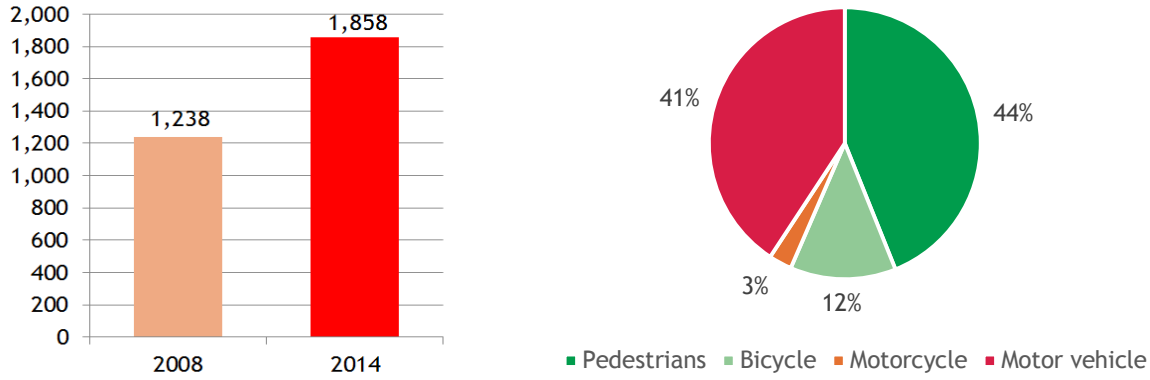

Figure 15: Road fatalities in 2008 and 2014 (left)[20] and fatalities by road user (right).[21]

5. Assessment of the institutional & legal framework

5.1 Institutional structure

The Ministry of Communications and Transport (MOCT) is responsible for overall transport policy while three agencies are responsible for road development and management: Road Development Agency (RDA), Road Transport and Safety Agency (RTSA), and National Road Fund Agency (NRFA). The Public Roads Act No.12 of 2002 assigns the responsibility for public roads to RDA, while the Local Government Act Cap 281 the Ministry of Local Government and Housing (MLGH) and Local Road Authorities (LRA) the responsibility for managing urban and rural roads.[22] However, in practice RDA continues to develop and maintain major roads in urban areas. RTSA was formed by the Road Traffic Act No. 11 of 2002, while NRFA received its mandate from the National Road Fund Act No. 13 of 2002.[23]

The formation of RTSA in 2002 represented a major step toward ensuring greater safety for road users. The Agency is responsible for licensing drivers and vehicles and regulating traffic in ways that enhance road safety and reduce crashes. Some highlights from RTSA's projects and programmes include a fast-track court cases for road traffic offences, web-based crash reporting systems, road safety audits, 858 school safety clubs, a road safety curriculum for primary and high schools, and rules on blood and breath alcohol concentration (BAC) limits. The fast-tracked courts in particular have set a tough stand against careless driving by revoking and suspending licenses and publishing

[19] Ibid.
[20] Ministry of Transport and Communications. (2016). National Road Safety Policy Strategy and Action Plan
[21] Ibid.
[22] National Assembly of Zambia. (1991, September). *Local Government Act Cap 281*. Retrieved from http://www.parliament.gov.zm/
[23] National Assembly of Zambia. (2002, December). *National Road Fund Act No. 13 of 2002.* Retrieved from http://www.parliament.gov.zm/

offenders' names in print media.[24] RTSA's information and education work also has helped with public awareness of road safety. Events such as the World Day of Remembrance for Road Traffic Victims, Road Safety Week, and the media campaign "Road Smart—Life is Precious" have gained wide publicity. RTSA also reaches out to communities through joint road shows with the Zambia Police and campaigns during traditional ceremonies that rely on traditional leaders and churches to convey road safety messages.

Coordination among multiple agencies responsible for managing the NMT environment is a challenge. RTSA hosts ad-hoc road safety reviews and reports on safety measures that may be considered by RDA, but RDA is not legally obligated to adopt the recommendations. The overlap of RTSA and the Zambia Police also affects enforcement clarity. The National Transport Policy (NTP) promised that the Government would harmonise the Public Road Act No.12 of 2002, the Road Traffic Act No.11 of 2002, the National Road Fund Act No. 13 of 2002, the Local Government Act Cap 281, and other auxiliary legislation. It also calls on the Government to establish Public Transport Authorities (PTA) in all local authorities, starting with City Councils, followed by Municipal Councils and eventually District Councils.

5.2 Policies and legislation

Zambia's road legislation and policies do not adequately address non-motorised transport (NMT). The National Transport Policy, adopted in 2016, states broadly that government would support the development of NMT, but the policy only briefly noted the current lack of NMT facilities under the short section "Rural Non-motorised and Intermediate Transport." The implementation plan allotted no annual targets or estimated costs for constructing walkways and cycle tracks, unlike other activities.[25]

NMT was noted in the National Road Safety Policy Strategy and Action Plan 2017-2020, developed by MOCT with European Union funding. The document envisions "a safe road network for all road users" in line with the United Nation's Decade of Action for Road Safety, which declared a goal of reducing road fatalities by 50 percent by 2020.[26] The Action Plan calls for road designs that meet the mobility and access needs of all users, especially vulnerable road users and those with disabilities. The Plan calls for the provision of footpaths, cycle tracks, and protected crossings. The Plan also designated MOCT to develop an NMT Policy; RDA to ensure that all new road designs consider NMT; and RDA, MLGH and LRAs to develop guidelines for NMT facilities. Most of these policy measures have not been implemented.[27]

The Persons with Disabilities Act 2012 mandates the provision of a built environment and transport facilities that are accessible to persons with disabilities.[28] The Roads and Road Traffic Act Cap 464 of the Laws of Zambia prevents people with disabilities from acquiring a driving license, which makes universal access in the NMT environment all the more important.[29]

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[24] Fast track courts bring sanity on Lusaka roads. (2016, July 30th). Retrieved from https://zambiadailynation.com/2016/07/30/fast-track-courts-bring-sanity-on-lusaka-roads/
[25] Ministry of Transport & Communications. (2016). National Transport Policy.
[26] Ministry of Transport & Communications. (2016). National Road Safety Policy Strategy and Action Plan
[27] Ibid.
[28] National Assembly of Zambia. (2012, July). *The Persons with Disabilities Act 2012*. Retrieved from http://www.parliament.gov.zm/
[29]National Assembly of Zambia. (1971, December). *The Roads and Road Traffic Act Cap 464*. Retrieved from http://www.parliament.gov.zm/

5.3 Import tariffs

Zambia currently levies a 25 percent tariff on the import of bicycles.[30] By contrast, motorcycles attract a tariff of 0 percent, and small cars attract a tariff of 20 percent.[31] Bicycle parts also attract significant tariffs: bicycle tubes and tyres have a 25 percent tariff, while bicycle lights are charged at 15 percent.[32] The high tariffs on bicycles and bicycle parts represent a significant financial barrier to the purchase and use of cycles by low-income people.

6. Assessment of design standards & highway code

6.1 SATCC geometric design code

Road designers in Zambia currently rely on the Southern African Transport and Communications Commission's (SATCC) Code of Practice for the Geometric Design of Trunk Roads. The Code of Practice, developed for countries that comprise the Southern African Development Community (SADC), was originally derived from American and English standards and is oriented primarily toward rural road design. As a result, the guidelines are inadequate for urban settings.

SATCC assumes that along most rural roads, no specific provision is needed for pedestrians and cyclists. Paved footpaths are only warranted for certain volumes of pedestrian and vehicle traffic. For example, a paved footpath on one side of the road is warranted if the average daily traffic is between 400 to 1,400, design speed between 60 and 80 km/h, and the pedestrian flow per day is at least 300. The minimum width of footpath is set as 1.0 m for rural areas and 1.5 m for peri-urban areas. These widths do not suffice on busy urban streets. Contemporary street design standards generally call for a clear width of at least 1.8-2.0 m.[33] The provision for refuge islands is based on limited sight distances in mountainous areas and not as relevant. SATCC recommends the use of lighting only if pedestrian casualties occur frequently. Its provision of cycle track is also inadequate since it only suggests a width of 1.2 m if a hard gravel shoulder is provided next to the track and 1.5 m width for a soft shoulder or drop-off. In urban setting, the standard width of cycle track is 2 m.[34]

SATCC design speeds also differ from standard practice in Zambia. SATCC suggests a design speed of 120 km/h for trunk roads and a reduction to 100 km/h when necessitated by rolling terrain or a reduction to 80 km/h in the case of mountainous terrain. In Zambia, the default speed limit in general are 50 km/h in urban areas, and 100 km/h on open highways.

6.2 Highway Code

The Highway Code, issued in 2009, offers traffic rules applicable to cyclists. The Code is based on the UK code, the UN Economic Commission for Africa Highway Code, and the SADC Traffic Signs Manual. The general rules associated with cyclists include:

- Use of a helmet
- Use of a front and rear light

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[30] Zambia Revenue Authority. (2015, January). Customs and excise tariff. Retrieved from https://www.zra.org.zm/pages/documents/consolidatedTariffGuide.pdf
[31] Ibid.
[32] Ibid.
[33] See for example, Global Designing Cities Initiative. (2016). Global Street Design Guide. Retrieved from https://globaldesigningcities.org/publication/global-street-design-guide/
[34] Ibid.

- Use of “light-coloured or fluorescent” clothing
- Use of reflective clothing or accessories (i.e., ankle bands)

While helmets and bright-coloured clothing can improve cyclist safety, mandatory helmet and clothing rules can become a barrier to cycling. Too much policy focus on helmets detracts from the larger safety issues that cyclists experience on roads without protected cycle infrastructure. Helmet laws are designed to protect cyclists during crashes on unsafely designed roads and are unnecessary if cities adopt road designs that accommodate all users.

6.3 Land use regulations

Compact, mixed-use neighbourhoods make it easier for NMT users to access services. The Lusaka City Council City Planning Department calls for mixed use corridor development along arterial roads (e.g., Great East, Kafue, Mumbwa, Leopards Hill, and Great North Road). It states that the developments should accommodate compatible activities including shops, offices, indoor recreation, and residential functions. Different activities would be allocated to different floors of the same multi-storey development to maximise the utilisation of land in areas with high land value.[35]

7. Guiding principles for the NMT Strategy

7.1 Safety

Making non-motorised modes of transport viable and convenient requires rebalancing street space so that it caters to all modes transport. The physical design of streets and the provision of sidewalks, crossings, and other walking infrastructure is crucial to creating a high-quality walking environment. Accommodating NMT involves two basic techniques:

- **Systematic traffic calming on smaller streets** to reduce motor vehicle speeds and provide safe places for the mixing of pedestrians and other modes (shared lanes); and,
- **Pedestrian and cycle infrastructure that is physically separated from motor vehicle traffic on larger streets**, paired with traffic calming or traffic control to facilitate safe crossings. Pedestrian footpaths should provide clear space for walking, with other elements positioned in a strategic manner. These elements include paving, landscape planting, street lighting, street furniture, public facilities, underground utility access points, and other sidewalk amenities. There are also features that make streets more accessible, including curb ramps, tactile paving, and traffic signs. Similarly, dedicated cycle tracks should be provided, separate from the mixed traffic carriageway. Large streets require signalisation or traffic calming at crossings and intersections to enable pedestrians and cyclists to cross the street safely.

[35] Lusaka City Council. (2015). City Planning Department Sections. Retrieved from https://www.lcc.gov.zm/city-planning/

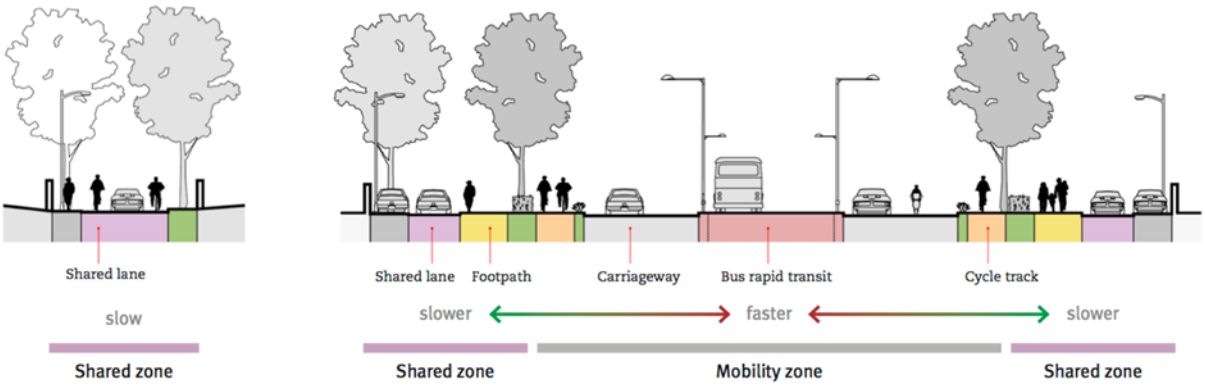

Figure 16: Smaller streets can function as shared spaces where pedestrians walk together with slow-moving vehicles (left). On larger streets with heavy vehicles and faster speeds, separate space for pedestrians and cycles is needed (right).

Safe street design also aims to encourage moderate vehicle speeds. Street designs that reduce motor vehicle speeds can significantly improve pedestrian safety since the likelihood of pedestrian death in a traffic collision increases dramatically when motor vehicle speeds rise above 30 km/h. A pedestrian has a 90 per cent chance of surviving being hit by a car travelling less than 30 km/h, but only a 50 per cent chance of surviving impacts at 45 km/h.[36]

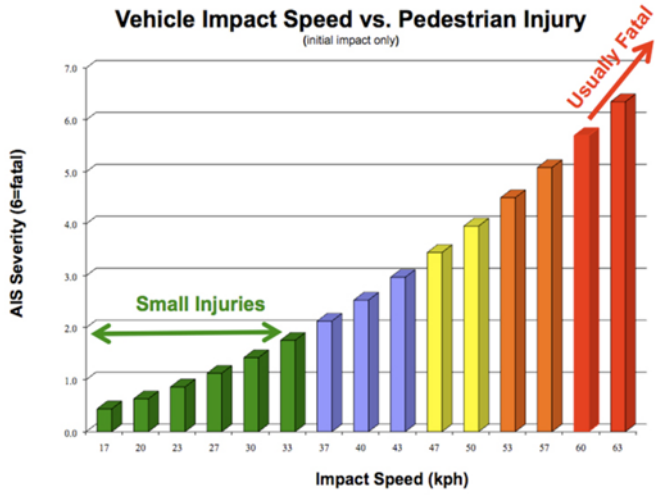

Figure 17: Speed reduction is a critical element of a safe pedestrian environment because the chance of pedestrian death in a collision increases dramatically when motor vehicle speeds rise above 30 km/h.[37]

A high-quality NMT environment recognises city streets not just as spaces for the movement of vehicles but also as inter-connected spaces where people walk, talk, cycle, shop and perform the

[36] WHO. (2013). Pedestrian Safety: A Road Safety Manual for Decision-Makers and Practitioners.

