Designing for cyclists with the Street Design Manual for Urban Areas in Kenya

September 2020
Promoting equitable and sustainable transport worldwide
Introducing the SDMUAK

STREET DESIGN MANUAL FOR URBAN AREAS IN KENYA

PREPARED BY

ITDP Institute for Transportation & Development Policy

SUPPORT FROM

GRSF Global Road Safety Facility

WORLD BANK GROUP

INTERNATIONAL CLIMATE INITIATIVE (IKI)

MINISTRY OF TRANSPORT, INFRASTRUCTURE, HOUSING, URBAN DEVELOPMENT, AND PUBLIC WORKS
Why do we need street design standards?
How people travel

Nairobi
- Walk: 40%
- Bus & matatu: 41%
- Motorcycle: 13%
- Car: 5%
- Other: 1%

Mombasa
- Walk: 45%
- Public transport: 36%
- Boda boda: 11%
- Tuk-tuk: 4%
- Car: 3%

Kisumu
- Walk: 53%
- Bicycle boda: 13%
- Motorcycle boda: 13%
- Tuktuk: 3%
- Matatu: 13%
- Bicycle: 3%
- Car: 6%
- Other: 1%
Vehicle movement
Parking
Walking?
Cycling?
Spaces to meet your friends?
Organised street vending?
Kisumu
Can we just widen the roads?

- Short-term benefits
- Attract more vehicles, making congestion worse
- Compete with public transport
A more equitable approach

How we usually plan streets

A more equitable approach
COVID-19 response

Pop-up bike lanes & shared streets

Berlin
22 km

Bogota
35 km

Oakland, USA
119 km

Paris
50 km

Barcelona
21 km
How to make it easier to cycle?
- Nairobi residents

- Dedicated cycle tracks
- Better driving by motor vehicles
- Secure bicycle parking facilities
- Information on safe cycling routes
- Less harassment while cycling
- Better pedestrian behaviour
- Workplace support
- Better lighting conditions
- Support from family and friends

Source: ITDP online survey of cyclists
How to make it easier to cycle?
- Kisumu residents

Source: ITDP household survey
How to make it easier to cycle?
- Mombasa residents

Source: ITDP interview survey
Highways & urban streets

Highway
- Focus on uninterrupted vehicle movement at high speeds
- Pedestrians cross on footbridges
- No provision for public transport
- NMT users in the carriageway

Urban street
- Vehicle movement at moderate speeds (up to 50 km/h)
- At-grade pedestrian crossings
- Dedicated lanes for public transport
- Separate space for NMT
1. Introduction
2. Complete street design principles
3. Priority networks
4. Street elements
5. Street templates
6. Intersections
7. Design process
8. Design checklist
Complete street design principles
Designing for safety

Vehicle Impact Speed vs. Pedestrian Injury
(initial impact only)

AIS Severity (6=fatal)

Impact Speed (kph)

Small Injuries

Usually Fatal
Speed management

- Speeds should be managed through physical traffic calming—not just posted speed limits.

**Street typology**

- **Local streets with shared space.** At speeds of up to 15 km/h, motor vehicles, pedestrians, and cyclists can safely mix. Traffic calming is needed to minimise vehicle speeds.

- **Local and collector streets.** Streets with speeds of 30 km/h require separate footpaths. With traffic calming, cyclists can share the carriageway with mixed traffic.

- **Arterial streets.** Streets with speed limits of 40-50 km/h require physically separated cycle tracks and footpaths. Traffic calming or signalisation is required at pedestrian crossings.

**Sample cross section**

- **Speed limit for motor vehicles:** 15 km/h
- **Footpath**
- **Carriageway**

**Separate footpath needed**

**Separate footpath & cycle track needed**

All modes can share space
Efficient use of road space

3-lane carriageway

Passenger capacity:
3,000 passengers per hour per direction

2 lanes + elevated road

4,700

Dedicated lanes for bus rapid transit

12,000 - 45,000+
Universal access

- Accommodate assistive devices for persons with disabilities
- Persons with disabilities are entitled to reasonable access to places and transport services
- Barrier-free and disability-friendly environment to enable people access to buildings, roads, and other social amenities
• Women and men travel differently
• Different expectations from a transport system
• Different perceptions of safety and security
• Improve experience of women and girls while walking, cycling, or using public transport
Modal hierarchy

