KAMPALA CYCLE NETWORK PLAN 2023-32

KAMPALA CAPITAL CITY AUTHORITY

INSTITUTE FOR TRANSPORTATION AND DEVELOPMENT POLICY

UNITED NATIONS HUMAN SETTLEMENTS PROGRAMME

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PREPARED BY

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1. INTRODUCTION

The Greater Kampala Metropolitan Area (GKMA) is Uganda's main urban area, industrial centre, and economic hub, with a population of 3,650,000 people. Greater Kampala is growing at 5.6 percent per year (Vermeiren, Van Rompaey, Loopmans, Serwajja, & Mukwaya, 2012) and is expected to reach a population of 5 million inhabitants in the present decade (Kampala Capital City Authority, 2012). The rapid metropolitan growth is exerting pressure on the city's mobility network, contributing to growing congestion, air pollution, and road safety challenges. There is an urgent need to improve facilities for active modes and public transport.

Residents of GKMA need a healthy, sustainable, cost-effective, and safe transport network that caters for all users. As a key step toward a more equitable and sustainable mobility system, Kampala needs a complete and well-connected cycle network. Greater adoption of cycling has the potential to reduce travel costs, improve public health, and mitigate emissions of harmful pollutants. Initial efforts to implement cycling infrastructure, including the Namirembe Road project, need to be scaled up to ensure safe cycling conditions at the city level. Complementary initiatives such as the introduction of a bikeshare system, car-free zones, and safe cycle parking can further support a growing cycling culture in the city.

To inform the development of cycle infrastructure in GKMA, the Kampala Capital City Authority (KCCA), in partnership with the Institute for Transportation and Development Policy (ITDP) and UN-Habitat, has developed the Kampala Cycle Network Plan. The KCNP describes cyclist movement patterns, current conditions for cyclists in Kampala, and projects that have been implemented so far in relation to cycling. Based on the available data, the KCNP offers recommendations for a complete cycling network as well as a phased implementation plan for the network.

1.1 BENEFITS OF CYCLING

A well-connected cycle network can encourage a shift from motorised modes to cycling, bringing several benefits to riders and the community as a whole (Whitehorse City Council, 2018):

- **Equity:** Well-connected cycling infrastructure can improve transport equity by improving access for people who do not have access to motor vehicles.
- **Economic benefits:** Cycling is cheaper than motorised modes, including cars and boda bodas.
- **Health benefits:** Physical activity reduces the risk of obesity, heart disease, cancer, and diabetes, contributing to a healthier and happier community.
- **Environmental benefits:** By replacing trips of polluting motor vehicles, cycling can reduce emissions of dangerous local pollutants and greenhouse gases.
- **Quality of life:** A bicycle-friendly community can foster liveability, with residents experiencing a stronger sense of place, freedom of mobility, and improved social interactions.
- **Safety:** Providing cycling infrastructure and designing for slower speeds can reduce the risk of fatalities and injuries from crashes.
- **Gender equality:** As women are affected by time poverty due to inequitable gender-based division of labour and economic dependence, women can benefit from the time and cost savings associated with cycling.

1.2 EXISTING POLICIES IN SUPPORT OF ACTIVE MOBILITY

1.2.1 UPDATED NATIONALLY DETERMINED CONTRIBUTION (NDC), 2022

The updated Nationally Determined Contribution (NDC) for Uganda identifies transport as a key mitigation sector (Ministry of Water and Environment, 2022). The NDC sets a target of implementing 100 km of complete streets or dedicated NMT corridors in GKMA, leading to 10 percent shift in passenger-km from other modes to NMT, and the construction of 100 km of NMT facilities in secondary cities, for a potential reduction in emissions of 0.66 MtCO2e.

UGANDA NON-MOTORISED TRANSPORT POLICY, 2012

The Uganda NMT Policy (Ministry of Works and Transport, 2012) aims to raise the profile of NMT in the country, improve the understanding of NMT user needs at all levels of government, and ensure that NMT is incorporated at all stages of infrastructure planning and implementation. The NMT Policy's objectives are increasing recognition of NMT including cycling in transport; providing safe infrastructure for NMT including cyclists; establishing the provision of financial resources for pedestrians and cycling; promoting the adoption of universal design standards; and improving regulation and enforcement.

1.2.2 MULTI-MODAL URBAN TRANSPORT MASTER PLAN FOR THE GREATER KAMPALA METROPOLITAN AREA, 2018

The Master Plan aims to guide the implementation of an efficient, integrated, sustainable, and safe transport system for inclusive socio-economic development. It devises scenarios for transport investments over the horizons of 2025 and 2040. The plan sets out a list of priority interventions in terms of institutional frameworks, roads, public transport, mobility management, and NMT. For NMT, the Plan calls for implementing 68 km of NMT corridors.

1.2.3 KAMPALA PHYSICAL DEVELOPMENT PLAN, 2012

The Physical Development Plan sets ten planning goals, including developing a multifunctional and multicentric city, an extended CBD, the provision of central parks, a new spatial system for leisure, cultural activities, and tourism stemming from the city centre, the development of hill tops for public use, and encouraging new housing models (Kampala Capital City Authority, 2012). In terms of provision of cycling infrastructure, the plan recommends providing easy NMT access around all schools, markets, hospitals, community facilities, informal settlements, and BRT stations. All new roads, including the BRT corridors, are to contain cycle tracks. The aims are the conformation of a complete NMT network, the reduction of car trips, and the increase of cycling to 10 percent of daily trips.

1.3 STUDY AREA

The Greater Kampala Metropolitan Area (GKMA) covers an area of 1,000 sq km and comprises Kampala Capital City and the surrounding municipalities of Nansana, Kira, Mukono, Makindye-Ssabagabo, and Entebbe. The KCNP covers the entire GKMA.

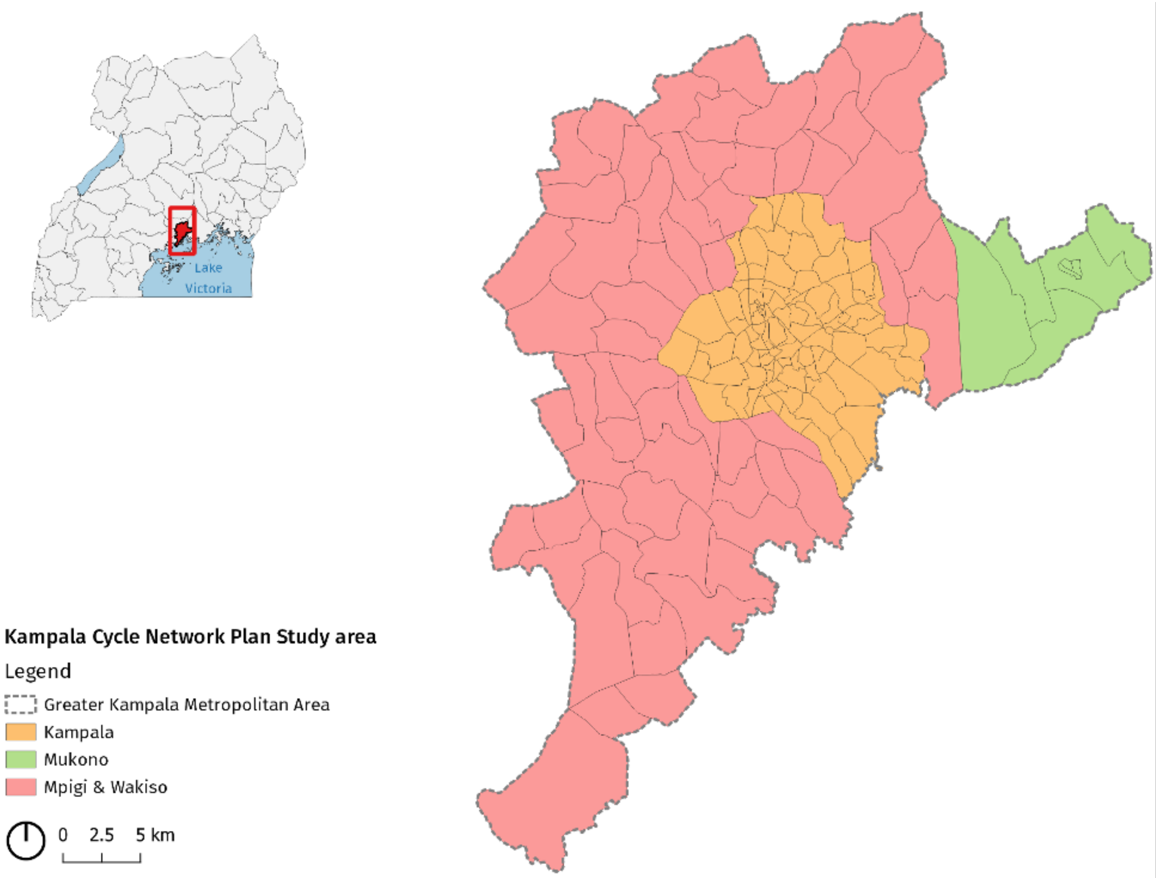

Figure 1. Study area map for Kampala cycle network plan.

2. PRINCIPLES OF CYCLE NETWORK PLANNING

Acknowledging the importance of cycling and walking for urban sustainability, prosperity, and equity, the national government requires that all urban streets provide walking and cycling facilities where the demand is present (KCCA, 2019). Cycle facilities must cater for multiple groups of cyclists—not just those who are already riding, but also more cautious users who might be willing to ride in the presence of a well-designed and complete cycle network. The potential users of the cycle network have diverse needs and concerns in terms of personal safety, expertise, income, and physical ability. The cycle network should offer safe, coherent, attractive, direct, secure, accessible, and comfortable routes for all user groups.

2.1 TYPES OF CYCLISTS AND THEIR NEEDS

Typically, cyclists in East African cities are young, male, experienced cyclists making utilitarian trips or recreational cyclists. To increase cycle ridership for all groups in Kampala, there must be a focus on understanding cyclists' needs and addressing these needs in the planning of the cycle network. Planning should address the needs of vulnerable users, including children, the elderly, people with disabilities, women, and child-carrying women, who often experience barriers to access in the mobility system. Different vehicles, including three-wheeled bikes for transporting goods and kids, should also be accommodated by the cycle infrastructure.

Cyclist skill levels can be classified into three basic groups: child/novice, basic competence, and experienced. On-road training is needed for novices. All cycle facilities should be suitable for cyclists with basic competence. The needs and behaviours of different user groups can be described in more detail, depending on age, gender, and trip purpose, as shown in the figure below.