[37] Image source: Chester Chellman.

multitude of functions that are critical to the health of cities. Streets are the most valuable assets in any city and maximising their potential requires a "complete" approach to street planning and design. This can be achieved by applying a set of well-defined principles and standards that target street design, building design, and network design.

7.2 Universal access

All citizens of Zambia have the right to safe and efficient urban transport services and infrastructure. The NMT Strategy will ensure universal access in provision of urban transport infrastructure and services. Universal access is the concept of designing transport services and environments that as many people as possible can use, regardless of age or ability. Streets designed according to universal access principles accommodate assistive devices for particular groups of persons with disabilities.

In order to ensure that persons with disabilities can make complete journeys, needs should be accommodated in each step of the transport chain, from origin to destination. Accessibility to transport is only as strong as its weakest link, so inclusive design must cover public passage, public transport stop and boarding, vehicle interiors, alighting, and passage to the final destination.

An accessible environment has ample, well connected pedestrian facilities with unobstructed space for movement, consistent pavement surfaces, appropriately sloped ramps, and safe pedestrian crossings. Multiple elements of the streetscape must be designed in an integrated manner in order for the space to work. People with small children, people carrying heavy shopping or luggage, people with temporary accident injuries, and older people can all benefit from an inclusive transport environment.

7.3 Equity & social justice

The Zambia Government will ensure an equitable allocation of resources to the various urban transport modes and equitable access to efficient and safe transport services. Transport investments will prioritise modes used by lower income groups, including walking, cycling, and public transport.

The Strategy also seeks to ensure gender equity by supporting the development of an integrated and safe transport system that provides access to education, work, health care, cultural, and other important activities that are crucial to women's participation in the society. Of particular concern in the context of street design is the level of safety and security that female users experience. Inclusive designs help to improve the experiences of women and girls, making it easy to walk, cycle, or use public transport.

7.4 Collaboration

Provision of urban transport services and infrastructure is complex task that calls for concerted efforts and participation of all relevant stakeholders. Development and implementation of the Zambia NMT Strategy will be achieved through close collaboration among government departments, civil society, the private sector, and other partners.

7.5 Environmental sustainability

The government will prioritise urban transport modes that minimise emissions of harmful local pollutants and greenhouse gas emissions.

7.6 Accountability & transparency

Service providers in urban transport infrastructure and services shall ensure the best use of available resources and account for their utilization. The NMT Strategy seeks to promote participation of all stakeholders for effective monitoring of service delivery over time. The government will encourage open access to transport data, reports, and other resources related to the NMT Strategy.

8. Vision and goals

The Government of Zambia has adopted the following vision for the walking and cycling network in all cities and urban areas in the country:

> Zambian cities and towns will provide safe, efficient, and accessible walking and cycling networks to improve mobility for all residents, enhance access to opportunities, and promote equitable allocation of street space.

Investment in high-quality NMT facilities is expected to yield numerous benefits, including improved convenience for pedestrians and cyclists; a reduction in fatalities and injuries from traffic collisions; improved economic vitality; cost savings for the government; improved public health; greater social cohesion; enhanced security in the public realm; foreign exchange savings due to reduced fuel use; and reduced emissions of local air pollution and greenhouse gases.

The following table summarises the key goals that the Government aims to achieve over the next ten years. Central to achieving these outcomes is a holistic approach to NMT promotion, incorporating a variety of interventions ranging from infrastructure improvements to more effective street management. Besides the NMT initiatives outlined in this Strategy, improved public transport services will form the backbone of the sustainable transport system and are critical to meeting the targets listed below.

Table 3: Ten-year goals for an improved NMT environment in Zambian cities.

Goal	Contributing Actions	10-year targets
Increased mode share of walking, cycling, and public transport	• Investments in high-quality walking and cycling facilities. • Improved last-mile connectivity to public transport.	• Public transport and paratransit constitute 80% of all motorised trips • Modal share of NMT remains at or above 60% of trips. • Women constitute 50% of cyclists.
Reduction in the use of personal motor vehicles (PMV)	• Measures to manage/control private-vehicle use. • Improved attractiveness of sustainable modes	• Vehicle kilometres travelled (VKT) by PMVs are no more than 2018 levels.
Improved road safety	• Safe crossings, improved intersections, and dedicated facilities for NMT.	• Fatalities of pedestrians and cyclists are reduced by 80 percent below 2018 levels.
Improved air quality	• Increased investments in high-quality walking and cycling facilities.	• WHO ambient air quality norms are met 350 days a year.

	• Measures to control private vehicle use in place.	• Greenhouse gas emissions follow the overall targets set in Zambia's Nationally Determined Contribution.

To achieve the goals listed above, the Government of Zambia will invest in walking, cycling, and public transport, and manage private vehicle use per the following implementation targets. The Government urges local authorities and other concerned agencies to take complementary actions to realise these targets.

Table 4: Implementation targets for Zambian cities.

Initiative	5-year target	10-year target
Footpaths	5 km per 100,000 population.	10 km per 100,000 population.
Cycle tracks	2 km per 100,000 population.	5 km per 100,000 population.
Traffic calming	Traffic calming measures paved streets ≤ 12 m wide: 10 km per 100,000 population	Traffic calming measures paved streets ≤ 12 m wide: 20 km per 100,000 population
Universal access	All new road project incorporate universal access provisions.	All footpaths and road crossings accessible to persons with disabilities.
School zones	Safe crossings and other facilities implemented at all schools located on arterial streets.	Safe crossings and other facilities implemented at all schools.
Bicycle sharing	Cities with population over 300,000 implement first-phase bicycle sharing systems with at least 200 cycles each	200 shared cycles per 100,000 population.
Rapid transit	First-phase corridor with high quality NMT facilities (at least 10 km) implemented in cities over 1 million	3 km per 100,000 population, for cities with a population over 1 million
Parking management	100 spaces per 100,000 population managed through and IT-based parking management system.	400 spaces per 100,000 population managed through and IT-based parking management system.
Land use	All rapid transit corridors identified as transit-oriented development corridors. The largest dimension of blocks in all new developments to be 150 m or less.	-
Outreach & communications	Spend 1% of the city's transport budget on campaigns to create awareness among citizens and policy makers.	Spend 1% of the city's transport budget on campaigns to create awareness among citizens and policy makers until at least 75% of the goals are achieved.
Trade policies	Tariffs on bicycles and bicycle parts eliminated.	-

9. NMT initiatives

9.1 Pedestrian network

Major streets in all cities and towns in Zambia need high-quality footpaths. Well-designed footpaths provide continuous space for walking. They also support other activities such as street vending and comfortable waiting space at bus stops without compromising pedestrian mobility. The success of a

footpath depends on the integration of multiple elements in a coherent design. Footpaths need to be unobstructed, continuous, shaded, and well lit. Footpaths should consist of three zones (Figure 18):

- The **frontage zone** provides a buffer between street-side activities and the pedestrian zone and should be 0.5 to 1 m wide.
- The **pedestrian zone** offers continuous space for walking. The pedestrian zone should be clear of any obstructions, level differences, or other obstacles to pedestrian movement and should have a clear width of at least 2 m.
- The **furniture zone** provides space for landscaping, furniture, lights, bus stops, signs, and private property access ramps.

In addition, footpaths should be no higher than 150 mm above the carriageway level and should have a smooth surface. Footpaths should be designed without abrupt level differences, especially at property entrances and intersections. For persons with visual impairments, tactile paving can be installed to indicate locations where vehicles and pedestrians interact. Implementation phasing will prioritise streets with large volumes of pedestrians. In addition, wide footpaths should be developed on all planned BRT corridors.

Figure 18: All streets need to have safe and accessible spaces for pedestrians. Well-design footpaths have three main zones: the frontage zone; the pedestrian zone, providing at least 2 m of clear space for walking; and the furniture zone.

Crossings and junctions are also essential components of a well-connected street network. When properly designed, crossings and junctions allow pedestrians, cyclists, and other NMT users to cross busy streets safely and conveniently. At points where pedestrians need to cross multiple lanes of traffic, it is important to reduce vehicle speeds to safe levels (e.g., below 15 km/h) or incorporate signals to stop traffic. Refuge islands should be provided whenever pedestrians need to cross more than two traffic lanes at a time. Crossings also require proper signage and road markings.

Many cities have sought to increase vehicle speeds by providing grade-separated crossings. These facilities are often inaccessible to many people, including those with a disability, and increase pedestrian travel distances and times. While grade separation may be warranted along stretches with a highway typology, at-grade crossings are more appropriate when a highway interacts with urban environment with heavy pedestrian activity and other roadside activities. At crossing points where

multiple vehicle users interact, it is important to reduce vehicle speeds to safe levels (e.g. below 15 km/h).

Figure 19: Table-top crossings, such as the table top crossing at Manda Hill Mall, reduce the speed of motor vehicles and offer universal access for pedestrians.

The provision of shade protects pedestrian from exposure to the sun and makes walking a more enjoyable experience. Shade can be provided with trees, awnings, or arcades built into the building line to maintain cooler temperatures for walking. Many mature trees are currently present on many streets in Zambia towns (Figure). The existing trees should be preserved during road expansion projects. Further, all road infrastructure projects should incorporate provisions for new street trees and landscaping throughout the corridor.

Figure 30: Well shaded footpath in Lusaka (left) and in Ndola (right) provide a safe, and high quality walking environment.

Key actions

- Construct a continuous pedestrian realm with high-quality footpaths, safe at-grade crossings, street trees, and adequate street lighting along new and existing streets.
- Develop pedestrian zones on streets with high pedestrian volumes. Such streets will be closed to motorised traffic and can incorporate organised street vending.

9.2 Bicycle network

To enhance safety of cyclists and attract new users, Zambia cities and towns should plan for networks of dedicated cycle tracks with safe and user-friendly and convenient infrastructure. Such a network should include cycle tracks along key urban corridors and major streets with two or more lanes of traffic in each direction.

Cycle tracks require physical separation from the carriageway—painted lanes and "sharrows" are not sufficient to provide a safe cycling environment. Cycle tracks track should have sufficient clear width for cycle movement (i.e., at least 2 m), a smooth surface material (concrete or asphalt, but not paver blocks), shade from trees, an elevation above the carriageway, smooth transitions where level differences are present, and a buffer between the track and carriageway. Wider cycle tracks are needed to accommodate two-way movement. Cycle tracks should incorporate proper signage and road markings.

On smaller streets, separate cycle tracks may not be needed. Instead, traffic calming in the form of speed bumps, chicanes, and other elements can help to reduce motor vehicle speeds, making it easier for cyclists and vehicles to travel together.

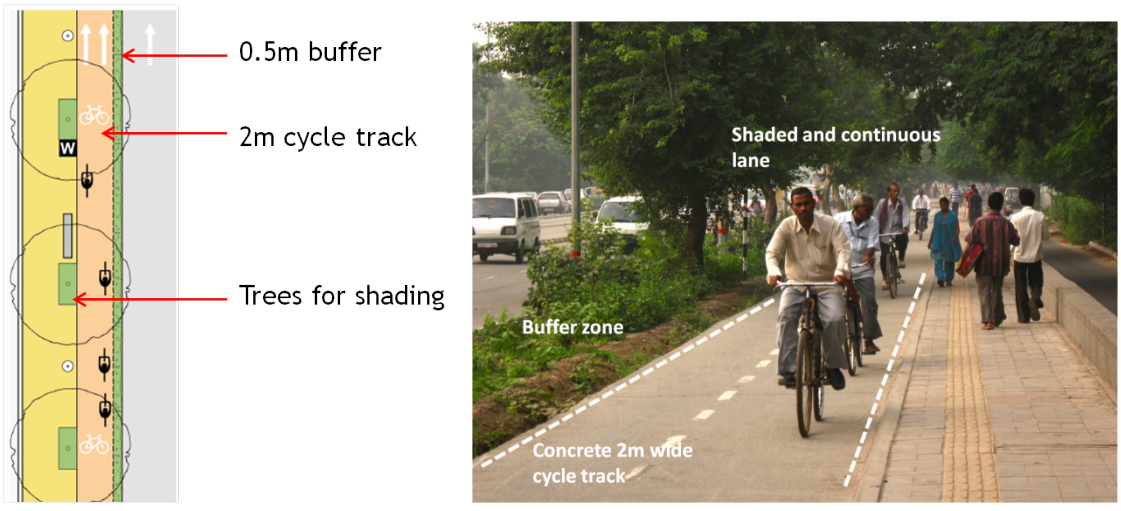

Figure 20: Cycle tracks should have a minimum width of 2 m and an elevation of 100-150 mm above the carriageway. Trees provide shade and comfort for cyclists.

Key actions

- Develop dedicated cycle tracks along major streets.
- Introduce bike repair training in technical colleges.
- Create bicycle parking at all public buildings, bus stations, and educational institutions.

9.3 Greenway network

To supplement walking and cycling improvements on city streets, open spaces in the city can be developed as NMT corridors that support commuting as well as recreational uses. The term "greenway" is used to describe walkways and cycle paths that utilise an independent ROW, such as in a park or water body. In this way, greenways can provide safe, convenient connectivity to important destinations, such as schools, colleges, and markets. Waterways can be cleaned through interception sewers and the removal of encroachments. Greenways should incorporate universally accessible walkways and dedicated cycle tracks, both of which should offer ample width for two-way movement and should be integrated into NMT networks along adjacent streets.