In order of priority:
• Pedestrians
• Cyclists
• Public transport
• Freight
• Moving cars
• Parked cars
Priority networks
Priority networks

- Walking
- Cycling
- Public transport
- Mixed traffic

- Provide access while ensuring safety and efficient movement for walking, cycling, public transport
- Ensure moderate travel speeds
- Complete the network to reduce bottlenecks
- Manage congestion through user fees
Kisumu cycle network plan

Source: Kisumu Sustainable Mobility Plan
Existing cycle tracks in Nairobi

>> Urgent need to create a cycle network plan for Nairobi
Street elements
• Positioned between the footpath and carriageway
• Minimum width of 2 m for one-way movement, and 2.5 m for two-way movement
• Elevated +150 mm above the carriageway
• Physically separated from the carriageway—not just paint
• Buffer of 0.5 m next to the carriageway
• For a 2 m cycle track, one bollard in the middle, to allow for cyclists to pass on either side
• Smooth surface material—asphalt or concrete. Paver blocks are to be avoided
Mombasa
Cycle track design standards

- Physically separated from mixed traffic
- Minimum clear width of 2 m
- Smooth surface material
- Wide adjacent footpath (4 m)

Dar es Salaam
Fast & simple retrofits can improve safety for cyclists
Planter boxes removed from carriageway
Paver blocks = Uneven surface. Use asphalt or concrete.
Cycle tracks & bus stops
Cycle tracks & bus stops

- Cycle track shifted behind bus stop
- Sufficient waiting area for passengers
Clear space behind bus shelter
• Increase travel time and distance
• Not accessible to persons with disabilities
• Dangerous at night (and maybe during the daytime too!)
• Elevators and escalators are expensive and break
• They usually obstruct the footpath
Ramps to reduce vehicle speeds

Pedestrians remain at the level of the footpath
Raised zebra crossing

Ngong Rd, Nairobi
Nairobi’s disappearing tree canopy
Incorporate existing trees in street designs
Utility management
Smooth finishing of utility covers
Street templates
## Guide to the templates

<table>
<thead>
<tr>
<th>Template</th>
<th>Shared space</th>
<th>Footpath</th>
<th>Cycle track</th>
<th>Dual carriageway</th>
<th>BRT</th>
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</table>

- **Shared space**: Indicates whether the template includes a dedicated shared space for pedestrians and cyclists.
- **Footpath**: Indicates if the template includes a footpath.
- **Cycle track**: Indicates if the template includes a dedicated cycle track.
- **Dual carriageway**: Indicates if the template includes a dual carriageway.
- **BRT**: Indicates if the template is designed for Bus Rapid Transit (BRT).
Official crossing vs. pedestrian desire line
The detour for cyclists is even more extreme.
• Ideal junctions are compact & rectilinear
• Reduce vehicle speeds at points of conflict
• Minimise crossing distances
• Assume drivers are distracted
• 3-6 m typical corner radius, max 8 m
• Centerline turning radius of WB-15 (largest truck to be accommodated in city) is 12.5 m. No need for larger radii
Protected intersection design to improve cyclist safety
Cycle access at roundabouts
Design process
Street design process

Stage 1: Data collection
Stage 2: Concept designs
Stage 3: Design review and approval
Stage 4: Final designs
Stage 5: Bill of quantities

Stakeholder consultations
• **Existing plans and policies:** Check existing city, town and County plans

• **NMT facility audit:** Footpath and cycle track presence and condition, pedestrian crossing, shade, street furniture

• **NMT user counts:** Pedestrian & cycle volumes

• **Parking survey:** Parking supply, occupancy & turnover

• **Street vending:** Type of structure, type of goods sold, relationship with government

• **Street lighting survey:** presence and performance of street lights

• **Public transport:** Saccos, routes, bus stops

• **Taxis (boda bodas, tuk tuks):** stops, shelter, numbers

• **Topographic survey**
Transformations
Ongoing projects should incorporate cycle facilities.
Moi Ave, Nairobi - proposed
Jogoo Rd: Existing
Thank you

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