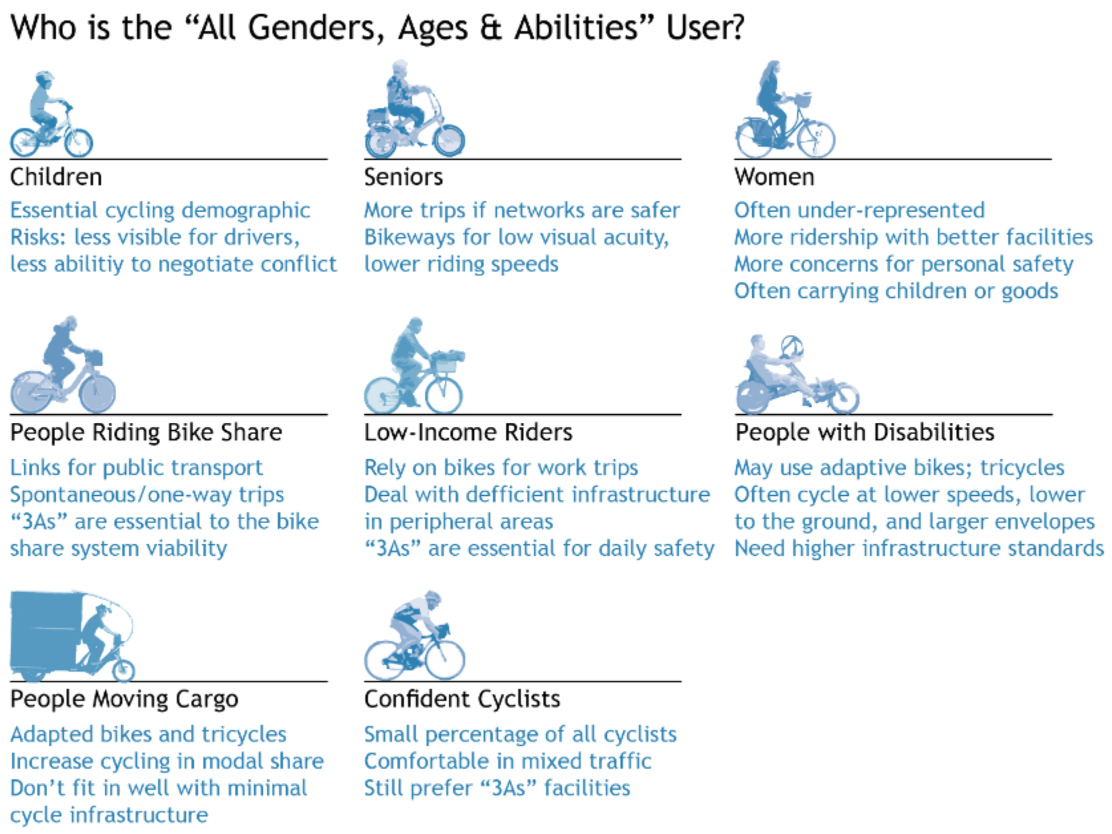

Figure 2. Cyclists of all gender, ages, and abilities (National Association of City Transportation Officials, 2017).

Considering risk-tolerance and comfort with cycling, the public can be broken into four categories (Geller, 2009):

- **Strong and fearless:** willing to cycle under any traffic conditions.
- **Enthused and confident:** comfortable sharing the roadway with car traffic but prefer to ride on separate facilities.
- **Interested but concerned:** like to ride but afraid to do so due to the speed of vehicles. This group requires separate cycle facilities.
- **Unable/not interested**: may not be willing to cycle regardless of the infrastructure type.

Much needs to be done to improve the infrastructure to attract "interested but concerned" and "enthused and confident" riders. The figure below displays cycleway typologies and the extent to which they support usage by all ages and abilities, including interested but concerned cyclists (City of Vancouver, 2017). Local streets with slow-speed carriageways can be safe for all users if motor vehicle speeds are limited by design. Cycle tracks are the most appropriate choice for major streets in Kampala, while smaller streets can be designed with slow-speed carriageways or shared space. Off-street pathways are encouraged in parks and along waterways.

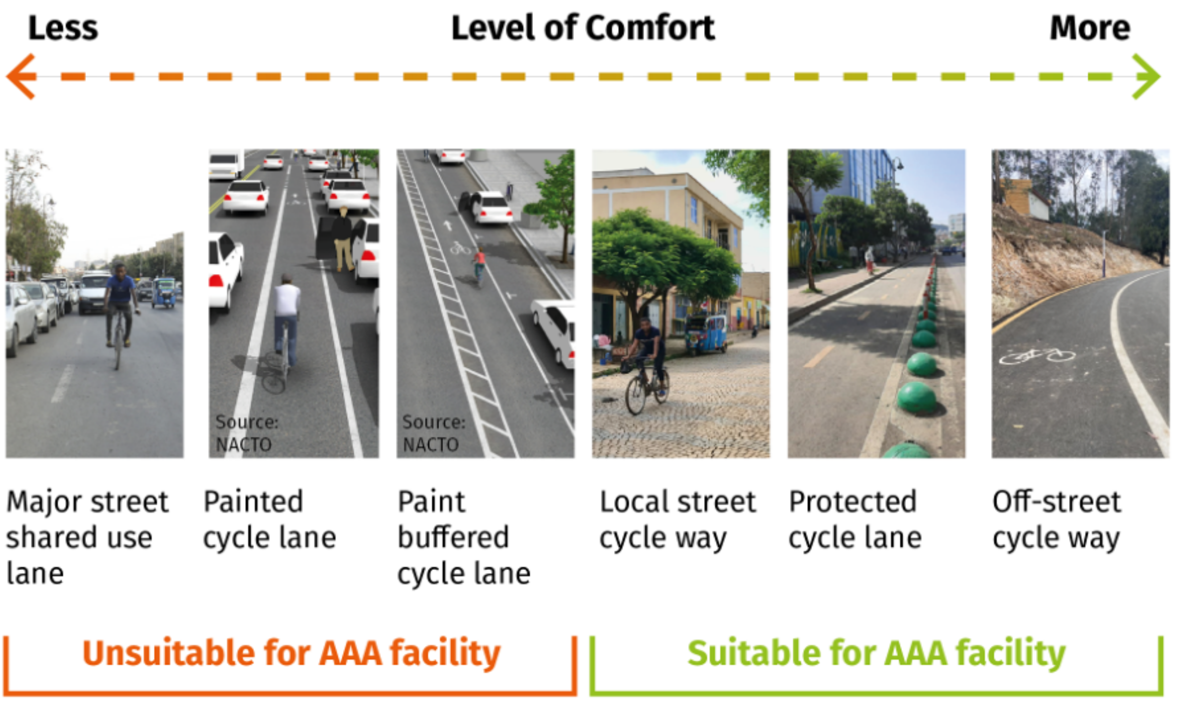

Figure 3. Suitability of infrastructure for cyclists of all ages and abilities (City of Vancouver, 2017).

Aside from the creation of high-quality infrastructure, complementary programmes and policies can support new users. Bikeshare would offer a way for potential users such as to try out cycling without the need to invest in a cycle. Bikeshare users check out cycles with a smart card or phone and use the cycle for a short one-way trip, complementing other transport modes. In addition, riding skill trainings can impart the basics of safe cycling for new cyclists.

Economic access to bikes is the main barrier to cycling in Kampala, with current taxation for up to 30 percent of the total cost of a new cycle (Ministry of Works and Transport, 2012, p. 32). To reduce the cost of cycles, import tariffs on cycles should be reduced or eliminated, as discussed in the national NMT Policy. Cycle distribution and microfinance initiatives can help low-income users access high-quality cycles.

Gender is crosscutting issue in access to cycling in Kampala, requiring attention to women's trip patterns, cycle ownership, safety, attitudes, and cultural factors (Ministry of Works and Transport, 2012). Preventing sexual harassment while moving around the city is important, as it would incentivise more women to learn to cycle. The cycle network should be connected to support multi-purpose trips. Strategic actions targeting women cyclists can effectively improve their ridership. Guided cycling tours, targeted survey questionnaires and the provision of affordable cycles or bike share fees can bring more women to use the cycle network.

2.2 NETWORK PLANNING PRINCIPLES

Cycle network planning should prioritise safety, coherence, directness, attractiveness, accessibility, security, and comfort (LTSA, 2004). A network with these five qualities can reduce cyclist stress levels and appeal to all users, thereby helping to get more people on bikes (National Transport Authority, 2013).

2.2.1 SAFETY

Cycle routes should be safe, provide personal security, and accommodate cyclists as well as all other road users. Vehicle speeds and volumes influence the cycling experience and cycle ridership. Whenever less experienced cyclists come across “near miss” incidents, stress levels rise. These factors generally affect women cyclists more than men.

Cycling close to motor vehicles at 40 km/h is the threshold for discomfort. On smaller streets where motor vehicles and cyclists share the same space, motor vehicle volumes and speeds should be contained to reduce stress levels for cyclists. If vehicle volumes exceed 1,000 vehicles per day (i.e., around 50 vehicles per direction at the peak hour), speeds should be no higher than 30 km/h in the absence of a cycle track. Traffic calming measures, including speed bumps, tabletop crossings, chicanes, and neckdowns, can help reduce vehicle speeds.

As traffic speed and volumes increase, the risk of conflicts and the severity of injuries increase (National Association of City Transportation Officials, s.d.). On streets with speeds over 30 km/h or vehicle volumes over 1,000 ADT, separate cycle tracks are needed. In addition, intersection treatments can ensure that cyclists and vehicles can interact safely.