Key actions

- Develop greenways with NMT facilities along urban waterways.

Figure 21: Greenways can offer pedestrian and cycling paths along clean waterways.

9.4 Child mobility & health

Globally, road traffic injury is currently the leading cause of death for children and young adults. Specific efforts are needed to improve safety for children. As a first step, safe school zones should be developed around each elementary school to improve safety and expand opportunities for play. School zones typically include speed restrictions to 30 km/h or below within a 200 m radius of the school as well as traffic calming elements to ensure that vehicles follow the speed limit. In addition, signs indicating school zone presence, traffic calmed pedestrian crossings, and speed limits

should be installed to remind drivers to treat the area with special care and attention. In Lusaka, the Zambia Road Safety Trust, Lusaka City Council, and other partners have implemented a tabletop crossing outside the Northmead Primary and Secondary School to reduce vehicle speeds. Such efforts should be scaled up to schools across the country.

In addition to school zones, streets near playgrounds, parks, community centres, and other locations frequented by children require special attention to pedestrian safety. These areas also require footpaths, pedestrian crossings, cycle tracks, and other elements that improve safety for pedestrians and cyclists. Neighbourhood streets where children play also require traffic calming to reduce motor vehicle speeds. To further enhance the walking and cycling environment for children, public spaces and NMT facilities should incorporate spaces that encourage creative play.

Key actions

- Conduct audits of the NMT environment around schools to inform the prioritisation of school zone interventions.
- Develop safe pedestrian access in school zones including 30 km/h speed limits, continuous footpaths for a radius of 200 m from the school, safe crossings, and adequate signage.
- Adopt legislation to provide legal backing for traffic regulations in school zones.
- Incorporate facilities in public spaces and road corridors that encourage creative play. Such spaces should be connected to NMT networks through safe crossings and other means. Local streets in neighbourhoods should incorporate traffic calming to create safe spaces for children.
- Educate children and other road users on how to safely interact with streets paying special attention to children's mobility.

9.5 Street lighting

Adequate street lighting improves safety by enhancing visibility—both the NMT users' ability to survey the surroundings and drivers' ability to see pedestrians and cyclists. Street lighting also contributes to the perceived and actual threat of criminal activity. Designing streets with proper lighting therefore contributes to safety and security for NMT users at night and encourages NMT use.

Key actions

- Repair all faulty existing street lights and expand street lighting into new streets. Prioritise streets with a high frequency of crashes.
- Prepare maintenance plans for street lighting.

9.6 Intersection improvements

Improved intersection design can significantly reduce road crashes, injuries and fatalities while at the same time improving motorised traffic flow. Dedicated and protected space should be provided for pedestrians to safely cross the street at intersections. Vehicle traffic should be controlled through traffic signals, to allow ample time for pedestrians to cross a street. Traffic calming measures such as speed bumps, tighter turns, restrictions on free turns, narrower lanes are equally necessary to improve safety for all road users, particularly pedestrians and cyclists. Bollards are also useful for defining refuge islands and protecting pedestrian spaces from encroachment by motorised traffic. Bollard placement should allow for universal access.

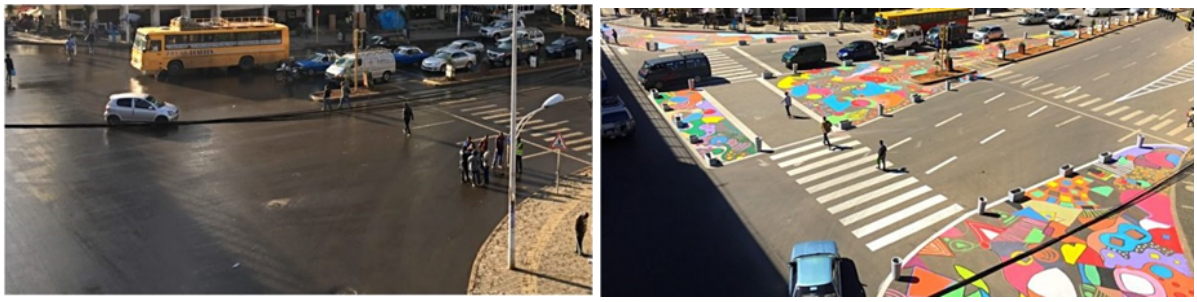

Figure 22: Before and after images of intersection modifications in Addis Ababa to reduce lane widths and turning radii for motor vehicles in order to improve pedestrian safety.

The following design strategies can be used;

- **Tightening corner radii:** Narrowing corner radii reduces vehicle turning speeds and pedestrian crossing distances. Reducing the size of a corner radius is key to creating safe and compact intersections.
- **Medians and refuge islands:** Centre pedestrian refuge islands which are raised and medians can be used to reduce lane width forcing drivers to slow down, thus improving safety of pedestrians.
- **Creating direct pedestrian crossings:** Pedestrian crossings should be aligned as closely as possible with the pedestrian clear path. Inconvenient deviations create an unfriendly pedestrian environment.
- **Narrowing and aligning travel lanes**: Compact intersections improve visibility for all users and encourage predictable vehicle movements. Narrowing travel lanes slows down vehicle traffic, while aligning lanes coming in and out of an intersection facilitates efficient movement of traffic.
- **Reclaiming underutilised space:** Implementing the above recommendations helps to reclaim underutilised space, that can be improved to create public spaces, designate vendor locations, or include safe public transport stops.

Key actions

- Review road safety data to identify hazardous locations and implement traffic calming improvements at dangerous intersections.

9.7 Bicycle sharing

Bicycle sharing can serve short trips in Zambian cities and improve last-mile connectivity to public transport through a healthy, safe, and environmentally friendly means of transport. Bicycle sharing will contribute towards the rollout of a truly integrated transport system, based on a network of high-capacity BRT, and city bus/paratransit corridors.

Bicycle sharing systems employ the following best practice features:

- A dense network of stations across the coverage area.
- Cycles with specially designed parts and sizes to discourage theft.
- An automated locking system that allows users to check cycles in or out without the need for staffing at stations.
- IT systems to track where a cycle is picked up, where it is returned, and user's identity.
- Real-time monitoring of station occupancy rates through General Packet Radio Service (GPRS), used to guide the redistribution of cycles.
- Real-time user information provided through various platforms, including the web, mobile phones, and/or on-site terminals.
- Advertising space on cycles and at stations (provides revenue generation options for system operator or city).
- Pricing structures that incentivise short trips, helping to maximize the number of trips per cycle per day.

Figure 23: A user checks out a cycle using a smart phone or RFID-enabled smart card and can return it to any other station (left). Bicycle sharing can improve last-mile connectivity for public transport systems (right).

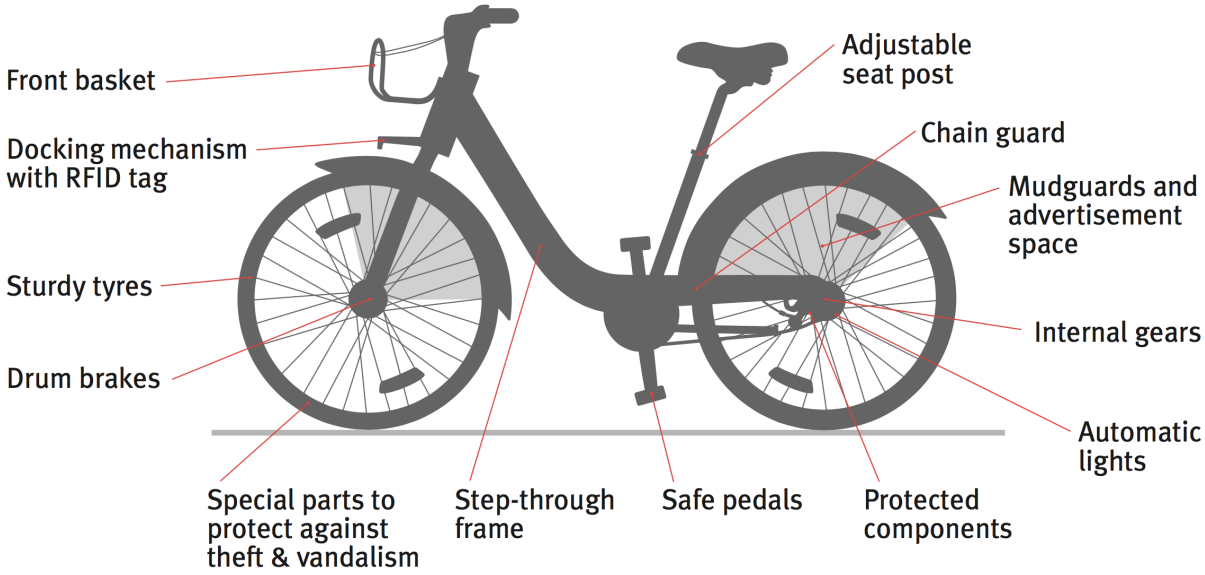

Figure 24: A unique, unisex, robust bicycle design is critical. Such a design increases brand awareness and allows the bicycle to be used by anyone.

Stations should be placed at frequent intervals, serving public transport hubs; offices and institutions; healthcare facilities; educational institutions; cultural hubs, and tourist destinations. Close station spacing reduces the distance that a user has to walk to access the bicycle sharing system.

Bicycle sharing can serve commuters who travel by public transport and need a "last mile" option to reach their final destinations; workers and students who need to make short-distance errands during the day; and tourists using the bicycles to explore the city centre. People who already use bicycles will benefit from "safety in numbers" once the system begins to generate a larger number of cycling trips in the city. In addition, bicycle sharing stations can be paired with parking areas for personal cycles. Dedicated bicycle facilities developed in the bicycle sharing coverage area will benefit existing cyclists and new users alike. The project also will provide an employment opportunity to the poor, particularly in the form of the semi-skilled labour in support of system operations.

The registration system should incorporate safeguards to accommodate vulnerable users. While the majority of users can access a bikeshare system through a website or station terminals, it is important to have a face-to-face platform at a central location where users can subscribe to the system and make payments. Through creative approaches to user registration, payment, and system management, bikeshare projects can overcome implementation barriers related to purchasing power, credit card/debit card penetration, smartphone penetration, and security.

Following the completion of preparatory activities, local authorities can contract private operators to install bikeshare systems and handle day-to-day operations and maintenance. To ensure long-term sustainability of the project, local authorities should identify full-time staff to manage bikeshare systems. Bikeshare systems can be funded through a combination of revenue sources, including advertising, sponsorships, user fees, and the city budget. The launch of bikeshare systems should be accompanied by a number of communications and outreach activities aimed at encouraging use of the system, particularly among women, and building a stronger cycling culture in the city.

Along with bicycle sharing systems in city centres, an important means of expanding access to cycles is the provision of bicycles through low-interest micro-loans or income generating projects. While

cycling may be cheaper overall than using public transport, the upfront cost of a high-quality bicycle can be prohibitive for low-income earners, especially after the application of high import tariffs. Microfinance can help reduce this barrier to cycle purchases.

Key actions

- Implement bicycle sharing systems in dense, mixed-use city areas to serve short trips and improve last-mile connectivity to public transport.
- Expand microfinance facilities to support the purchase of low-cost bicycles.

9.8 Review of street design standards

Engineers in Zambia currently rely on the SATCC Code of Practice for the Geometric Design of Trunk Roads. The Code of Practice, developed for countries that comprise the Southern African Development Community (SADC), originally derived from American and English standards and is oriented primarily toward rural road design. As a result, the guidelines are inadequate for urban settings.[38]

A Zambia Urban Street Design Manual (ZUSDM) should be developed to provide guidance on the design of urban streets. The manual should incorporate appropriate guidance on design speeds for different classes of roads, ensuring slower speeds that encourage safe motor vehicle driving behaviour. It should also incorporate details on the geometry of footpaths, cycle tracks, crossings, bus stops, street vending spaces, on-street parking, bus rapid transit, and intersections.

Key actions

- Develop a Zambia Urban Street Design Manual for use by RDA and local authorities to guide the design and development of urban streets.

9.9 Parking management

On-street parking should be provided only after adequate provisions have been made for higher priority transport modes, including walking, cycling, and public transport. Where on-street parking is provided, market-based parking fees can help manage demand. In addition, robust parking enforcement mechanisms are needed to ensure that walking and cycling facilities, once built, remain well maintained and free of encroachments. Over time, the rationalisation of on-street parking can help reclaim street space for sustainable modes and manage the use of personal motor vehicles.

The rapid influx of vehicles has resulted in growing demand for parking. Some local authorities in Zambia have contracts with private operators to collect parking fees in city centres. Outside CBDs, on-street parking is largely unregulated and in many cases haphazard. Vehicles often park on

[38] Southern African Transport and Communications Commission's (SATCC) Code of Practice for the Geometric Design of Trunk Roads

pedestrian footpaths, forcing pedestrians to walk on the carriageway. Since parking rules are not defined, enforcement is arbitrary. Parking outside of CBDs is usually free of charge and cities do not receive any revenue for the use of valuable public space by private vehicles.

Clear and consistent customer information on parking rules and fee levels is necessary for efficient parking management. Parking fees should be based on demand. Parking charges for areas with higher demand should be higher than those where demand is lower. Income generated from parking fees can be used for street improvement including construction of new NMT and maintenance of existing NMT facilities and tree planting.