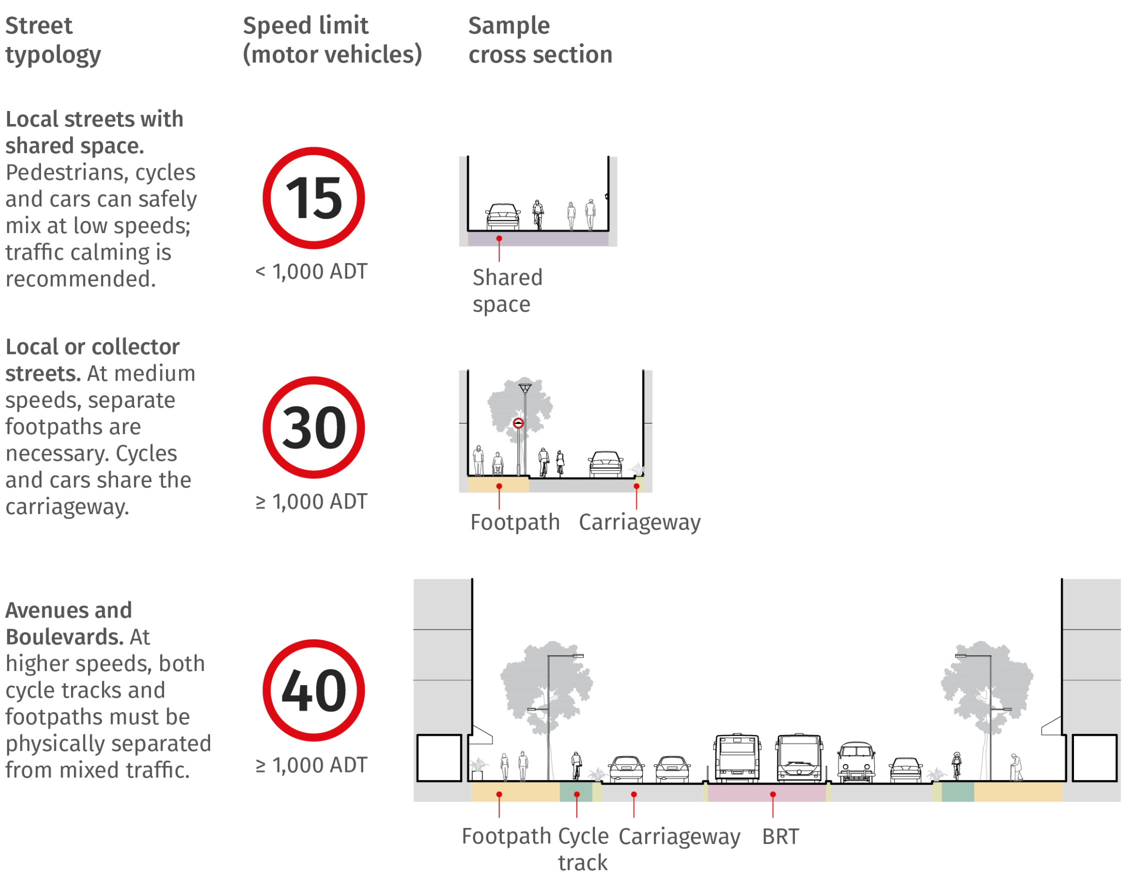

Figure 4. Street typologies and corresponding traffic speeds for safe cycling.

2.2.2 COHERENCE

Cycle routes should link all potential origins and destinations, be logical and continuous, and offer a consistent standard of protection throughout. Cycle facilities should not disappear at intersections or other stressful locations, as those gaps discourage new cyclists and undermine ridership and the success of the network as a whole. To be recognisable, cycle facilities should follow consistent standards and designs. They should be easily understandable at intersections. For commuter routes, the infrastructure should be physically separated from cars and crossings should be minimised to avoid delays for cyclists.

2.2.3 DIRECTNESS

Cycle routes should be as direct as possible, based on desire lines, to minimise detours. Shortcuts should be provided, and signal designs should minimise delays at intersections. Footbridges should be avoided on key cycling routes because they increase travel times and may force cyclists to dismount and walk their bikes over the facility. People will not cycle to key destinations if the cycle facility takes a longer route.

In some cases, large urban blocks may need to be divided into smaller units by creating cut-throughs for pedestrians and cyclists during the redevelopment process. This reduces travel times and makes active mobility an attractive option compared to the use of motorised modes. The cycle network also needs to overcome barriers such as water bodies and rail lines.

2.2.4 ATTRACTIVENESS

Cycling environments should be interesting and pleasant. Attractive routes are particularly helpful for attracting beginners, tourists, and recreational cyclists. Cycle routes should complement their surroundings, enhance public security, look attractive, and generally contribute to an enjoyable cycling experience.

Urban design and building design also play a role, as streets with active edges, play elements, and organised street vending can become vital public spaces. The design of the NMT network should consider the local context of the street or neighbourhood and consider local activities and movement patterns.

2.2.5 COMFORT AND SECURITY

Cycling infrastructure should be designed, built, and maintained for ease of use and comfort of all users. Cycling routes need gentle slopes, smooth surfaces, sufficient width, and lighting. They should be designed to avoid complicated manoeuvres. Shade and lighting are also critical to creating a comfortable environment for riding. Provision of adequate lighting and CCTV cameras can help address the security risks that women face.

Cycling routes should be accessible for all users, including peoples with disabilities, and shall consider avoiding features that reduce accessibility, such as narrow cycle lanes, physical obstacles, barriers, and potholes.

Separate facilities for walking and cycling are crucial as a means to prevent pedestrians from competing with cyclists for space. The interplay between parking and carriageway width also should be assessed, with priority given for cycle movement.

Figure 5. Network planning principles.

2.3 CYCLE FACILITY DESIGN

The physical conditions of cycle infrastructure impact the ability of a cycle route to appeal to users of all gender, ages, and abilities. The pavement surface, junction treatments, lighting conditions, drainage, and presence of debris influence the usability of the facility. All streets should be designed in accordance with a complete streets approach to cater for the needs of all users and activities, through equitable allocation of space. Larger streets need continuous cycle tracks and safe intersections, while smaller streets require adequate traffic calming facilities to reduce vehicle speeds.

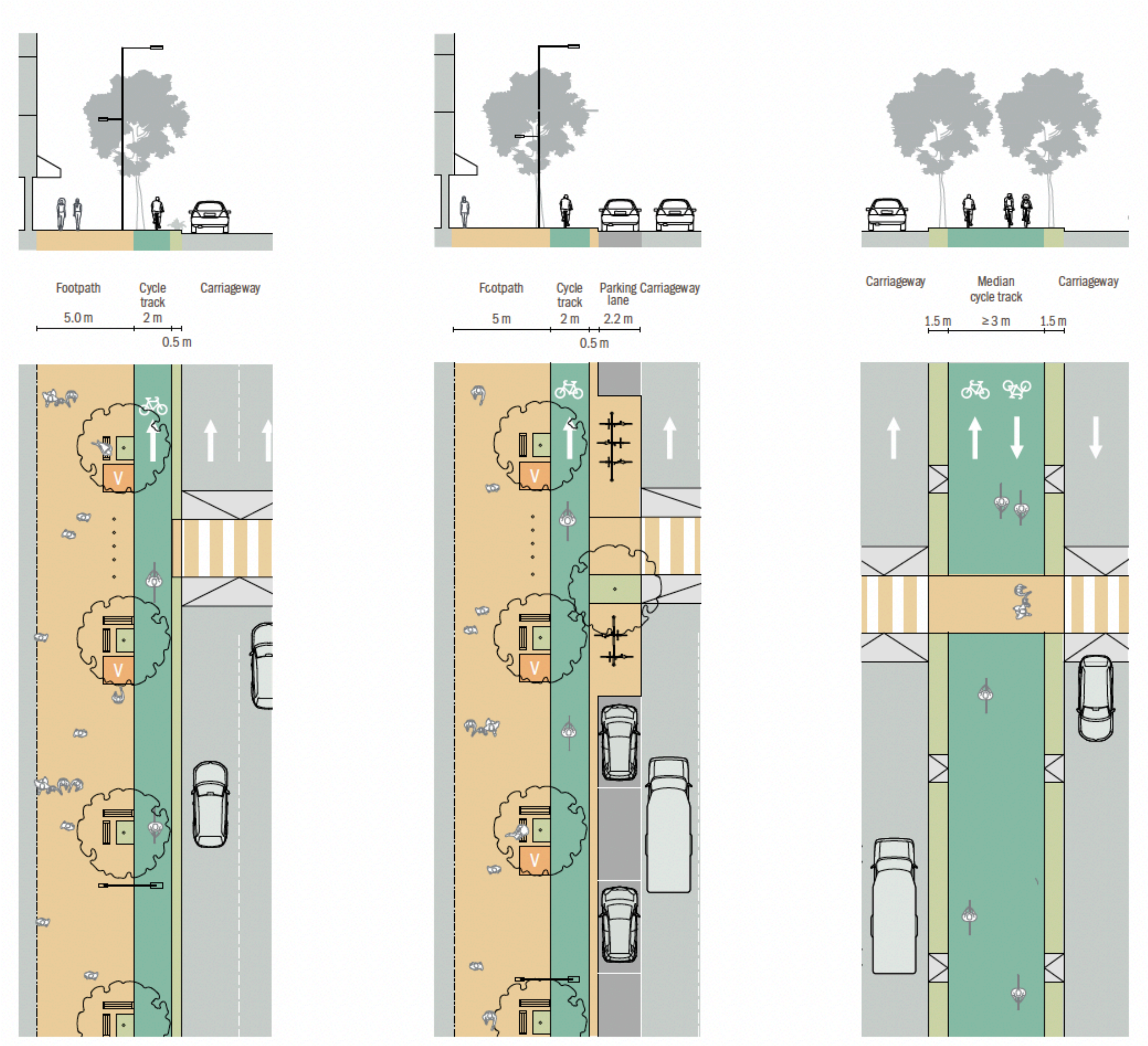

Figure 6. For one-way movement, cycle tracks should have a width of 2 m plus a 0.5 m buffer next to the carriageway. The width should be increased to 3.0 m for two-way movement.

2.3.1 CYCLE TRACKS

The design guidelines for cycle track provision include:

- Positioning between the footpath and carriageway.
- Width of at least 2 m for one-way movement, and 3.0 m for two-way movement.
- Elevation +150 mm above the carriageway.
- Physical separation from the carriageway.
- Buffer of at least 0.5 m; paved when adjacent to a parking lane.
- Smooth surface material: asphalt, or concrete. Paver blocks are to be avoided.

- Central bollards along the cycle track for cyclists to pass on either side while preventing entry by motor vehicles.

The ideal cycle infrastructure layout consists of a duo of segregated, unidirectional cycle tracks, demarcated with landscaped buffers, and clearly signalled to all street users with cycle symbols and road markings. Ramps must be provided to accommodate level differences for cyclists when approaching intersections and bus stops. Long crossing distances and steep slopes can discourage vulnerable users. Reduced vehicle speeds, quality of signage, sufficient lighting and dedicated bicycle parking also must be provided to ensure accessibility, comfort, security, and safety for all groups of cyclists.

Where space constraints are present, for instance, when retrofitting historic districts or in conservation areas, it is acceptable to adopt a bidirectional cycle track layout on one side of the street. Sharrows, painted lanes, and not-segregated infrastructure are not acceptable, due to safety priorities for the cyclists. The following table summarises the cycle track minimum widths, according to the road hierarchy in Kampala.

Table 1. Cycle track widths.

Street typology	*ROW range (m)*	*Cycle track width(m)*
Trunk routes	40 to 60	2.0 m cycle track on either side of the street (1.8 m minimum) 3.0 m two-way cycle track on one side of the street (2.5 m minimum) 0.5 m buffer between the carriageway and cycle track
Major arterials	28 to 40	
Minor arterials	20 to 28	
Collector routes	15 to 20	
Access routes	8 to 15	Shared space.
Informal settlement access ways, NMT ways	≤ 8	Shared space.

Figure 7. Protected cycle infrastructure in Kampala (United Nations Human Settlements Programme, 2020).

2.3.2 INTERSECTION DESIGN

Intersections should be built with segregated cycle facilities for safety and comfort for all users. The following key principles apply to intersection design:

- Minimise exposure to conflicts.

- Reduce speeds at conflict points.
- Communicate right-of-way priority.