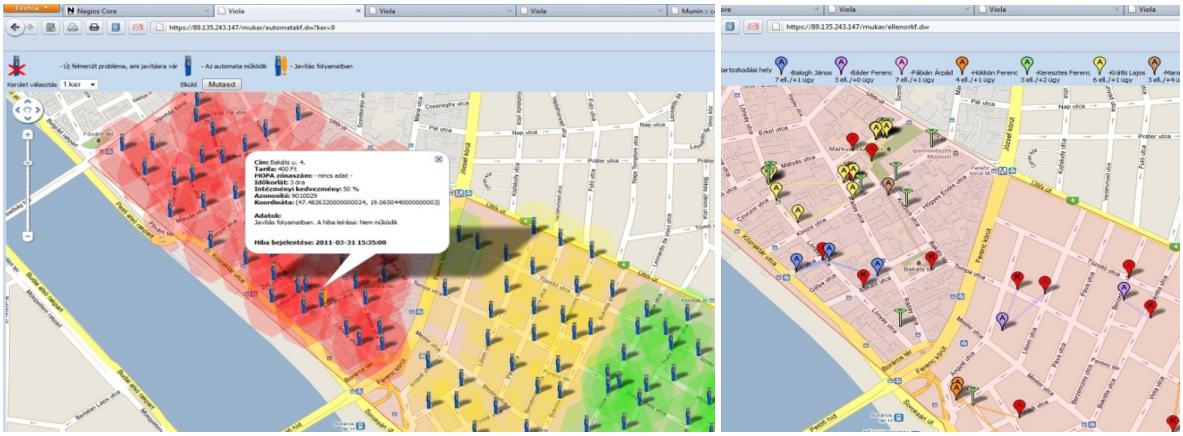

Figure 25: Budapest's parking management system provides real-time information on the status of all parking meters (left) and enforcement personnel (right).

Efficient and effective parking management systems should have the following features:

- Handheld devices for use by parking field officers to administer and enforce parking fees.
- Management software that will serve as the interface between the field officers, system managers, and the local authority.
- On-street signage, consisting of static signs informing drivers of parking regulations on each street and live message boards alerting drivers concerning available parking spaces nearby.
- Customer service kiosks should be set up at strategic locations to provide any necessary assistance or information to vehicle owners.
- A telephone hotline is necessary to facilitate communication between vehicle owners and city management.
- Mobile apps should be set up to provide live information on available parking spaces and information on parking fees.

Parking enforcement should be improved by monitoring of enforcement officers using an IT-based system. Through this system, the local authority can receive regular parking enforcement updates including number of vehicles checked, payment status, and information on completed enforcement activities. A GPS based system can be used to track individual parking attendants against a minimum number of vehicles that should be checked per hour. Vehicles parked on NMT or any other non-parking zones should be clamped and heavy penalties imposed.

Parking management system can be introduced along busy commercial streets in key cities such as Lusaka, Ndola, and Kitwe. A study for each city would be required prior to implementation to assess the current level of demand and inform the parking fee levels.

Figure 26: Bollards can help prevent parking encroachments on pedestrian spaces: Bengaluru (left) and Dar es Salaam (right).

Key actions

- Introduce IT-based on-street parking management systems with demand-based fees.
- Install bollards to prevent parking encroachments on footpaths.

9.10 Vendor management

Street vending not only employs many urban residents in Zambia but also is an important function in an urban street environment. Street vending makes streets vibrant and safer for pedestrians, offering essential goods and services as people walk to their destinations.

Dedicated vending spaces on city streets should be identified and clearly marked. Some vending zones can be time-based, with streets closed to motorised traffic at certain times of the day or certain days of the week. Local authorities can issue licenses to street vendors, set standards for vending stands, and monitor the upkeep of vending areas. Local authorities should provide waste disposal bins and constant enforcement to ensure that vendors keep their spaces clean and they do not encroach on pedestrian zone. Local authorities should encourage vendors to form associations to facilitate management.

Figure 27: The use of parking lanes and furniture zones for street vending can help ensure that clear space remains for pedestrian movement.

Key actions

- Work with vendors to form vending associations.
- Launch street vending management programs to facilitate the orderly reintroduction of street vending in Zambian cities.

9.11 Communications and outreach

Communications and engagement activities will play a key role in building public support for the NMT Strategy. Effective messaging about NMT and public activities can build enthusiasm for NMT use and can begin to foster a changed culture that accepts walking and cycling as integral modes of transport. In addition, participation of local residents, businesses, and other stakeholders in the planning and design of streets can help improve transparency and foster the community's active use and sense of ownership of public spaces. Communications and outreach activities can include the following:

- **Open streets events** can help introduce the idea of streets as spaces that provide equitable access for all users. During such events, where private motor vehicles are temporarily banned and streets are opened for exclusive access by pedestrians and cyclists. Programmed activities during open streets events can include health and fitness activities, dance classes, bicycle maintenance clinics, inclusive recreation, and arts activities.
- **Marketing campaigns** can raise the profile of walking and cycling, encourage usage of the city's bicycle sharing system, and encourage safe driving among motor vehicle drivers. To reach a diverse audience, such campaigns should make use of multiple channels, including television, radio, print media, and social media.
- **Cycle trainings** can introduce safe cycling techniques and encourage ridership among new users, especially women and youth.

- **Sustainable commuting days** for government staff can expose city engineers and planners to issues faced by NMT and public transport users and will give an opportunity for staff to "lead by example."
- **Use of bicycles by city officials**, including the police, can help change the image of cycling.
- **Participatory planning activities** will give community members a chance to offer input on plans and designs for NMT projects. The Government of Zambia will adopt an open data policy to improve access to information. Stakeholder engagement should call on even non-NMT users to contribute to and support the implementation of the Strategy because the social and environmental benefits of NMT go beyond the direct benefits to the users themselves.
- **NMT award for local authorities:** The Government of Zambia can organise an annual NMT Award for the best performing city or town with respect to the planning, implementation, and maintenance of NMT facilities.

Figure 28: Car-free days in Mexico City (left) and Kigali (right) repurpose streets for walking, cycling, and other healthy activities.

Key actions

- Launch car-free day on at least one Sunday per month in Zambian cities.
- Launch monthly sustainable commuting (walking, cycling or public transport) day for national government and local authority staff.
- Restart reporting of road safety data to the World Health Organisation.

9.12 Review of building control & planning regulations

The built environment surrounding pedestrian routes must be conducive to walking. Walking is safer and more enjoyable when sidewalks are populated, animated, and lined with useful ground-floor activities such as store fronts and restaurants. In turn, being closer to passing pedestrians and cyclists increases the exposure and vitality of local retail, bringing significant economic benefits.

Architectural design elements such as building setbacks, the ratio of building height to street width, and the articulation and permeability of building-street interface (i.e., the number of doors and windows) have a major impact on the quality and safety of pedestrian spaces. Blank compound walls isolate the street from private uses and contribute to unsafe conditions for pedestrians. Similarly, parking setbacks diminish the connection between pedestrian activity on a footpath and activity inside adjacent buildings. They also increase the risk of parking encroachments on footpaths. Building control regulations should be updated to ensure that private developments contribute to the public realm rather than functioning as isolated islands of activity.

Besides active façades, another key to mobility for NMT users is a high ratio of intersection nodes to road links so that streets and pathways are well connected. The maximum recommended block size for people friendly streets is 100 m.[39] Prioritised connectivity creates finer grained networks for walking, including pedestrian-only streets. A fine-grained walking and cycling network helps to reduce trip distances and improves access to public transport.

Land use policies should encourage transit-oriented development (TOD) within walking distance (i.e., 500 m) of mass rapid transit lines. TOD policies can include affordable housing mandates, incentives for mixed use, and restrictions on off-street parking. All of these principles should be taken into account when preparing layouts and designs for condominium projects.

Figure 29. Planning and building control regulations should encourage active facades and mixed land use to create a safer and more attractive pedestrian environment.

[39] Institute for Transportation and Development Policy. (2017). The TOD Standard. Retrieved from https://www.itdp.org/tod-standard/

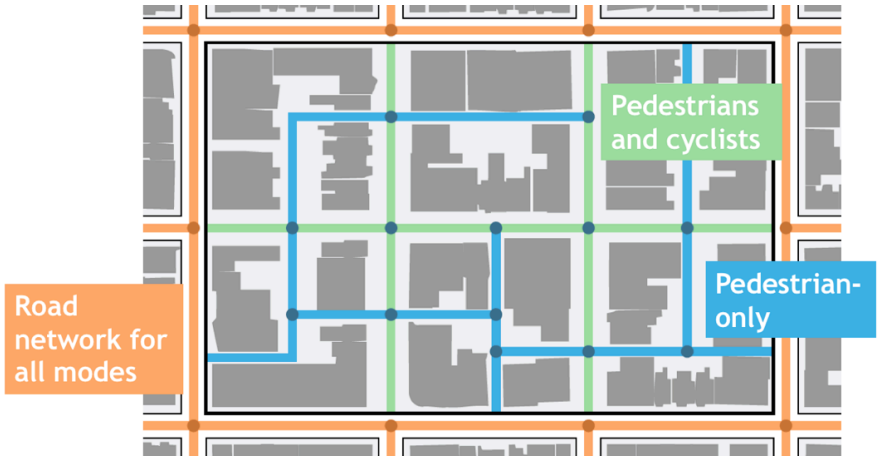

Figure 30: A fine-grained network of streets improves access for NMT users.

Key actions

- **Building control policies and regulations**: Each local authority should review building control policies and regulations to promote active frontage; minimise setback requirements; open setback spaces for pedestrian access; include arcades along commercial streets; and limit block size to 100 m for all future development projects.
- **Land use policies:** Land use policies should be revised to promote high density, compact developments within 500m of existing and planned BRT corridors. TOD elements will include affordable housing, higher densities, and maximum off-street parking limits.

9.13 Audits of on-going road projects

While some efforts to develop pedestrian walkways have accompanied road expansion and rehabilitation projects such as Link Zambia 8000, Pave Zambia 2000, and L400, the resulting NMT facilities fall short of best practices. While the streets incorporate rudimentary walkways, they lack other essential NMT facilities such as pedestrian crossings, cycle tracks, and safe intersection geometry. There is a need to review the designs for ongoing projects to ensure that all planned road project incorporate adequate infrastructure for NMT and public transport.

Key actions

- Review the designs for ongoing projects, including the Lusaka Decongestion Project, to assess the inclusion of footpaths, cycle tracks, crossings, and other NMT and public transport elements.
- Incorporate BRT with high-quality NMT access as part of the Lusaka Decongestion Project. Dedicated BRT lanes should be included on all grade separators planned under the Decongestion project.

9.14 Trade policies

Bicycles traditionally have been considered luxury goods and subjected to high import tariffs. Existing tariffs on bicycles are higher than those on motorcycles and some cars. To increase access to high-quality bicycles, tariffs on bicycles should be removed.

Key action

- Remove tariffs on imports of bicycles and bicycle parts.

10. Implementing the NMT Strategy

Achieving the ambitious goals outlined in the Zambia NMT Strategy will require steady progress over time, strong political will and public support. One way to build stakeholder buy-in is to implement demonstration projects to highlight the benefits of complete streets. Streets that experience high pedestrian volumes and serve as important access routes to public transport have potential for significant impact. By initially focusing on projects with a high probability of success, local authorities in the key cities and towns in Zambia can build public enthusiasm for more widespread transformations. While change may be difficult at the beginning, determined efforts can help Zambia to move toward making cycling and walking safe and enjoyable for all city residents.

10.1 Institutional framework

Successful implementation of street design projects will involve cooperation among multiple stakeholders.

10.1.1 Agency responsibilities

The following table displays the respective responsibilities of different agencies in implementing the NMT Strategy.

Table 5: Key government stakeholders and responsibilities.

Stakeholder	Responsibility
Ministry of Transport and Communications	• Provide political leadership and general oversight toward dissemination and implementation of the NMT Strategy. • Monitor progress over time.
Ministry of Local Government	• Design and implement high-quality walking and cycling facilities. • Update national street design standards. • Partner with academic institutions and technical organisations to conduct training programs for engineers, planners and other technical staff in the basics of street design.
Ministry of Housing and Infrastructure Development	• Develop model building control rules and planning regulations.
Road Development Agency	• Design and implement high-quality walking and cycling facilities.
Road Transport and Safety Agency	• Enforce traffic rules, educate street users, and identify where improvements are required to improve safety

Stakeholder	Responsibility
National Road Fund Agency	• Ensure allocation of adequate budget for NMT development and maintenance.
Local authorities / Transport Authorities	• Design and implement high-quality walking and cycling facilities. • Plan and implement bicycle sharing systems. • Develop greenway corridors with continuous walking and cycling facilities. • Oversee operations of the on-street parking management system. • Manage street vending. • Prevent encroachments on NMT facilities. • Conduct audits and surveys to monitor progress on implementation of the Strategy. • Manage local Urban Transport Funds.
Traffic Police	• Control and manage traffic operations.

Civil society, schools, universities, and the private sector also have a role to play in supporting implementation of the NMT Strategy.

Table 6: Non-governmental stakeholders and responsibilities.

Stakeholder	Responsibility
Civil society	• Bring attention to the right to movement, particularly for vulnerable groups such as children, women, and persons with disabilities. • Review designs for new streets. • Monitor NMT Strategy implementation.
Universities	• Conduct research on sustainable transport. • Train engineers, planners and architects on complete street designs, road safety, and transport planning.
Primary and high schools	• Incorporate road safety as part of the curriculum.
Public transport operators	• Improve access for persons with disabilities. • Practice safe driving around pedestrians and cyclists. Yield to pedestrians and cyclists at crosswalks.
Business community	• Engage in public private partnerships for NMT development. • Encourage employee commuting by sustainable modes. • Support bikeshare systems through sponsorships and advertising.
Development banks & agencies	• Support the preparation of technical studies for sustainable transport projects. • Carry out design review for ongoing projects. • Provide financing for sustainable transport initiatives.

10.1.2 National NMT Committee

The Government of Zambia and local authorities will develop appropriate frameworks to coordinate among key departments, both at the national and local levels. To improve inter-agency coordination, the MOTC will set up and convene regular meetings of a national NMT Committees to review proposed designs, guide implementation, and monitor performance over time. The NMT Committee will prepare quarterly and annual NMT implementation and maintenance reports and submit the same to the PS MOTC, listing any challenges experienced and recommendations.

The national NMT Committee will include representatives from the following agencies:

- Ministry of Transportation and Communications (MOTC) (Chairperson)
- Ministry of Local Government (MOLG)
- Ministry of Housing and Infrastructure Development (MHID)
- Road Transport and Safety Agency (RTSA)
- Roads Development Agency (RDA)
- National Road Fund Agency (NRFA)
- Zambia Environmental Management authority (ZEMA)
- Zambia Traffic Police
- Agency for Persons with Disabilities
- Lusaka City Council (LCC)

The Committee will invite additional stakeholders to participate in committee deliberations:

- Non-government or community organisations
- Local Government Association of Zambia
- Zambia Institute of Planners
- Engineering Institution of Zambia
- Representatives from universities

10.1.3 Transport Authorities

Per the National Transport Policy of Zambia (§6.1.2), local authorities shall create Transport Authorities to plan, design, implement, and manage urban transport systems. Transport Authorities will facilitate dialogue among city and national-level agencies that are involved in the planning, design, management, and operation of the transport system. They also will monitor transport service levels, usage patterns, and trends, and populate the database with information gathered from transport operators and primary surveys.