The ideal intersection layout, a protected intersection, maintains a physical separation to reduce the exposure of pedestrians and cyclists to motor vehicles. The intersection must be compact to shorten pedestrian crossing distances and provide safe refuge spaces for cyclists, while accommodating left turns of the design vehicle. Cyclist turns become two-stage turns. It is important to reduce traffic speed at the conflict points.

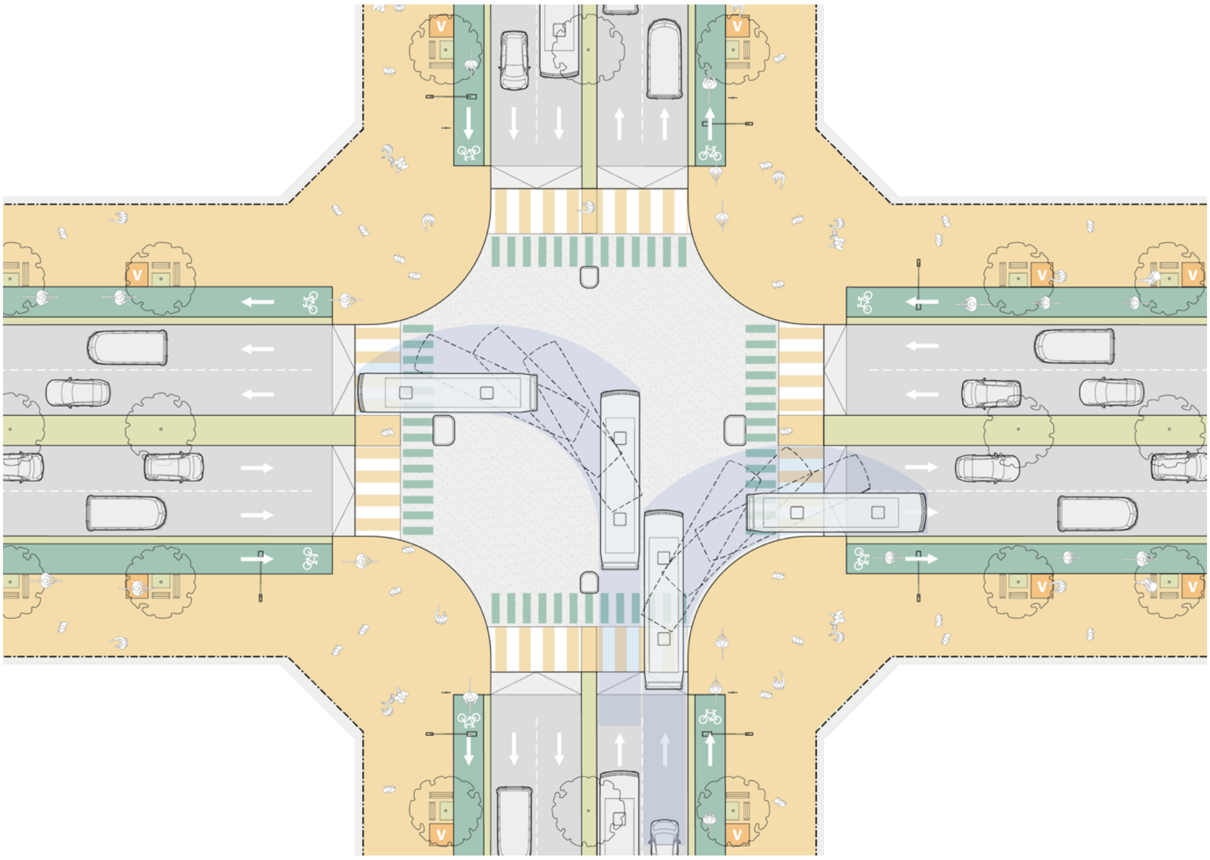

Figure 8. Protected intersection.

As seen below, in (1) the corner refuge island is a physical barrier between cyclists and drivers at the cycle turning points. It also allows for the cyclists to pause briefly before crossing, using the forward bicycle queueing area (2). The motorists' yield zone (3) must have signage indicating that priority is given to cyclists. As for pedestrian crossings, where two or more lanes are crossed, median islands (4 and 5) are obligatory, and for every crossing point, universal access is guaranteed by providing ramps (6), tactile paving, and accessible pedestrian signals (featuring sound signal systems). Where merging areas, crossings, or shared operating spaces are required, they should be designed to minimise exposure (Massachussets Department of Transportation, 2015).

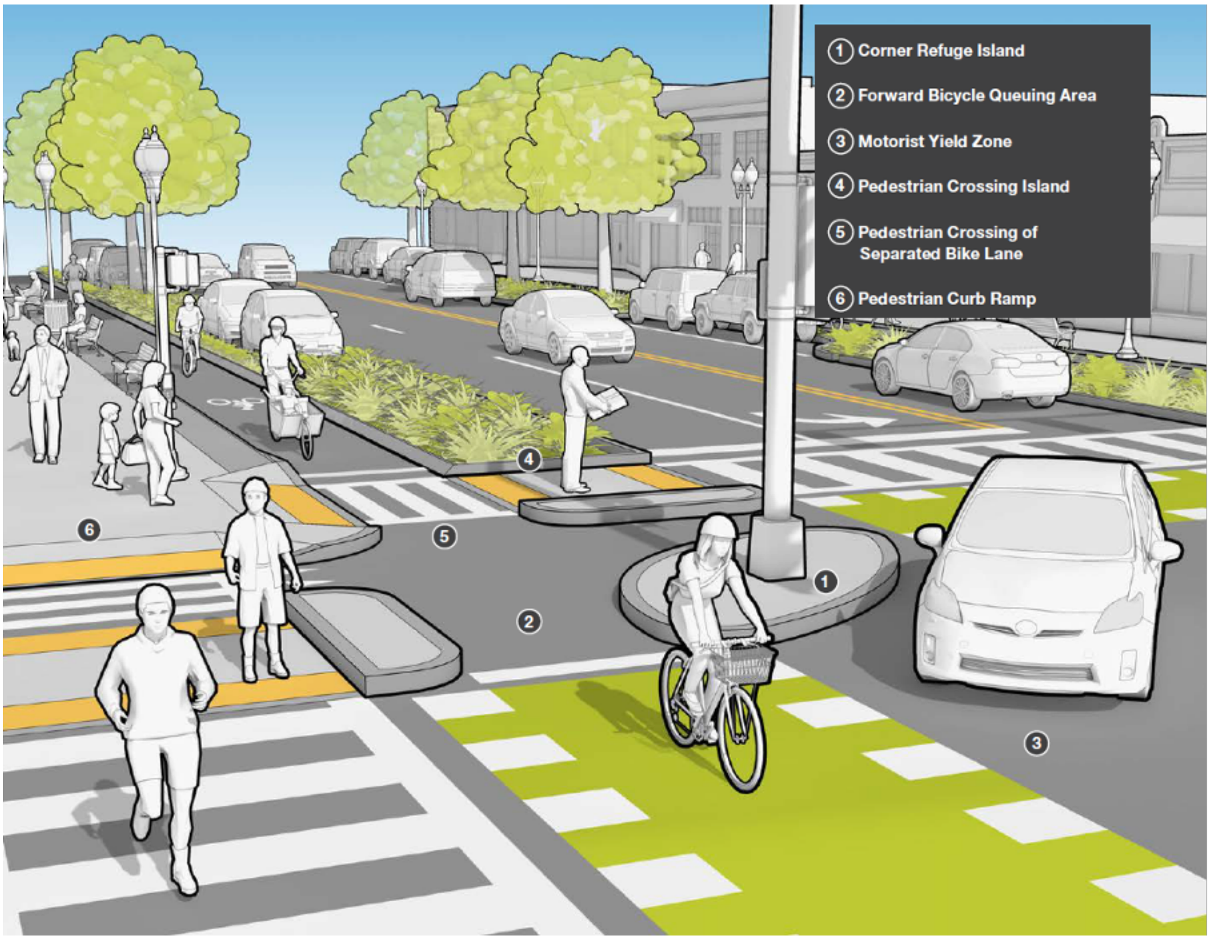

Figure 9. Protected intersection features (Massachussets Department of Transportation, 2015).

2.3.3 SLOW-SPEED CARRIAGEWAY

Where it may be necessary to have cycles share the carriageway with motor vehicles, it is imperative to reduce vehicle speeds to 30 km/h or below to reduce the stress levels for cyclists. Other traffic calming measures, such as speed cushions, tabletop crossings and chicanes, can be helpful in ensuring that the traffic flow is still compatible with the presence of cycles.

2.3.4 SHARED SPACE

Shared space streets are appropriate for historical districts, commercial areas such as street markets, festivals, and touristic areas, or residential areas. In shared space, motor vehicles should clearly be guests in the streetscape. The priority is given to active transport modes, pedestrians, and cyclists. Motor vehicle speeds should be limited to 15 km/h.

2.3.5 GREENWAYS

Blue-green infrastructure is strategic for the urban cycle networks and offers quality cycling routes with very low-stress levels for cyclists. Greenways can usually accommodate fully segregated cycle tracks, with lower noise levels and an appropriate setting for all sexes, ages, and abilities. Parks, old rail rights-of-way and paths alongside rivers can be used to create more direct cycle highway routes, with greenways connecting districts. Where possible, greenways can be alternative routes to avoid overpasses and motor vehicle bridges that can be hostile or too steep for comfortable cycling. These routes can also be proposed alongside environmental conservation projects and programmes, increasing public ownership and participation in such projects, as well as attracting the public and making green spaces more social, secure, and safer especially for women.

2.4 CYCLE NETWORK HIERARCHY

The cycle network aims to connect the activity centres for jobs, housing, shopping, and transport facilities across all levels of the street hierarchy. The purpose of connecting multiple activity centres, providing access to jobs, education, health facilities, markets and shopping areas is to improve opportunities for all classes of people, especially considering the travel patterns of women. Women tend to have more multipurpose trips, often shorter and more frequent than trips taken by men. Connectivity to as many different activities as possible is important to tend to women's daily travel needs in Kampala.

Main cycle routes typically run along the main streets. They can also pass through green areas, where such an alignment can reduce travel times for cyclists. The secondary bicycle routes fill in the gaps between the main routes, connecting main routes to neighbourhood centres. Finally, the local routes will providing local access to the greater bicycle network and typically permeate residential areas.

Streets with a ROW of 28 m or more will have unidirectional lanes on both sides of the street, next to the walkway, and raised to the level of the walkway. On streets with a ROW of 15-28 m, the cycle track can be bidirectional and located on only one side of the street, but unidirectional lanes are still preferred. On local access routes, cyclists can travel in mixed traffic, provided there are traffic calming measures, or the space can be configured as a shared street.

Table 2. Bicycle routes and desired speeds based on street classification.