10.1.4 Local authority implementation committees

Local authorities are encouraged to form NMT Committees to develop NMT project plans; facilitate community participation; and monitor project implementation. Such committees can include the following members:

- City Town Clerk (Chair)
- City Director of Transport / Transport Authority CEO (Deputy Chair)
- Representative from MOLG
- Representative from city Department of Lands, Housing, Urban Development
- Representative from city Department of Environment
- Representative from city Department Finance & Economic Development
- Representative from city Department of Trade & Industry

- Representative of RDA (in districts where the agency is represented)
- Representative of RTSA (in districts where the agency is represented)
- Traffic Police, local office
- Residents association
- Business community representative
- Commuter association

10.2 Planning

Each city with a population of 400,000 and above is expected to develop a Sustainable Mobility Plan (SMP). An SMP will:

- Set a vision and quantitative goals for transport system improvements. SMPs should have a goal of a mode share of 80 per cent or more for walking, cycling, public transport, and intermediate public transport and less than 20 per cent for personal motor vehicles.
- Outline a comprehensive time-bound programme for expanding and improving NMT facilities, public transport, and travel demand management.
- Include explicit measures to reduce the absolute number of trips by personal motor vehicles and encourage a shift from personal motor vehicles to public modes and NMT.
- Describe land use reforms to complement the proposed transport improvements.
- Be consistent with this NMT Strategy.

Cities with a population below 400,000 will be encouraged to create NMT Plans with the following elements:

- Outline a comprehensive time-bound programme for expanding and improving NMT facilities.
- Be consistent with this NMT Strategy.

The Government of Zambia will ensure that all projects funded by the national government involving construction of new streets or retrofitting of existing streets improve safety and convenience for NMT users. As discussed above, the Government will create urban street design guidelines, known as the Zambia Urban Street Design Manual (ZUSDM). The ZUSDM will include detailed standards and design guidelines for footpaths, cycle tracks, carriageway, BRT, and other street elements. All designs will comply with the ZUSDM.

The Government will ensure that all transport-related planning, plans, and studies (including surveys, plans, forecasts and models, and implementation plans undertaken by professional staff, consultants and / or international agencies), even those without a specific focus on NMT, consider the impact of proposed interventions on NMT users. The Government will require, where possible, that NMT user participation is included in transport-related planning processes.

10.3 Funding

The Government will prioritise sustainable transport projects, including footpaths, cycle tracks, cycle sharing, and greenways, in order to meet the goals of this Strategy. National funding for urban transport, whether provided by the National Road Fund, the Government's budget, or other sources,

will be devoted to funding projects that benefit sustainable modes of transport (i.e., walking, cycling, and public transport). National funding for transport projects will be subject to consistency of the project with provisions of this Policy as well as the following specific conditions:

- The Government will provide funding for urban road projects only if the roads are designed as complete streets with adequate facilities for pedestrians, cyclists, and public transport users.
- The Government will provide funding for grade separators only if such infrastructure gives priority to public transport.
- The Government will not fund projects that expand the supply of parking for personal motor vehicles.
- The Government will facilitate funding from external sources for projects promoting the use of sustainable transportation modes as well as restricting the use of personal motor vehicles.

To receive national funding for urban transport projects, local authorities will be required to meet the following conditions:

- A local authority's capital expenditure on infrastructure for NMT, from its own resources as well as loans from external sources, must constitute 33 per cent of total spending on transport initiatives. Examples of such projects are: footpaths, cycle tracks, cycle sharing systems, and cycle parking.
- A local authority's capital expenditure on infrastructure for personal motor vehicles, whether from its own resources or as loans from external sources, may not constitute more than 33 per cent of total spending. Examples of such projects are: structures like flyovers and grade separators designed for better movement for personal motor vehicles, road widening, parking lots, and mechanised parking.
- The local authority must have an approved Sustainable Mobility Plan.

If a local authority does not meet one or more of these conditions, national funding for new projects will be withheld. If the local authority does not meet these conditions for two or more consecutive years, all national funding for new and existing projects will be withheld.

The Government will assist local authorities in creating dedicated Urban Transport Funds (UTF) to manage financial resources for the transport systems. The Government will provide funding support for feasibility studies and detailed project reports for street design, cycle sharing, parking management, BRT, and city bus improvements.

10.4 Monitoring & evaluation

Monitoring will consist of two broad components:

- Tracking of progress toward implementation targets (e.g., km of footpath, km of cycle tracks, number of managed parking spaces, etc.)
- Measurement of NMT Strategy outcomes (e.g., mode share of walking and cycling, VKT by personal motor vehicles, local air pollution levels, etc.)

Table 7 lists the data sources for the tracking of these indicators. MOTC will consolidate information gathered by local authorities, national agencies, and other stakeholders.

Table 7: Data sources for performance indicators

Indicator	Type of indicator	Data source(s)
Length of street with footpaths, cycle tracks, traffic calming, universal access, and rapid transit.	Implementation target	Street audits and government records
Fraction of schools with school zone elements.	Implementation target	Government records
Number of managed parking spaces	Implementation target	Government records
Number of bicycles available in bicycle sharing systems	Implementation target	Government records
Adoption of TOD policies	Implementation target	Government records
Spending on NMT-related communication campaigns	Implementation target	Government records
Removal of tariffs on bicycles	Implementation target	Government records
Fatalities of pedestrians and cyclists	Outcome	RTSA & Traffic Police records
Mode share of NMT and motorised trips	Outcome	Household surveys
Vehicle kilometres travelled (VKT) by PMVs	Outcome	Household surveys
Fraction of cyclists who are women	Outcome	Traffic counts
Ambient air pollution levels	Outcome	Pollution monitoring devices
Greenhouse gas emissions from transport	Outcome	Emissions inventory

To inform measurement of these indicators, initial NMT facility audits should be conducted by all local authorities. The audit will document the current extent of footpaths, cycle tracks, and other NMT elements. In each city, the information should be stored in citywide asset management system built on a Geographic Information Systems (GIS) platform. Over time, this database can be updated when street improvement projects are implemented on particular corridors. Other implementation target indicators can be measured directly through government data and records.

For the outcome indicators, some new data collection efforts will be required. In particular, information on mode shares and travel patterns will be obtained from household surveys conducted on a regular basis (e.g., every 5 years). In addition, gender disaggregated counts will be required to document volumes of NMT users, including the fraction of users who are women. Air pollution monitoring devices will be needed to measure ambient concentrations of local pollutants.

11. Action plan

The following table describes planned implementation activities for the first three years following adoption of the NMT Strategy. The pace of multiyear activities has been calibrated to meet the NMT Strategy goals by the end of the 10-year period.

Table 8. Action items

Initiative	Action steps	Primary agency responsible	Supporting agencies & partners	Timeline	Estimated resources required
Implement NMT demonstration projects in areas with high pedestrian and bicycle volumes					
Footpath & cycle track construction	Implement 40 km of complete pedestrian facilities and 20 km of cycle tracks per year across 10 key cities & towns. Prioritise streets with high NMT volumes and hazards for NMT users.	RDA Local Authorities	MOTC MOHID MOLG MOF Traffic Police	Annually	USD 18 million per year[40]
Traffic calming on local streets	Build speed bumps and other forms of traffic calming on 75 km of local streets per year across 10 key cities & towns. Prioritise streets with high NMT volumes, presence of children, and road safety challenges.	RDA Local Authorities	MOTC MOLG RDA MOF Traffic Police	Annually	USD 750,000 per year[41]
School zones	Introduce tabletop crossings, traffic calming, signage, and other elements outside 40 schools per year. Prioritise schools on arterial streets that face road safety hazards.	RDA Local Authorities	MOTC MOLG RDA MOF Traffic Police	Annually	USD 1.2 million per year[42]

[40] Cost estimate: 40 km of footpaths and 20 km of cycle tracks at USD 300,000 per km.
[41] Cost estimate: 75 km of streets retrofitted with traffic calming elements at USD 10,000 per km.
[42] Cost estimate: 40 school zones at USD 30,000 per school zone.

Initiative	Action steps	Primary agency responsible	Supporting agencies & partners	Timeline	Estimated resources required
Intersection retrofits	Build pedestrian crossings, refuge islands, footpaths, and other elements at 20 intersections per year. Prioritise intersections that are dangerous for pedestrians and cyclists.	RDA Local Authorities	MOTC MOLG RDA MOF Traffic Police	Annually	USD 2 million per year[43]
Street lighting	Repair and expand street lighting on major streets.	Local authorities	MOTC MOLG RDA MOF Traffic Police	Annual	USD 8 million per year[44]
Pedestrian zone in Lusaka	Develop a pedestrian zone on a street with high pedestrian volumes.	LCC	MOTC MOLG RDA MOF Traffic Police	Jan 2021-Dec 2022	USD 250,000[45]
Expand access to bicycles					
Bicycle sharing systems	Implement IT-based bicycle sharing systems in city centres and other dense, mixed-use city areas to expand options for short trips and improve last-mile access to public transport.	Local authorities	MOTC MOLG	First-phase systems launched by Jun 2020, with annual expansions and new systems launched thereafter	USD 1.9 million per year[46]
Bicycle purchase assistance	Introduce microfinance options to support the purchase of low-cost bicycles.	Local authorities	MOTC MOLG MOF Private sector	Planning in 2020 and launch in 2021.	Finance charges for low-cost loans
Develop design standards to ensure that all new street projects include best practice NMT facilities					

[43] Cost estimate: 20 intersections at USD 100,000 per intersection.
[44] Cost estimate: 200 km of street lights at USD 40,000 per km.
[45] Cost estimate: 0.5 km pedestrian zone at USD 500,000 per km.
[46] Cost estimate: Bikeshare systems with 750 cycles at USD 2,500 per cycle to cover hardware and six years of operating costs net of user fees.

Initiative	Action steps	Primary agency responsible	Supporting agencies & partners	Timeline	Estimated resources required
Develop and adopt the Zambia Urban Street Design Manual	Develop and adopt the Zambia Urban Street Design Manual, providing standards for urban streets in line with international best practices. A ZUSDM Steering Committee consisting of representatives from government agencies and local authorities will be appointed to guide the process.	MOTC	MOLG MOHID Local authorities RDA MOF	Jan-Dec 2020	Staff time to prepare the design standards. USD 30,000 for international street design expert to review the draft standards
Street design review process	Institute a design review process for all new road improvement projects. The ZUSDM Steering Committee consisting of representatives from key government agencies and local authorities will oversee the reviews	MOTC	MOLG MOHID Local authorities RDA MOF	Ongoing following adoption of the ZUSDM	Staff time
Manage streets to improve access and convenience for NMT users					
IT-based parking management systems	Implement an IT-based on-street parking management system to prevent parking encroachments on pedestrian spaces and generate revenue for pedestrian improvements	Local authorities	MOLG Traffic police	IT-based parking systems implemented in Lusaka, Ndola, and Kitwe by Jan 2021 and in other cities thereafter	Project will increase revenue generation for the government
Vending management system	Implement a vending management program to facilitate the orderly reintroduction of street vending in Zambian cities	Local authorities	MOLG	Pilot vending system launched in Lusaka by Jan 2022. Other systems launched thereafter	Staff time and modest costs for issuance of vending permits
Engage road users through communications and outreach activities					
Car-free days	Host monthly car free days to raise awareness of the importance of NMT spaces and sustainable transport. Car-free spaces will illustrate the need for more NMT facilities in urban areas while providing an opportunity for local authorities to engage in public outreach.	Local authorities	MOTC MOLG MOHID RTSA Traffic Police Civil society	Hold car free day once monthly per week starting Jan 2020	Staff time and public service announcements. Media adverts and social media. USD 10,000 per event for collateral and street management.