Street class	*Street typology*	*Route connection*	*Cycle track typology*	*Desired cycle speeds (km/h)*
1	Trunk routes	Main city centres to intermediate or sub-centres	Protected, raised, unidirectional lanes on both sides of the street	15-25
2	Major arterials			
3	Minor arterials			
4	Collector routes	Intermediate centres to neighbourhood centres	Protected, raised, unidirectional lanes on both sides of the street (ROW 30+ m) or Bidirectional lane on one side of the street (ROW below 30 m)	15-20
5	Access routes	Neighbourhood centres to neighbourhood areas, and last-mile connections	Bidirectional lane on one side of the street or Cycles in mixed traffic, with traffic calming measures	Up to 15
6	Informal settlement access ways	Property access and neighbourhood centres to neighbourhood areas	Shared street (preferred) or Cycles in mixed traffic, with traffic calming measures	less than 15
7	NMT ways			

2.5 CYCLE TRACK MATERIALS

On streets with faster speeds, cycle tracks can reduce conflicts between bicycles and motor vehicles. Cycle tracks should be designed and constructed to be physically separated from the carriageway. The recommended material for cycle tracks and cycle lanes should be a smooth surface material made of asphalt or concrete finish. Asphalt is a common material for cycle tracks because it provides a smooth surface for cyclists. Concrete can also be used, but it tends to be more expensive. Using a coloured pavement to distinguish cycle tracks from other street elements is an option but painted cycle lanes offer little protection to cyclists and should be reserved for very narrow right of way streets, serving as shared streets (ITDP, UN-Habitat, 2023).

Cycle tracks should be elevated to 150mm above the carriageway, to allow for storm water runoff and prevent the accumulation of debris. On both new and existing pavements, cycle tracks should be positioned between the footpath and the carriageway. A buffer of at least 0.5m should be provided between the cycle track and the carriageway. The buffer should be paved if it is adjacent to a parking lane (ITDP, UN-Habitat, 2022).

On existing carriageways, the existing pavement surface should be used to demarcate space for cycle tracks and rehabilitated depending on the existing condition.

On new pavement construction projects, the pavement layer thickness, composition, and strength required for cycle tracks will vary from that of the carriageway. The sub-sections below discuss the pavement materials and layer thickness for a cycle track, along with recommendations to be followed in cycle track pavement design.

2.5.1 UNBOUND AND BITUMINOUS MATERIALS

The pavement layer material requirements of a cycle track will not be as that of the normal carriageway and will require compromises given the light load that will be imposed by bicycles on the cycle track. The following points should be considered when designing for cycle track material layers under new construction street projects.

- **Asphalt**: Asphalt premixes are plant-based bituminous mixes using good quality aggregates, hot-mixed, transported to the site, and laid and compacted while still hot. The minimum asphalt premix thickness must be 40mm (MoWT, 2010).
- **Surface dressing**: cutback bitumen of medium to rapid curing should be used since they revert to their viscosity within reasonable time. Otta seals (graded aggregate materials) should be used, as light traffic load is expected along a cycle track. Single surface treatments should be sufficient for cycle tracks and doubles as being the cheapest and simplest option (MoWT, 2010).
- **Granular base**: A wide range of materials can be used for the unbound bases (MoWT, 2010).
- **Granular sub-base**: Depending on the cyclist loading expected the Consultant shall design and recommend an appropriate CBR to be met (MoWT, 2010).
- **Selected layer**: Depending on the condition of the subgrade, this may be required to support weak sub-grades.

2.5.2 LAYER THICKNESS

This sub-section highlights guidance on the design and selection of the pavement material layer thickness for a cycle track (MoWT, 2010).

- Bicycles do not exist in the traffic class design categories in the existing MoWT design manuals, however, light loading from bicycles is expected compared to the usual vehicular traffic load. The equivalent damaging factor (EF) expected from bicycle traffic could be assumed to correlate with the least design traffic class category T1 (<0.3 $*10^6$ ESA).

- A uni-directional protected cycle track of at least 3m, width or a bi-directional protected cycle track of at least, 2m, depending on the street right of way width should be designed for under new construction projects.
- A protected cycle track with at least 2m width or 3m width will be designed for considering, the climate of Kampala city, the sub-grade conditions, bicycle traffic to estimate design traffic class and road making materials available along the purposed street.
- Referencing to the MoWT road design chart, appropriate layer thickness, comprised of Asphalt surface dressing, granular base, granular sub-base, and selected layers on top of the sub grade should be recommended at design stage.

The cycle track should be designed and constructed to provide water proofing. The pavement layers should be constructed to be durable enough to give a service life at least as long as the adjacent carriageway.

3. EXISTING SITUATION ANALYSIS

3.1 TRAVEL BEHAVIOUR IN KAMPALA

In GKMA, cycling accounts for 2 percent of trips above 1 km (KCCA, 2019). Walking accounts for another 46 percent of the trips, with the remaining trips split among taxis, boda bodas, and cars.

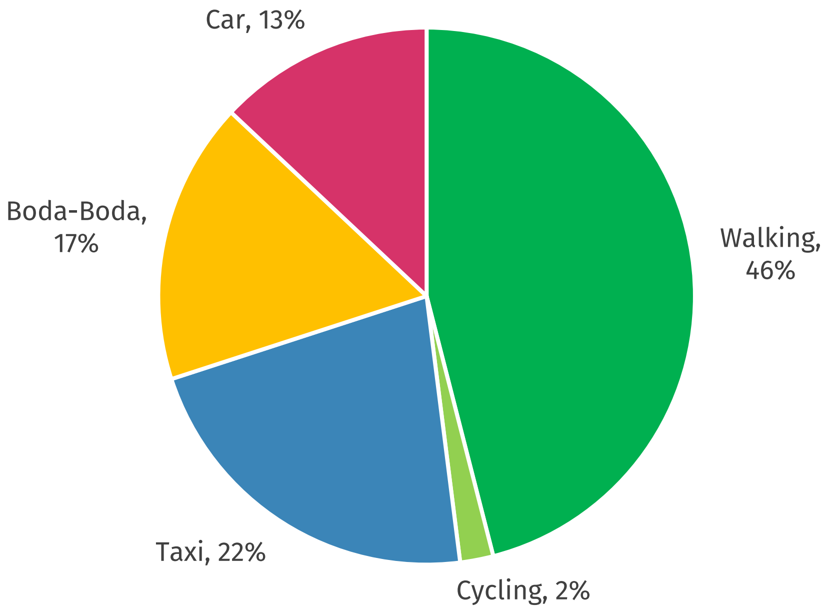

Figure 10. Mode share for Kampala. Source: (KCCA, 2019)

The onset of the COVID-19 pandemic in Mar 2020 highlighted the significance of walking and cycling in Kampala. To understand the impact of COVID-19, JICA, ITDP, and UN-Habitat surveyed 439 residents in Kampala in Jun 2021 using an SMS-based survey. Results from the survey indicated that 79 percent of residents are interested in in cycling. Participants also mentioned factors that would improve the cycling environment in Kampala (UN-Habitat, ITDP and JICA, 2021).

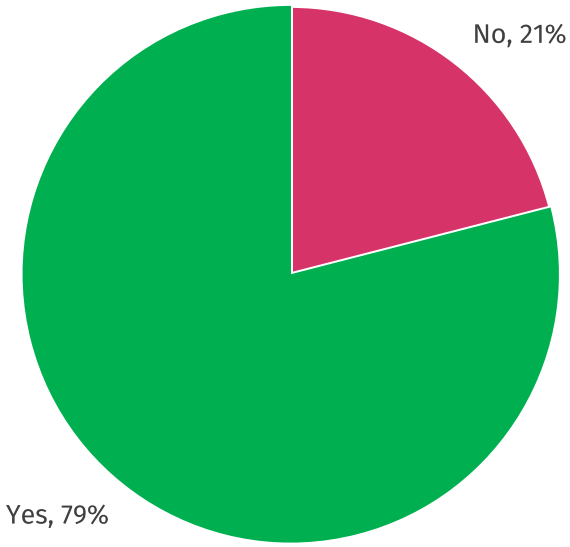

Figure 11. Interest in cycling in Kampala (UN-Habitat, ITDP and JICA, 2021).

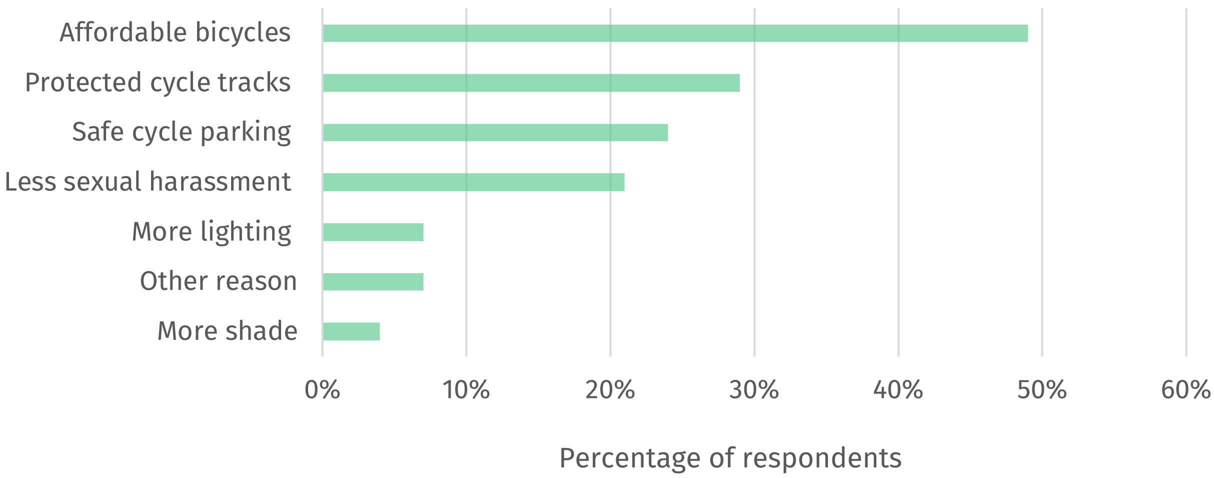

Figure 12. What would improve the cycling environment in Kampala? (UN-Habitat, ITDP and JICA, 2021).

In another study conducted by ITDP to understand the impact of COVID-19 among workers at Kasubi Market, 97 percent had an interest in cycling.

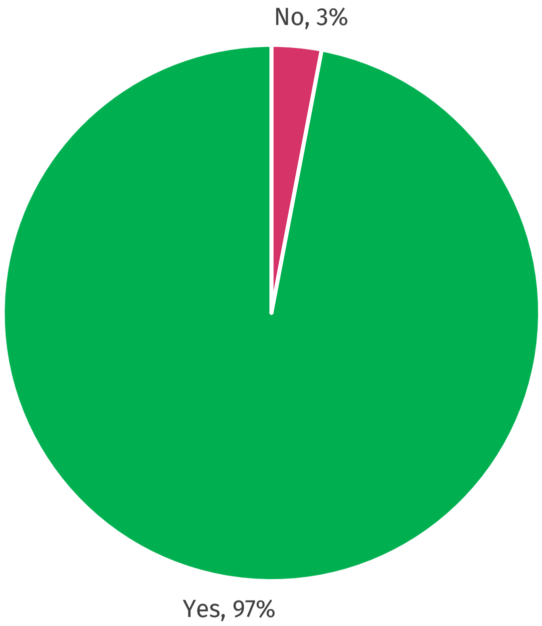

Figure 13. Interest in cycling in Kampala (UN-Habitat, ITDP and JICA, 2021).

3.2 CYCLE VOLUMES

Error! Reference source not found. To determine existing cyclist volumes, ITDP conducted counts in the five divisions of Kampala parish. Within the divisions, the survey prioritised key routes used by cyclists. For Hoima Road cycle volume data are available from a prior study.

Figure 14: Cycle count locations.

ITDP conducted morning and evening bicycle counts for three hours, for one day per station, from 11-19 Jul 2023. The morning peak hours duration was 6:30 to 9:30 hours while the evening peak hours duration was 15:30 to 18:30 hours. The manual collection forms were classified to categorise the cyclists as male, female, and child. A sample of the form is attached in Appendix A. Results of the morning and evening peak hours are summarised in Appendix B.

The morning and evening volumes are summarised in **Error! Reference source not found.** and **Error! Reference source not found.**. The route with the highest cycle volume was Bombo Road. Other corridors with moderate to high volumes include Katwe, Kampala-Entebbe, Masaka, Salaama, Port bell, Banda-Kireka, Mbogo-Kira town, Mamugongo-Kyaliwajjala, Bukoto-Kisaasi and Sir Apollo Kaggwa. None of these corridors have existing cycle facilities.

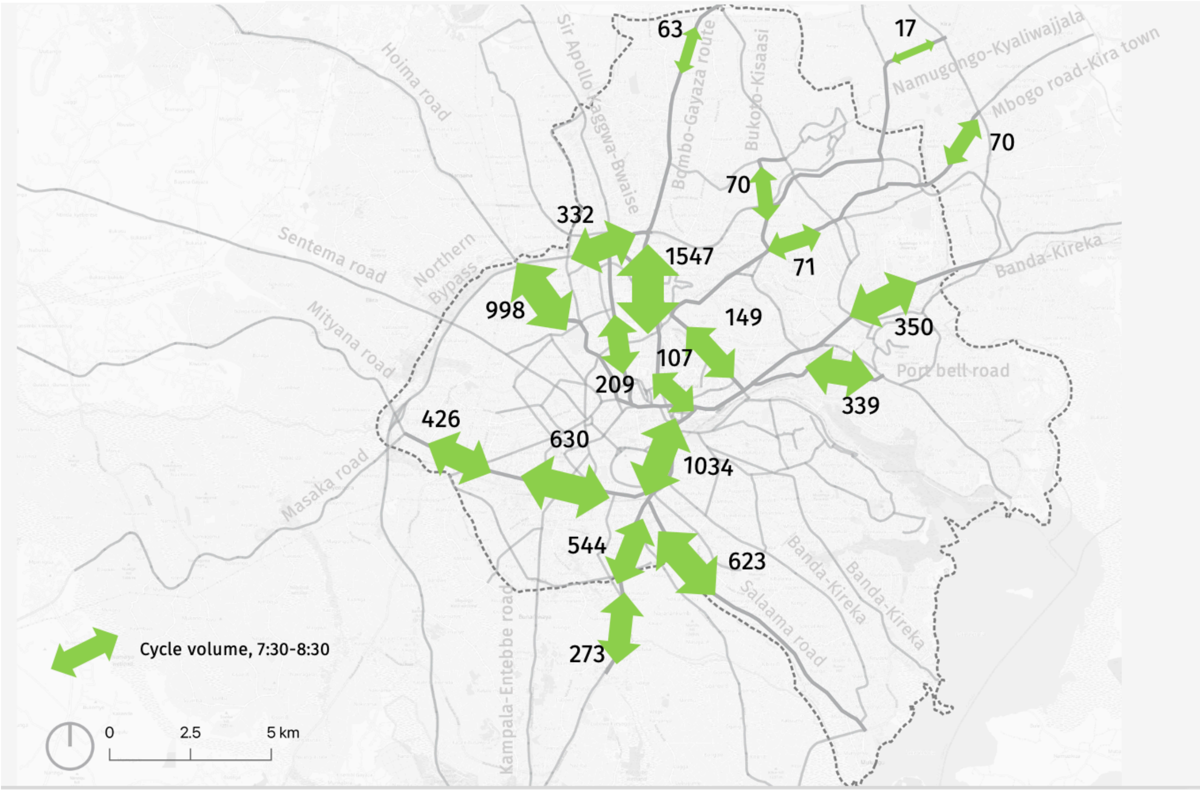

Figure 15: Cycle volume, 7:30-8:30 hours.

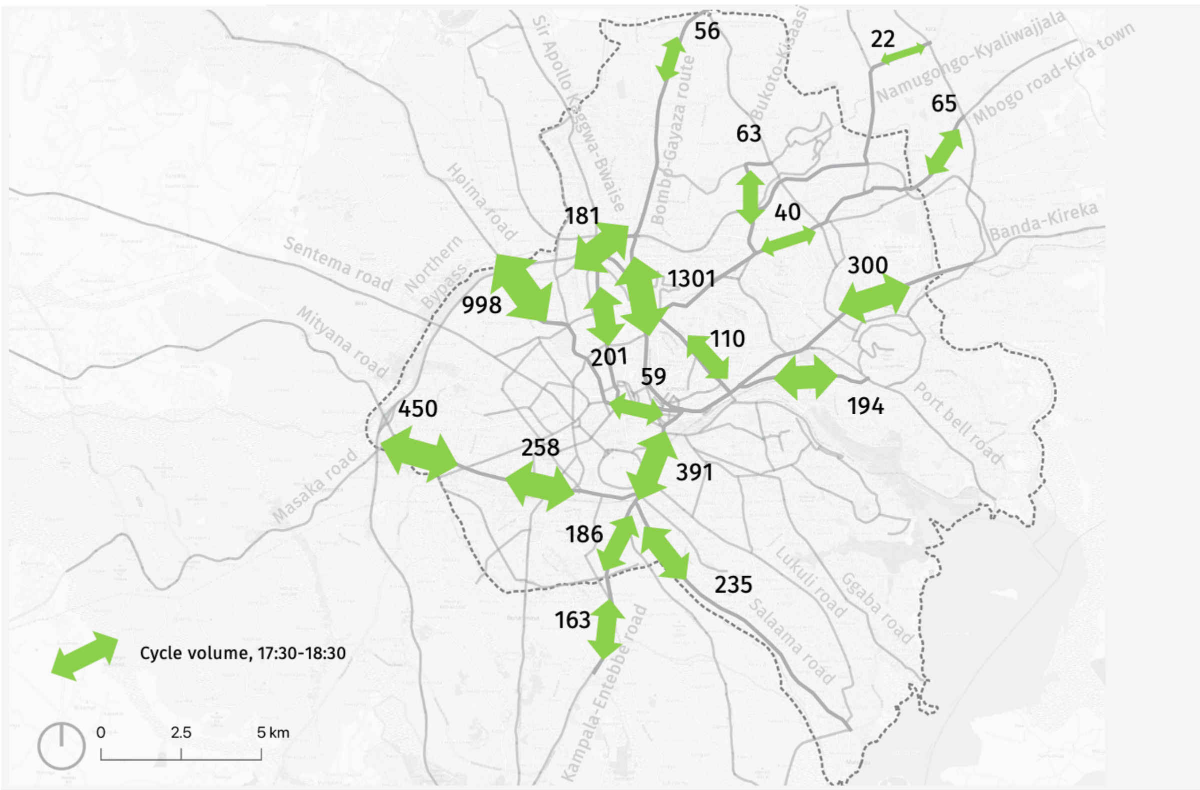

Figure 16: Cycle volume, 17:30-18:30 hours.

Male cyclists make up 98 percent of cyclists across the count locations, 2 percent are children (mostly riding to school), and only 0.04 percent are female adults.

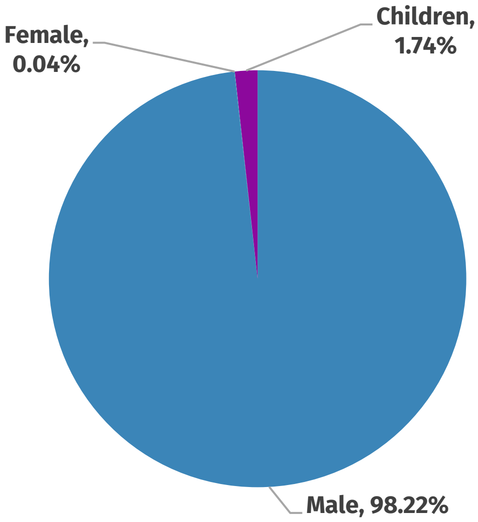

Figure 17: Gender and age split among cyclists.

Figure 18: Cyclists on Salaama Road and Kampala-Entebbe Road.

Figure 19: Cycling along Yusuf Lule Road during evening peak period (left) and cyclists at Masaka road junction (right).

3.3 CYCLING INFRASTRUCTURE

In 2012, Uganda adopted a Non-Motorised Transport (NMT) Policy to raise the profile of walking and cycling and ensure that safe NMT infrastructure is incorporated in the design of all urban roads. After years of promoting walking and cycling through Open Street Events and pilot bike corridors, the Kampala Capital City Authority recently completed the first comprehensive and integrated walking and cycling corridor covering about 3.5 kilometres clearly demarcated (UN-Habitat, 2020). The 3.5km road, renowned for its historical importance and its adjacency to Buganda Kabaka's Palace. The reconstruction efforts encompass a range of infrastructure enhancements, including the addition of pavements, traffic signs, street lights, drains, and trees.