Initiative	Action steps	Primary agency responsible	Supporting agencies & partners	Timeline	Estimated resources required
Scale up road safety trainings	Conduct road safety trainings for at least 150,000 school children per year.	RTSA	MOTC MOLG Traffic Police Civil society organisations	Annual starting in 2021	Staff time
Dissemination of Zambia NMT strategy	Publicise the Zambia NMT strategy and issue a clear directive making clear that the provision of high quality NMT facilities is one of the top priorities for Zambia, including distribution on social media and government websites.	MOTC	MOLG, MOHID, RTSA, RDA Engineering and Urban Planning Associations, Civil society	Sep-Dec 2019	USD 2,000 for printing and distribution of the NMT Strategy to relevant government agencies.
Plan for NMT improvements and monitor progress					
Design review for ongoing projects	Review the designs for ongoing projects, including the Lusaka Decongestion Project, to assess the inclusion of footpaths, cycle tracks, crossings, BRT and other NMT and public transport elements	MOLG	LCC MOTC	Review completed by Aug 2019	Staff time
Identification of hazardous locations for NMT users	Analyse crash data to determine black spots where NMT user deaths from traffic crashes are concentrated.	RTSA	MOTC Traffic Police	Black spot study to be completed by Dec 2019	Staff time
Citywide audits of NMT facilities	Undertake NMT condition audit and stock taking in 10 key towns in Zambia. Identify and quantify priority streets for NMT implementation. Can be done by local authority staff for all towns except Lusaka.	Local authorities	MOTC MOHID MOLG NRFA	NMT condition audits to be completed by Dec 2019	USD 50,000 to hire a consultant for Lusaka audit. Staff time for other cities & towns
Mobility plans	Preparation of mobility plans by local authorities.	Local authorities	MOLG MOTC	Initial plans prepared from Jan 2020-Dec 2021	USD 500,000 for the Lusaka mobility plan. USD 50,000 per city for other cities.
Local NMT environment monitoring	Collect data on NMT infrastructure and usage to inform the monitoring of the NMT Strategy.	Local authorities	MOTC MOLG	Institute data collection requirements by Aug 2019. Data collection starting in 2020	Support from project design consultants. Staff time from local authorities

Initiative	Action steps	Primary agency responsible	Supporting agencies & partners	Timeline	Estimated resources required
WHO reporting	Restart reporting of road safety data to for the WHO Global Status Report on Road Safety	RTSA	MOTC	Share road safety data for 2019 and subsequent years	Staff time
NMT network plan	Prepare a citywide network plan for walking and cycling facilities in Lusaka to guide street development projects.	LCC	MOTC MOLG RDA	Jan-Dec 2020	Staff time and USD 100,000 for consultant
NMT Strategy monitoring	Consolidate NMT data from local authorities and government agencies to monitor progress in achieving NMT Strategy targets and outcomes.	MOTC	MOTC MOLG MOHID RDA Zambia Traffic Police RTSA Local authorities	Institute data collection process by Aug 2019. Data collection starting in 2020	Staff time
Adopt policy and legislative reforms					
Bicycle parking in buildings	Revise building regulations to mandate the provision of bicycle parking.	Local authorities	MOLG	Adopted by Dec 2020	Staff time
School zone legislation	Update legislation to provide backing for traffic regulations in school zones	MOTC	MOLG Traffic Police	Adopted by Dec 2020	Staff time
Bicycle tariff removal	Remove tariffs on bicycles and bicycle parts	MOTC	ZRA	Adopted by Dec 2020	Staff time
NMT friendly building control and land use regulations	Reform building control regulations to mandate active, permeable frontages and restrict large setbacks. Revise land use policies to encourage compact, mixed-use development along public transport corridors.	MOLG	Local authorities MOTC	Regulations drafted by Dec 2020 and adopted by Dec 2021	Local authority staff time to prepare the design standards. USD 30,000 for international urban design expert to review the draft standards.
Build capacity to design, implement, and manage NMT facilities					

Initiative	Action steps	Primary agency responsible	Supporting agencies & partners	Timeline	Estimated resources required
Zambia NMT Steering Committee	Establish an NMT steering Committee composed of representatives from MOTC, MOHID, MOLG, MOF, RTSA, Local authorities, RDA, and Traffic Police plus 3 independent representatives (civil society, built environment and residents). Conduct monthly meetings to coordinate projects related to NMT. Chaired by Director Transport.	Director Transport, MOTC	MOTC MOHID MOLG MOF RTSA Local authorities RDA Traffic Police 3 independent representatives	NMT Steering Committee to convene by Aug 2019	Staff time from participating agencies
Street design certification course	Establish a one week mid-career certification course on street design for technical staff from MOTC, MOHID, MOLG, MOF, RTSA, Local Authorities, RDA. The course will consist of four all-day class sessions plus a final presentation to directors of the participating agencies. Similar Course to be offered in Universities and Colleges offering Civil Engineering and Urban Planning.	MOWT	Universities, Colleges,	Development of curriculum through Dec 2019. Trainings from Jan 2020 onward	Facilities and local transport cost of USD 500 per participant. One-time cost of USD 30,000 for international street design expert to design the curriculum and train the trainers.
Study tour for technical staff	Organize study tours to Dar es Salaam and Kigali to learn about best practices in NMT and public transport planning.	MOWT	MOTC MOHID MOLG MOF RTSA Local authorities RDA.	Tour to Kigali to be organised by Dec 2019. Tour to Dar es Salaam to be organised by June 2020.	Cost per participant around USD 1,300 including airfare, hotel fees, booking costs, and per diem.
University curriculum on bicycle repair	Introduce bicycle repair training in technical colleges	Educational institutions	MOTC	Establish curriculum by Dec 2020. Courses based on curriculum from Jan 2021 onward	Staff time
University curriculum on complete street design	Integrate training on complete street design and pedestrian mobility into curriculum at local universities so that new professionals enter workforce properly trained in street design best practices.	University of Zambia, Departments of Civil Engineering and Urban Planning	MOTC RDA	Establish curriculum by Dec 2020. Courses based on curriculum from Jan 2021 onward	Staff time

Table 9. Timeline.

		2019			2020				2021				2022			
Initiative	**Action item**	**Q2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
NMT Strategy adoption	Final draft submitted to MoTC															
	Final draft reviewed by MoTC															
	Final draft discussed by Cabinet															
	Approval by Cabinet															
	Gazettement															
	NMT Strategy launched & disseminated															
NMT demonstration projects	Footpath & cycle track construction															
	Traffic calming on local streets															
	School zones															
	Intersection retrofits															
	Street lighting															
	Pedestrian zone in Lusaka															
Expand access to bicycles	Bicycle sharing systems															
	Bicycle purchase assistance															
Design standards	Zambia Urban Street Design Manual															
	Street design review process															
Street management	IT-based parking systems in Lusaka, Ndola, Kitwe															
	Vending management system launched in Lusaka															
Communication & outreach	Car-free days															
	Road safety trainings in schools															
Planning & monitoring	Design review for ongoing projects															
	Identification of hazardous locations for NMT users															
	Citywide NMT audits															
	WHO reporting															
	Lusaka NMT network plan															
	Mobility plans															

		2019			2020				2021				2022			
Initiative	**Action item**	**Q2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
	NMT environment monitoring															
Legislative & policy reforms	Bicycle parking in buildings															
	School zone legislation															
	NMT friendly building control regulations															
	Bicycle tariffs															
Capacity building	NMT Steering Committee															
	Dar es Salaam study tour															
	Street design certification course															
	Kigali study tour															
	University curriculum on bicycle repair															
	University curriculum on street design															

12. Appendix: Street design standards

1. Street typologies

1.1. The street typologies listed in Table 10 will guide the design of street according to their role in the transport network and local conditions.

Table 10: Street typologies

Features	Local	Minor collector	Major collector	Arterial
Functions	Access to adjoining uses with little through traffic. Some roadside activity.	Local traffic movement and to connect to arterial streets. Moderate roadside activity.	Local traffic movement and to connect to arterial streets. Moderate roadside activity.	Meant for movement across the city. Significant road side activity.
Speed limit	20 km/h	30 km/h	40 km/h	50 km/h
Footpath clear width	2 m on at least one side; may also be designed as shared space	2 m on both sides	3 m on both sides	≥ 3 m on both sides
Cycling	In mixed traffic	In mixed traffic	May have dedicated cycle tracks if part of the cycling network	May have dedicated cycle tracks if part of the cycling network
Carriageway	3.5-5.5 m or shared space with priority to NMT modes	4.5-6.5 m, undivided; for two way movement	<5.5 m per direction	6 m (2 lanes)-9 m (3 lanes) per direction
Public transport	No	Feeder service	Feeder buses & medium frequency mainline bus services (<30 buses/h)	High speed/ high frequency bus service (≥30 buses/h). may have dedicate lanes
Medians and mid-block openings	Not applicable	No medians; Pedestrians can cross the carriageway anywhere	Intermittent median with a width of at least 1 m; Pedestrian crossings with a median refuge at least every 50 m; Median openings for vehicular movement permitted	Continuous Median of at least 1 m width; Pedestrian crossing with a median refuge at least every 200 m; No median openings for motor vehicles movement except at intersections
Intersections		Open at all intersections	When crossing an arterial, may be open and signalised; When crossing a major or minor collector, open and unsignalised	When crossing another arterial, open and signalised; When crossing a major collector, open and signalised; When crossing minor collectors and local streets, closed

				except for NMT users; At least one intersection every 500 m
At-grade pedestrian crossings at intersections	Raised speed table	Raised speed table	Not raised when signalized; Otherwise, raised speed table	Not raised
Typical ROW	<12 m	12-18 m	18-24 m	>24 m
Speed Reduction measures	Speed bumps, chicanes, etc.	Speed bumps, speed table crossings	Speed table crossings	Speed table crossings; traffic signals
Vehicle type	No heavy commercial vehicles	No restrictions except during certain times of the day	No restrictions except during certain times of the day	No restrictions except during certain times of the day
On-street parking	If space permits	If space permits	If space permits	Only from service lane, if one exists; short-term drop-offs and pick-ups may be allowed

2. Footpaths

2.1. Footpaths must meet the following standards:

2.1.1. Footpaths will include space for business frontage (frontage zone[47]), space for pedestrian mobility that is at least 2 m wide in residential areas and 2.5 m in commercial areas (pedestrian zone[48]), and space for landscaping and street furniture (furniture zone[49]) (Figure 31).

2.1.2. The height of footpaths will not exceed 150 mm above the carriageway.

2.1.3. Footpath surfaces will be evenly paved and smooth for all users, including those on wheelchairs.

2.2. Effort should be made to free up space for footpaths such as removing or realigning vehicle parking, junction boxes, and other obstructions and will prioritise street amenities such as street furniture, landscaping, and trees over vehicle parking.

2.3. Footpaths should be continuous even at property entrances for uninterrupted pedestrian movement. The height of the footpath should remain the same. To provide access to private properties, vehicle ramps should be provided in the furniture zone with a 1:6 gradient (Figure

[47] A frontage zone provides a buffer between street-side activities and the pedestrian zone. Next to a compound wall, the frontage zone can become a plantation strip.
[48] A pedestrian zone provides continuous space for walking and should be clear of any obstructions, level differences, or other obstacles to pedestrian movement.
[49] A furniture zone is a space for landscaping, furniture, lights, bus stops, signs, and private property access ramps

2). Bollards should be installed to prevent vehicles from parking on the footpaths, leaving a clear width of at least 1.2 m for wheelchair access between at least one set of bollards.

2.4. All rail overbridges and rail underpasses should have pedestrian access. Pedestrian and bicycle access on flyovers should be included where such access provides a mobility or safety benefit for NMT users.

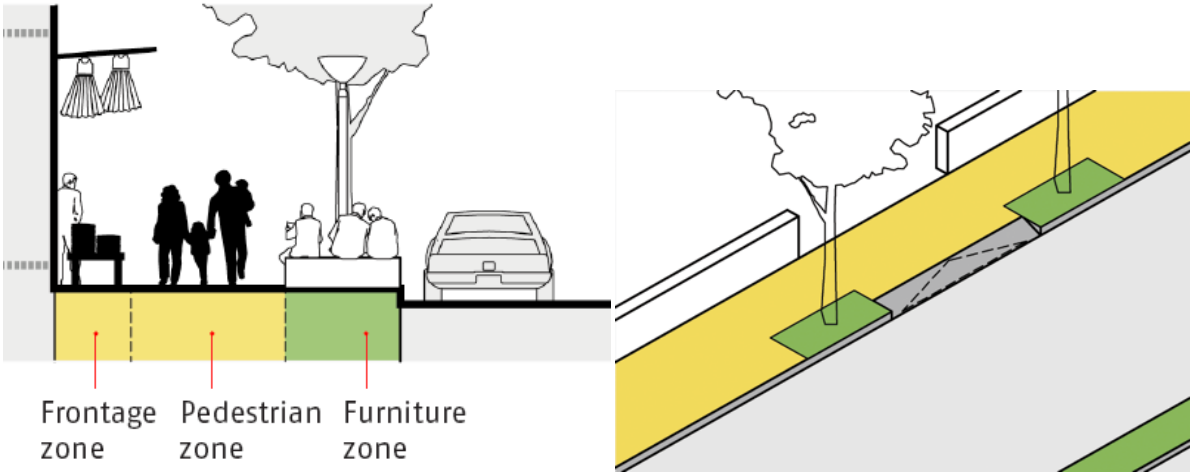

Figure 31: Footpaths should follow the zoning system, with a continuous pedestrian zone of at least 2 m (left). At property entrances, footpaths should remain at the same level, with vehicle ramps at a 1:6 gradient in the furniture zone (right).

3. Pedestrian zones

3.1. NMT-only streets will incorporate plazas, seating, trees and structures for shade, space for organised street vending, cycle parking, and access for emergency response vehicles.

3.2. All motor vehicle traffic will be prohibited, using barriers and enforcement to prevent their entry and encroachment of NMT space. Commercial deliveries to properties on such streets will be accomplished outside of normal business hours.

4. Pedestrian crossings: Midblock

4.1. All pedestrian crossings will be at grade. Skywalks may be created to link railway or public transport terminal to pedestrian bridges with key destinations provided that doing so does not compromise at-grade NMT infrastructure.

4.2. Pedestrian crossings will be provided at frequent intervals in order to improve safety and enhance compliance with designated crossings. Crossing locations and spacing will be informed by local conditions. In general crossings will be designed according to street typology as follows:

4.2.1. On local streets, pedestrians will be allowed to use the entire right-of-way, in the case of a shared space, or, if a footpath is provided, pedestrians will have the right to cross the street at any location.

4.2.2. On minor collector streets, pedestrians will have the right to cross the street at any location.

4.2.3. On major collector streets, medians will include pedestrian refuges providing safe street-level crossing opportunities at least once every 50 m. Formal marked crossings will be installed at least once every 100 m.

4.2.4. On arterial streets, at-grade pedestrian crossings with median refuges will be provided at least once every 100 m and every 200-400 m for rapid transit corridors.

4.3. At un-signalised crossings, raised speed table crossings will be constructed. Speed table crosswalks will have a minimum width of 3 m, be elevated to the level of the adjacent footpath, and have ramps for motor vehicles with a slope of 1:6 (Figure 32).

4.4. Medians will be designed as surmountable pedestrian refuge islands to enhance pedestrian safety. Streets with 4 or more traffic lanes will have medians with pedestrian refuges of minimum 2 m depth and 3 m width, with bollards located in the refuge space to enhance pedestrian safety.

4.5. Grade-separated facilities such as foot overbridges and subways are often unsafe and inaccessible to many users, and inconvenient for all pedestrians. Therefore, the facilities that involve a significant vertical displacement of pedestrians will not be permitted on urban streets. Such facilities will only be considered in the context of limited access expressways.

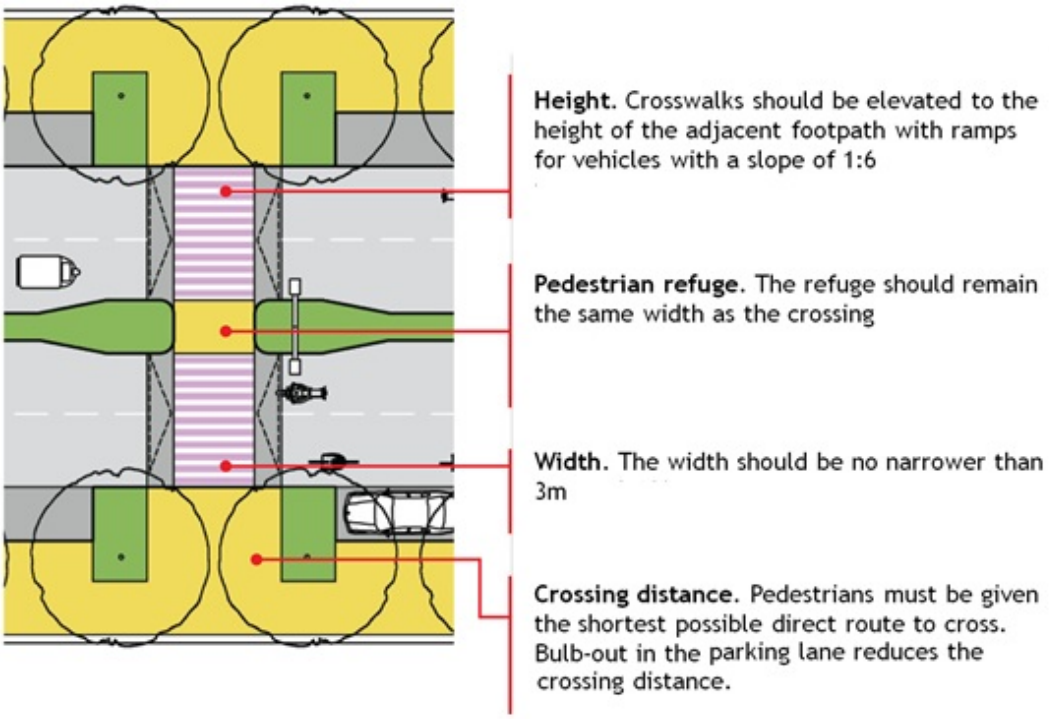

Figure 32: Raised pedestrian crossings are prefered as they reduce vehicle speed, thereby increasing pedestrian safety.

5. Pedestrian crossings: Intersections

5.1. At un-signalised intersections, raised crossings will be provided to ensure pedestrians can cross safely. They will be elevated to the level of the adjacent footpath, with ramps for motor vehicles with a slope of 1:8 (Figure 33).

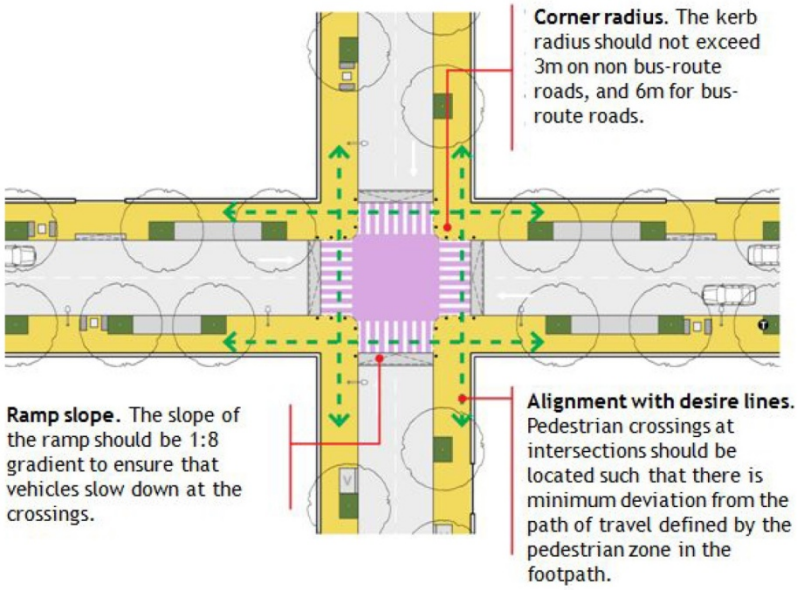

Figure 33: Raised pedestrian crossing at intersection

5.2. Smaller turning radii increase pedestrian safety by reducing vehicle speeds. Inner turning radii at intersections will not exceed 4 m on streets without bus service and 7 m on streets with bus service.

5.3. Pedestrian crossings at intersections will be designed to minimise crossing distances and follow pedestrian desire lines.

5.4. Tactile warning tiles will be installed at intersections so that people with visual impairments know where vehicles and pedestrians interact. Detectable tiles will be applied consistently throughout the city in order provide useful orientation cues for pedestrians.

6. School zones

6.1. NMT route plans will be created for all schools to determine the routes and NMT modes used by students to reach the schools.

6.2. Along major school access routes, the following interventions will be employed to improve access and safety:

6.2.1. The speed limit will be restricted to 30 km/h or below within a 200 m radius of the school and traffic calming elements will be installed to ensure that vehicles follow the speed limit.

6.2.2. Traffic calmed pedestrian crossings will be installed, meeting or exceeding provisions of Sections 4 and 5. Additional protection may include flashing beacons.

6.2.3. Signs indicating school zone presence, pedestrian crossings, and speed limits will be installed to remind drivers to treat the area with special care and attention.

7. Landscaping

7.1. All footpaths and cycle tracks should have a continuous tree lines to provide shade and improve the aesthetics of the streetscape.

7.2. Placement of landscaping should be coordinated with other street amenities (especially advertising panels and utility boxes) to maintain a clear path of travel for pedestrians and cyclists so as to not obstruct through movement.

7.3. Height of trees should be maintained so that it does not hinder the visibility of all road users. Tree canopies will have a minimum clearance of 3 m from the surface of the footpath to ensure better visibility for pedestrians.

7.4. Native trees will be planted to minimise irrigation and maintenance requirements and for prolonged tree life.

7.5. All trees will be protected with tree pits that allow maximum soil exposure enabling water and air to get to the roots.

8. Bus stops

8.1. Bus stops provide safety and comfort for passengers while waiting and will be placed at 200-400 m intervals so that passengers can easily access the nearest stop by foot.

8.2. Placement of bus shelters will maintain the continuity of footpaths and cycle tracks. This may imply diverting the footpath, cycle track, or service lane behind the bus shelter.

8.3. Bus stops will be placed adjacent to the bus linear line of travel so that a bus does not need to pull over to the left. If there is parking space between the footpath and the carriage way, bus stops will be located on the bulb-out of the parking lane.

8.4. Bus stops shall be sufficiently spaced from an intersection based on the bus frequencies and traffic volumes so as not to obstruct flow of traffic.

8.5. Stops will be managed to allow buses to only drop and pick passengers and prohibit buses from holding at the stop for long periods. Where long stay buses are necessary, these should be accommodated at high quality terminal stations at the ends of the bus corridor.

8.6. The length and width of a bus stop will vary depending upon passenger demand. However, it is recommended that bus stops be at least 2.5 m wide which is adequate for seating arrangements.

8.7. Seating will be more than 450 mm above the finished floor level. The finish floor level will not exceed 150 mm above the carriageway.

Figure 34: Bus stops should be placed adjacent to buses' linear line of travel and should allow for continuous footpath and cycle tracks.

9. Street lighting

9.1. Street lighting should be provided such that the longitudinal dimension is equivalent to three times the pole height, and horizontal dimension is slightly longer than the pole.

9.2. The table below indicates pole height and spacing options. The spacing between two light poles will be approximately three times the height of the pole.

Table 11: Pole height and spacing metrics

Street type	Pole height (m)	Spacing (m)
Footpath or Cycle track (< 5 m width)	4.5 - 6.0	12 - 16
Streets with ROW of 9 m or less	8 - 10	25 - 27
Streets with ROW of more than 9 m	10 -12	30 - 33

9.3. Poles will be no higher than 12 m to reduce undesirable illumination of private properties.

9.4. Additional lighting should be provided particularly at black spots, areas of sexual harassment and/or violence, areas of personal crime, and areas of isolation.

9.5. The placement of street lighting should be coordinated with other street elements so that they do not impede proper illumination.

9.6. A single row of light posts is generally sufficient for streets up to 12 m wide.

9.7. On wider streets, dual lights can be mounted on a single central post.

10. Street vending

10.1. Street vending should be accommodated where there is demand for their goods and services. Well-planned vending zones allow formal and informal vending to coexist together without compromising pedestrian and cyclist mobility.

10.2. Vending areas should be positioned in the furniture zone of the footpath in order to ensure the continuity of footpaths and cycle tracks.

Figure 35: Street vendors should be accommodated to enliven public spaces without compromising the continuity of cycle tracks and footpaths.

11. Street furniture and amenities

11.1. Street furniture will be located where it is likely to be used. Furniture is required in larger quantities in commercial hubs, market areas, junctions, bus stops, railway stations, and public buildings, and on streets with high pedestrian activity. Refuse collection furniture / waste bins will be provided at frequent intervals (e.g. every 20 m) on streets with large numbers of pedestrians and commercial activity. Public toilets will be placed at every 500–800 m.

11.2. Most street furniture, especially benches and tables, will be placed where it receives shade and does not obstruct pedestrian through movement.

11.3. Street furniture can be installed in bulb-outs of parking lanes. Similarly, a landscaping strip can be discontinued with street furniture on hardscaped spaces.

12. On-street parking

12.1. On-street parking should be clearly designated, managed, charged and restricted in volume. Parking areas should be allocated after providing adequate space for pedestrians, cyclists, trees and landscaping, and street vending.

12.2. Parallel parking is the preferred parking layout in terms of the area occupied per car. The same parking layout can be used as perpendicular parking for two-wheelers. Parking bays will have a preferred width of 2 m, maximum width of 2.5 m, and length of 5 m. The same area can be used to park five two-wheelers. Additional buffer may have to be provided at either ends of the parking bay for safe entry and exit of vehicles from these parking bays.

12.3. Unlike footpaths and cycle tracks, parking lanes need not be continuous. On-street parking may be provided where space is available in the public right-of-way, but authorities will prioritise the provision of NMT infrastructure.

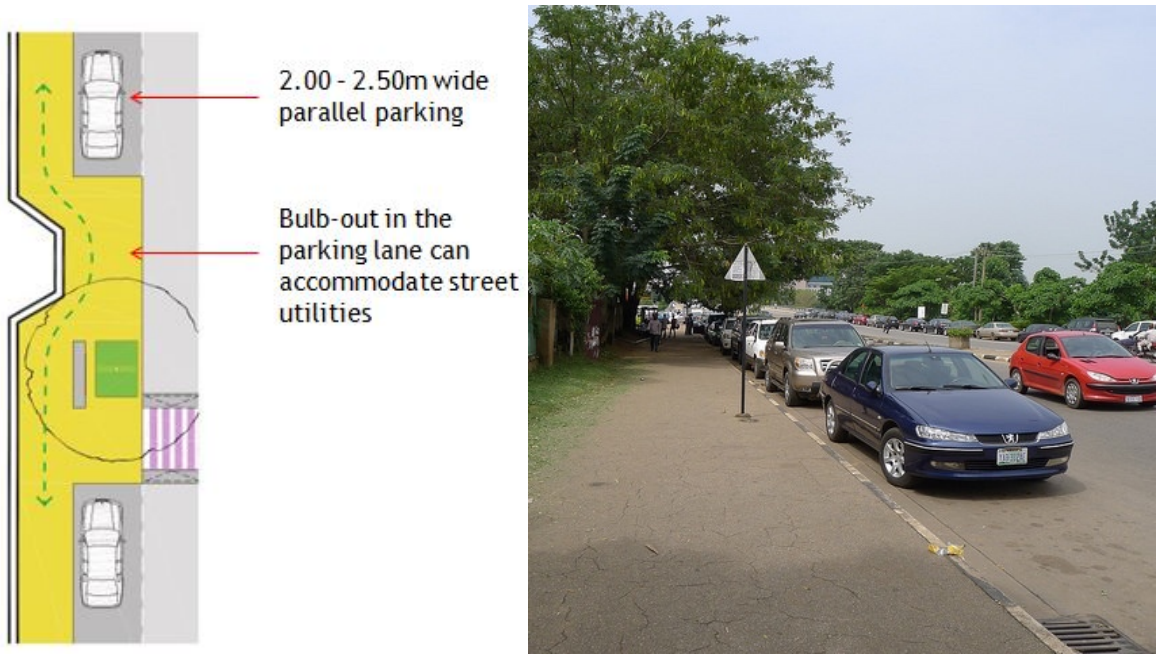

Figure 36: Parallel parking for cars is the most efficient parking layout, as compared to perpendicular and angular parking.

12.4. Parking signs will be erected that clearly communicate parking rules to the public. All signs will be located so as not to hinder pedestrian and cyclist movement, preferably in the furniture zone of the street.

12.5. Designated parking is often laid with similar material used on the adjacent carriageway- asphalt or concrete. Differentiated surface material such as paver blocks may also be used to distinguish space allocated for parking.

12.6. Bicycle parking spaces will be equipped with supporting infrastructure to lock the cycles.

13. Storm water drainage

13.1. City-wide storm water management master plans will be developed to address potential flooding and nonpoint source pollution. The master plan will consider the increasing demand for additional storm water capacity, the topography of an area and study of water body outlets.

13.2. Decisions regarding street designs will utilise techniques that reduce the impacts on the storm water system and increase the permeable surface area, through the planting of some trees and landscaping, and minimising unnecessary pavement. Design treatments will reduce storm water overflow and support the health and maintenance of street trees and landscaping.

13.3. Storm water drains will be designed based on local hydrology data. The size of the drain begins at minimum 450 mm at the start point and then varies based on the capacity at the outflow point. The depth of the catch pit can vary from 450–1,000 mm.

13.4. Catch pits will be located in the buffer at regular intervals, depending on their size and the catchment area, and the lowest point of the street cross section. The lowest point in the cross section will occur on the carriageway; and, footpath, cycle track, bus stops, and street vending areas will be at a higher level.

13.5. Manholes are generally located on footpath and its cover will be flushed for smooth through movement of pedestrians. They will be avoided on cycle tracks and if unavoidable, will be level with the surrounding surface.