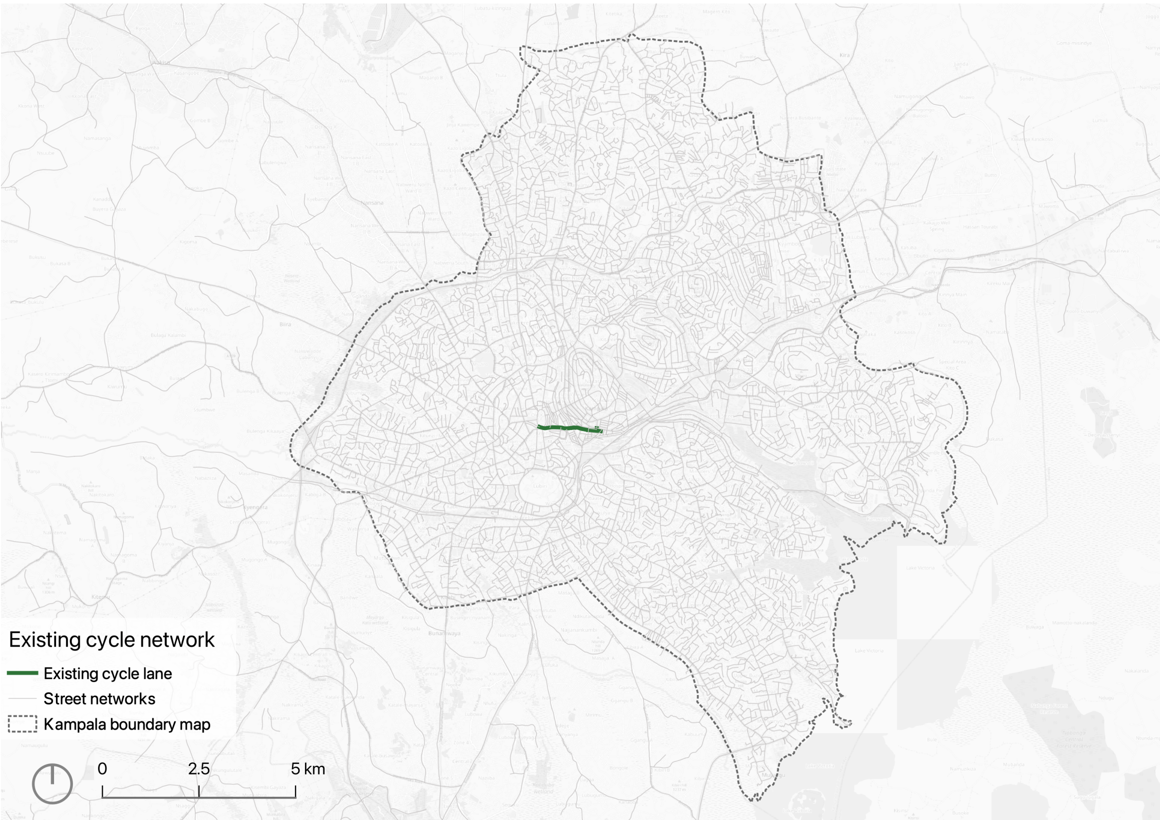

Figure 20. Existing cycle lane along Lubiri Ring Road.

Kampala has a Physical Development Plan that outlines key steps to promote cycling (Kampala Capital City Authority, 2012):

- Preparation of a cycle network plan for KCCA incorporating 200 km of cycling lanes. The potential cycling routes shall connect major residential locations to activity centres.
- Adoption of best practice geometric design standards for safe cycling infrastructure.
- Incorporation of cycle facilities in BRT cross sections.
- Development of a comprehensive communication strategy to increase cycling awareness among decision makers and potential users.
- Development of a comprehensive cycling outreach programme that includes all major employers.
- Selection of a pilot project and construction of necessary lanes and parking facilities. Launch a communication plan to increase awareness and usage of the implemented pilot project. Conduct before and after surveys and draw conclusions from the pilot project.

The preliminary cycling network proposed for KCCA is shown in Figure 21 below.

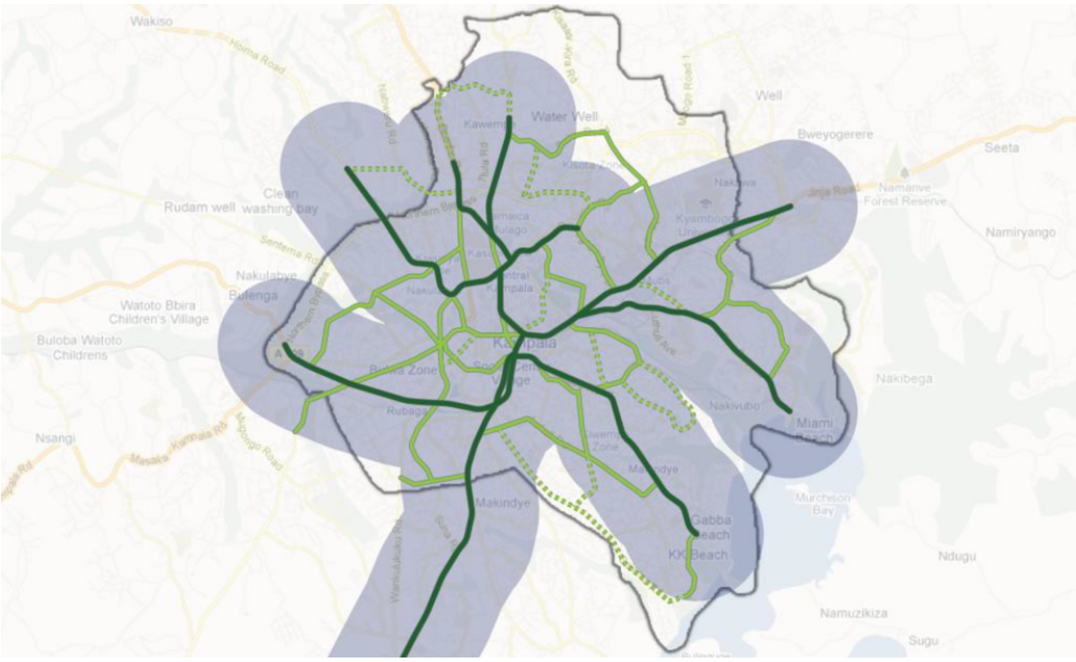

Figure 21. Preliminary cycle network for KCCA 2022 (Kampala Capital City Authority, 2012).

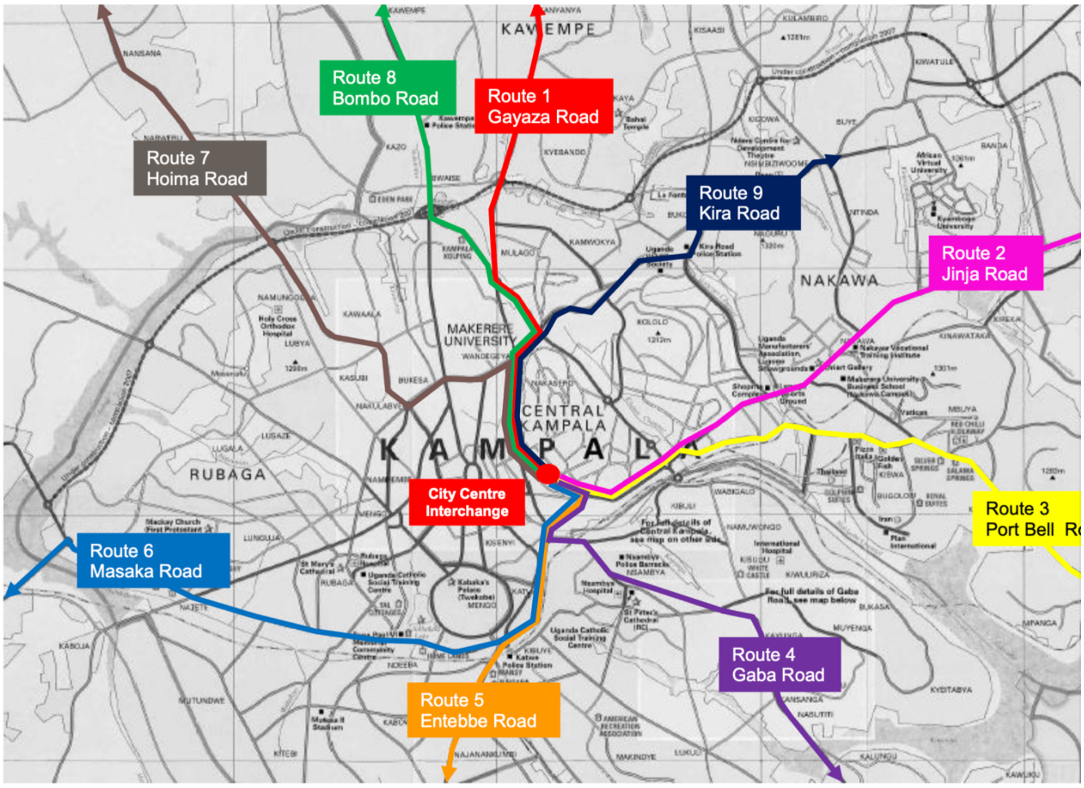

Figure 22: Proposed BRT corridors (Kampala Capital City Authority, 2012).

KCCA constructed a 2.0 km corridor along Namirembe Road in the central business district (CBD). In 2019, KCCA with support from the World Bank initiated the detailed design for additional NMT improvements, including 15 km of pedestrian and cycle paths along the Kampala–Namanve railway reserve and 4 km of pedestrianised streets in the CBD.

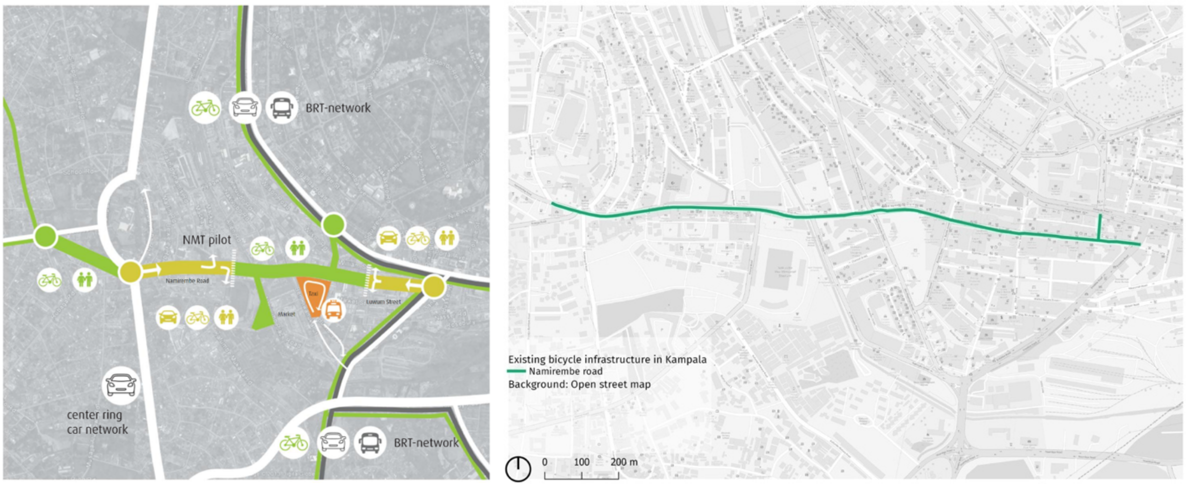

Figure 23. Diagram of Namirembe Road NMT pilot urban insertion (left) (Bosch, van der Stok, Kujipers, & Aarsen, 2014) and map of the pilot corridor (right).