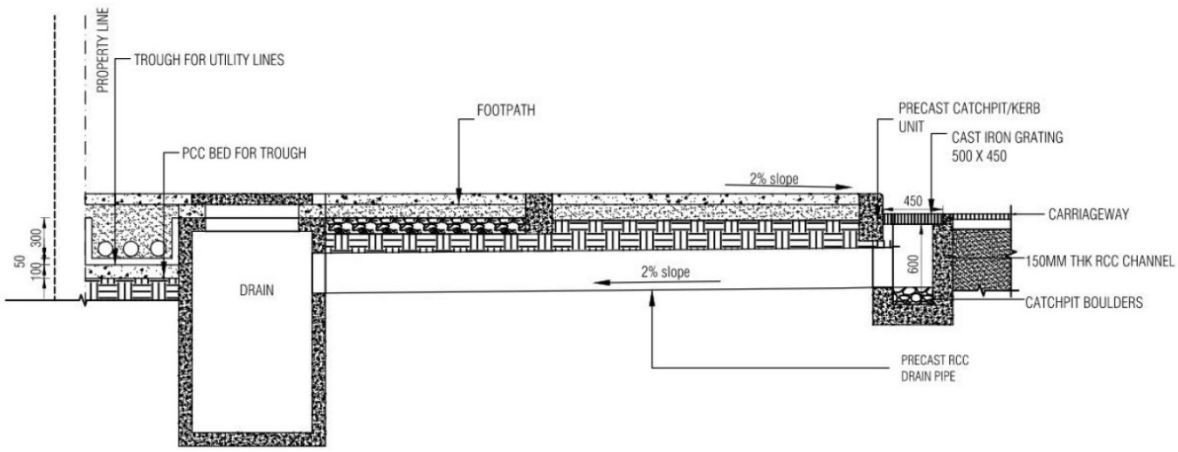

Figure 37: Typical storm water drain layout under a footpath.

13.6. Drain lines will be laid at approximate 2 per cent incline to encourage gravitational flow of water. Incline of the road also serves as a channel for storm water, directing it into catch pits that are protected with grating to prevent solid waste from entering the chambers.

13.7. Catch pits are designed such that silt collection happens in the chamber trough before the water flows through the concrete pies into the main storm water drain and it can be periodically cleared.

14. Other utilities

14.1. Local authorities, road agencies, and service utility providers will work together to ensure that access points for storm water, sewage, electricity, telecommunications, and other services meet standards.

14.2. Service utility providers will ensure that access points for storm water, sewage, electricity, telecommunications, and other services are designed in such a way that they do not conflict with NMT user movements; manhole covers should be in level with footpaths, cycle tracks, and the surfaces of other NMT facilities; and, utility access points should be designed to minimise disruption during maintenance.

15. Cycle tracks

15.1. Cycle tracks will have at least 2 m of clear space per direction for one-way movement and 3 m for two-way movement. They will be elevated 100-150 mm above the carriageway. A buffer of 0.5 m between the cycle track and parking areas or the carriageway will be constructed.

15.2. Cycle tracks should have a smooth surface: asphalt or concrete. Paver blocks should be avoided.

15.3. Painted cycle tracks, without segregation, will be discouraged as they are likely to be encroached by parked vehicles.

15.4. Cycle tracks should be provided on streets that have more than 100 motor vehicles and 400 cyclists during peak hour. On routes with more than 200 motor vehicles per hour, cycle tracks should be provided even if the cycle traffic is less than 100 per hour.

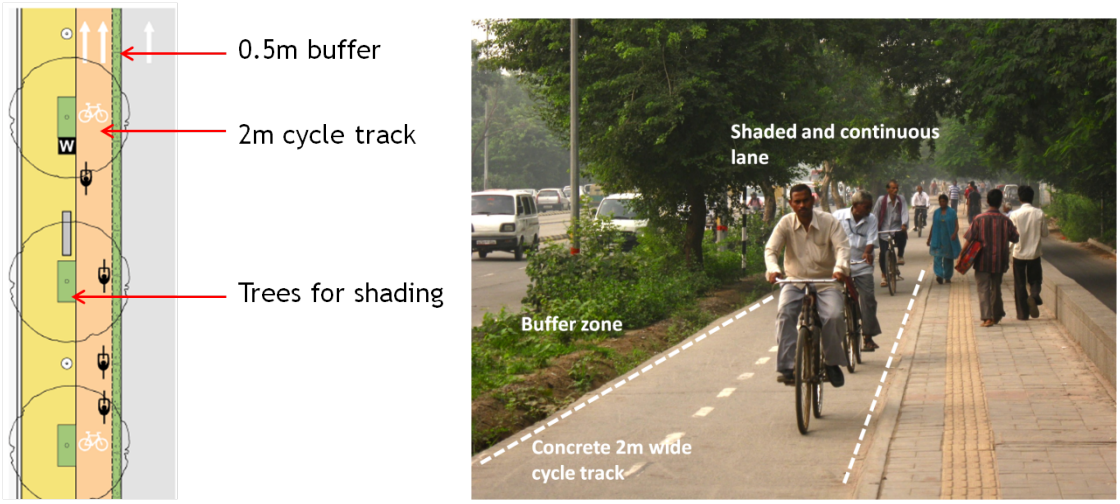

Figure 38: Cycle tracks should have a minimum width of 2 m and an elevation of 100-150 mm above the carriageway. Trees along the cycle track provide shade and comfort for cyclists.

16. Traffic calming elements

16.1. Traffic calming elements ensure pedestrian and vehicle safety by reducing at least speed and potentially also the volume of motor vehicles. Traffic calming slows down vehicles through vertical displacements, horizontal displacement, real or perceived narrowing of carriageway, material/colour changes that signal conflict point, or complete closure of a street.

16.2. Raised zebra pedestrian crossings will be implemented as traffic calming elements (see Section 4.3).

16.3. Pedestrian islands of varying shapes, sizes, and located, will be located within the right-of-way in shared spaces. Pedestrian islands require vehicles to navigate around them, thus, reducing vehicle speeds.

16.4. Parallel parking lanes can be designed as chicanes, alternating between the two sides of a street to prevent vehicles from speeding.

17. Carriageway

17.1. The primary purpose of a carriageway is vehicle mobility. A carriageway provides dedicated space in the middle of the street right-of-way for motorised vehicles that is separated from space for walking, cycling and stationary activities.

17.2. Street space will be allocated to the carriageway after adequate usable space has been reserved for walking, cycling, street vending and trees. Otherwise, such activities will spill over onto the carriageway, compromising motor vehicle throughout as well as the safety and comfort of all users.

17.3. Vehicle carriageways should maintain a constant width to ensure a smooth flow of vehicles.

17.4. A variety of traffic calming techniques, including reduced carriageway widths and speed breakers at frequent intervals, can reduce motor vehicle speeds (see Section 16).

17.5. Carriageway designs will be tailored to the purpose of the street:

17.5.1. On local streets, carriageways will be designed as shared spaces where motor vehicles, pedestrians and cyclists coexist. Speeds in shared spaces will be maintained at 20 km/h or less through traffic calming elements to ensure safety of pedestrians and cyclists.

17.5.2. On minor collector streets, carriageways will have a maximum width of 6.5 m for two-way movement, with adequate traffic calming elements to maintain vehicle speeds at 30 km/h or less.

17.5.3. On major collector streets, carriageways will have lane widths of 2.75-3.25 m (3.0 m preferred) and a 1 m median that has frequent cuts for vehicle movement. Vehicle speed should be maintained at 40 km/h or less.

17.5.4. On arterial streets, carriageways will have lane widths of 3.0-3.5 m (3.25 m preferred) and a 1-2 m median without cuts for vehicle movement except at intersections. Vehicle speed should be maintained at 50 km/h or less.

17.6. One-way carriageways should be avoided unless they are necessary to accommodate rapid transit (such as BRT) corridors or pedestrian zones. Where one-way streets are sanctioned, two-way movement for NMT modes will be allowed.

18. Bus rapid transit

18.1. Local authorities will be encouraged to develop city-wide mass rapid transit network plans, including bus rapid transit (BRT) corridors that offer high-capacity and high-quality public transport by providing an exclusive right-of-way for BRT buses.

18.2. A BRT should be sited on street with moderate to high demand for public transport that is over 2,000 pphpd.[50] A well designed BRT system can carry up to 45,000 pphpd.

18.3. BRT corridors will have dedicated median bus lanes that are physically separated from mixed traffic lanes. Dedicated lanes are crucial for ensuring the buses can move quickly and avoid congestion. The width of a BRT lane will be 3.5 m, plus 0.3-0.5 m buffer space next to mixed traffic.

18.4. The BRT system will have high quality stations with platforms that match the level of the bus so that passengers can enter and exit quickly and easily without climbing steps. Centrally located BRT station require 3-4 m in the cross section. Larger widths may be required if the demand is high.

18.5. Stations will be equipped with smart off-board fare collection to enhance passenger convenience and improve efficiency.

18.6. Footpaths, that meet the design guidelines outlined in Section 2, will be constructed on BRT corridors.

18.7. At-grade pedestrian crossing will be provided at reasonable intervals to ensure safety of pedestrians. Pedestrian crossings at stations must be elevated to the height of the adjacent footpath, with a slope of 1:10 for buses.

18.8. Where space permits, cycle tracks that meet the design guidelines outlined in Section 15, will also be constructed on BRT corridors.

19. Summary

19.1. A summary of various street elements and their specifications is presented below.

Table 12: Street element standards

Street element	Specifications	Minimum width (m)	Maximum width(m)
Footpath	Clear walking space	2.0	*
	Residential area, including furniture zone and frontage zone	3.5	
	Commercial area, including furniture zone and frontage zone	5.0	
	High intensity commercial area, including furniture zone and frontage zone	6.5	

[50] Passengers per hour per direction

Tree pit	Can be surfaced with permeable pavers to increase the usable walking space	1.0	*
Bus shelter	Should be placed in footpath furniture zone	2.0	*
Cycle track	One-way	2.0	*
	Two-way	3.0	*
Buffer	-	0.5	*
Parking	Parallel Parking	2.0	2.5
Carriageway lane	Local street**	2.75	3.0
	Minor collector	2.75	3.25
	Major collector	2.75	3.25
	Arterial	3.0	3.5

*Width as per requirement
** On local streets, meandering carriageways and shared space designs can improve safety

13. Appendix: Street design checklist

Table 13: Design review checklist.

Element	Design criteria
Footpath	• Height of at least 150 mm and no more than 200 mm. • Minimum 2 m clear width in all locations. • Wheelchair kerb ramps have a maximum slope of 1:12. • Bollards installed along the edge of the footpath to prevent driving and parking on the footpath. • At least one set of bollards with spacing of 1,200 mm. • The footpath surface is uniform and non-slippery, with slope of 1:100 to avoid water stagnation. • Tactile warning are strips located at transition points (e.g., mid-block crossings, intersections).
Cycle track	• Physically separated from the carriageway. • Elevated above the carriageway • Clear width ≥ 2 m for one-way movement; ≥ 2.5 m for two-way movement.
Property entrances	• The footpath remains at the same level through property entrances. • Bollards are installed on either side of each entrance to prevent driving and parking. • Property access is provided at a discrete location for each plot, with a maximum entrance width of 6 m
Mid-block crossings	• Pedestrian crossings at intervals of 100-150 m. • Crossing are raised to the level of the footpath with ramps for vehicles (minimum slope of 1:15) OR have kerb ramps at each end of the crossing. • Median refuge islands are provided at crossing points, with minimum dimensions of 2 m by 1 m.
Intersection	• Kerb ramps on all corners of intersections to provide wheelchair access to the footpath. • Median refuge islands with minimum dimensions of 2 m by 1 m on all arms with more than 2 lanes to cross. • Signalisation if any arm has more than 2 lanes to cross. • Pedestrian crossings are located along desire lines. • Turning radii are no more than 5 m.
Shade	• Tree pits least every 20 m.
Lighting	• No dark spots on footpath or carriageway.

On-street parking	• Parking is provided in parallel orientation rather than angled or perpendicular parking. • Car parking bay size is no more than 5.0 m x 2.0 m
Street vending	• The design includes designated spaces for organised street vending
Footpath	• Height of at least 150 mm and no more than 200 mm. • Minimum 2 m clear width in all locations. • Wheelchair kerb ramps have a maximum slope of 1:12. • Bollards installed along the edge of the footpath to prevent driving and parking on the footpath. • At least one set of bollards with spacing of 1,200 mm. • The footpath surface is uniform and non-slippery, with slope of 1:100 to avoid water stagnation. • Tactile warning are strips located at transition points (e.g., mid-block crossings, intersections).
Cycle track	• Physically separated from the carriageway. • Elevated above the carriageway • Clear width ≥ 2 m for one-way movement; ≥ 2.5 m for two-way movement.
Property entrances	• The footpath remains at the same level through property entrances. • Bollards are installed on either side of each entrance to prevent driving and parking. • Property access is provided at a discrete location for each plot, with a maximum entrance width of 6 m

14. Stakeholder engagement

Table 14. Stakeholder meetings held to inform the preparation of the NMT Strategy

Agency	Date
Road Development Authority	26 Mar 2018
Lusaka City Council	26 Mar 2018
Ministry of Local Government	27 Mar 2018
Zambia Environmental Management Authority	27 Mar 2018
Road Transport and Safety Authority	27 Mar 2018
Ndola City Council	28 Mar 2018
Kitwe City Council	28 Mar 2018
National Road Fund Agency	29 Mar 2018
Zambia Agency for Persons with Disability	29 Mar 2018
UNDP Zambia	22 May 2018
Ministry of Transport and Communications	23 May 2018
Round table with Ministry of Housing and Infrastructure Development, Ministry of Local Government, and Ministry of Transport and Communications	23 May 2018
Zambia Road Safety Trust	23 May 2018
Public Transport and Commuter Associations	23 May 2018
Stakeholder workshop	24 May 2018
Ministry of Transport and Communications	12 Dec 2018
Lusaka City Council	12 Dec 2018

Agency	Date
Ndola City Council	12 Dec 2018
Stakeholder workshop	13 Dec 2018
Ministry of Local Government	14 Dec 2018
UNDP Zambia	14 Dec 2018