Table 3. NMT project corridors (KCCA, 2019).

Route name	*Length (km)*
Wilson Road	0.557
William Street	1.498
Market square Road	0.259
Snay Bin Amir Street	0.202
Market square II Road	0.166
Sikh road	0.302
Kiyemba lane	0.207
Burton street	0.576
Dastur street	0.327
Total length	4

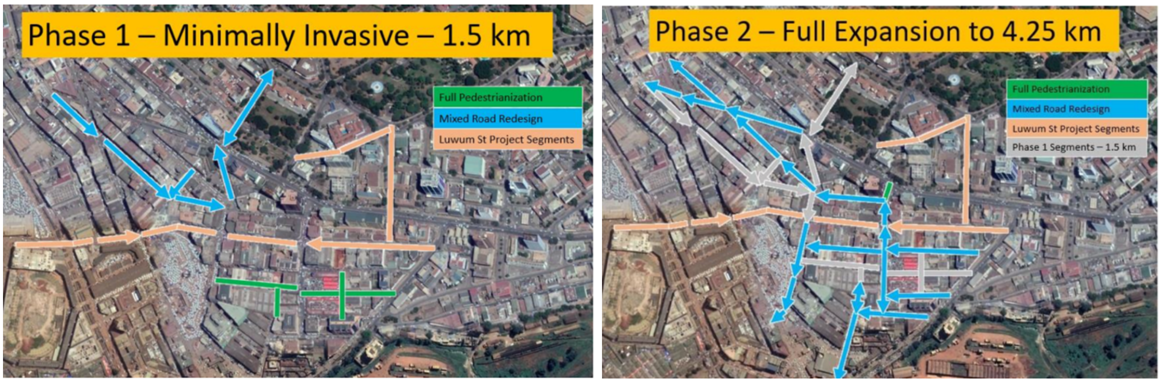

Figure 24. Proposed NMT corridors (Ministry of Works and Transport, 2012).

3.4 SPEED LIMITS

For urban and peri-urban roads in Uganda, the design speed is generally set at 50 km/h. In GKMA, most corridors have a speed limit of 50 km/h, with lower speed limits in some cases. According to the 2021 annual road safety report, speeding was the primary cause of road crashes in Kampala city, demonstrating the necessity of lowering speed limits (KCCA, 2021).

Table 4. Design speeds and functional classification (Ministry of Works and Transport, 2022).

Design class	Roadway width	Maximum design speed (kph)				Functional Class				
		Level	Rolling	Mountainous	Urban/ peri urban	A	B	C	D	E
1a Paved	20.8-24.60	120	100	80	50	✓				
1b Paved	11.0	110	100	80	50	✓	✓			
11 Paved	10.0	90	70	60	50	✓	✓	✓		
111 Paved	8.6	80	70	50	50	✓	✓	✓		
A Gravel	10.0	90	80	70	50		✓	✓	✓	

B Gravel	8.6	80	60	50	50				✓	✓

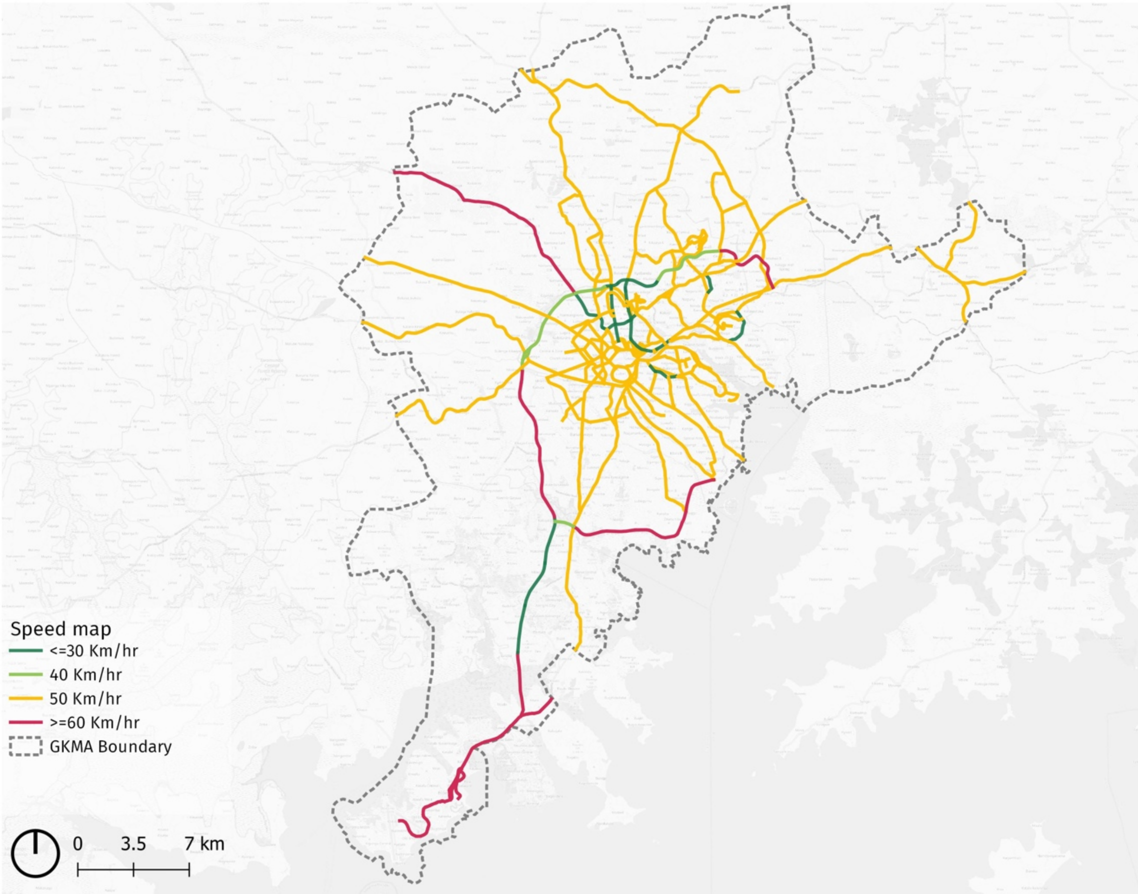

Figure 25. Posted speed limits in GKMA.

3.5 ROAD SAFETY

Figure 26 illustrate the locations of fatalities and serious injuries in the GKMA, indicating a high concentration in Kampala city centre. Boda bodas are the main cause of crashes, and males are most affected, accounting for 82 percent of fatalities and 71 percent of severe injuries (KCCA, 2021).

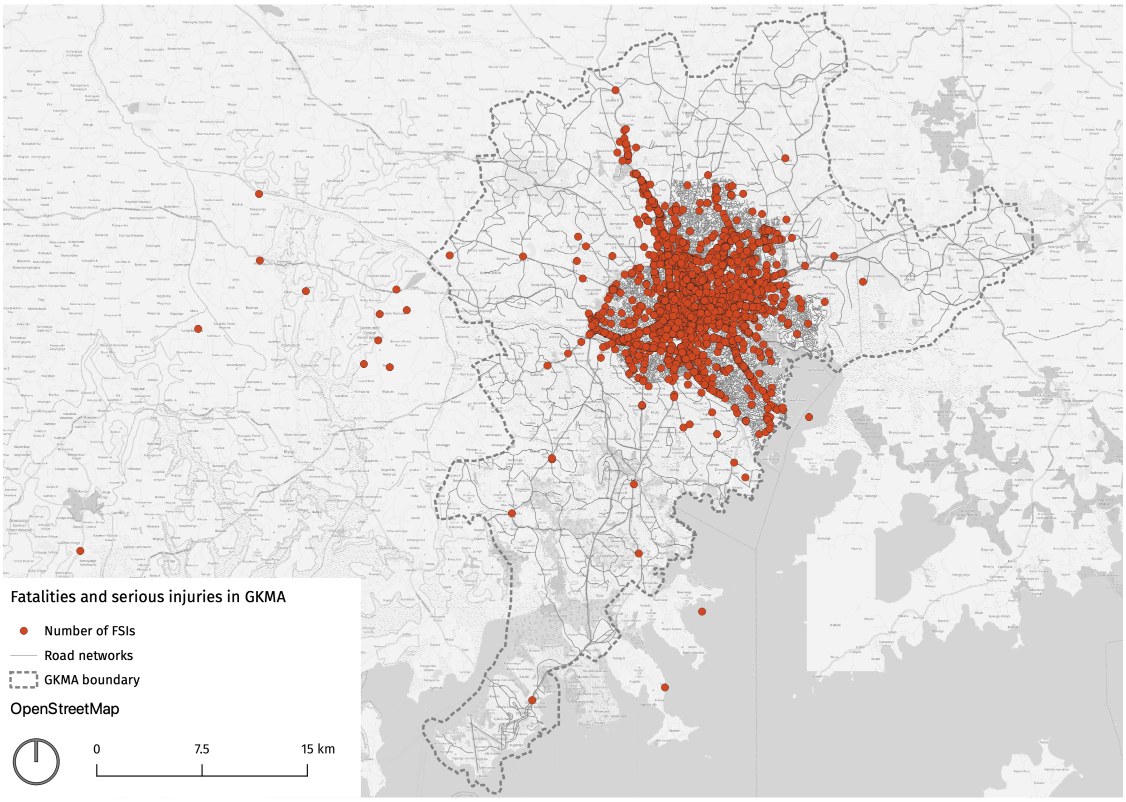

Figure 26. Most fatalities and serious injuries in GKMA occur within the KCCA area (2019, 20).

3.6 GENDER INCLUSION

Given women's complex daily activities and mobility patterns, time spent travelling has a significant impact on women's well-being and productivity as well as their ability to provide care support in their households. Nearly 5 in 10 women in Kampala use public transport to travel to work. Between 52 and 67 percent of women who are economically active work and live in the same division. Challenges faced by women include the high cost of transport (73.6%); heavy/slow traffic (64.4%); poor quality of road infrastructure (53%); poor quality of public transport vehicles (52.1%); and the risk of crashes (51.5%) (SEI and UN WOMEN, 2021). Besides considering an equitable household distribution of care responsibilities, establishing a safe and efficient transport system will make a significant contribution.

3.7 PUBLIC TRANSPORT SYSTEM

The Kampala public transport network is primarily radial, with routes traversing from the CBD to the outskirts of the city. The public transport system is informal and is operated by mostly mini-bus taxis and a few buses. Users face several challenges (ITDP, 2020):

- **Slow speeds.** Public transport services operate in mixed traffic, and speeds along key corridors, such as Jinja Road and Bombo Road, are as low as 5-15Km/h.
- **Lack of reliability.** Services are not scheduled, resulting in variable wait times. Frequent service is available at certain times, while at other times passengers must wait a long time for vehicles to fill up.
- **Poor vehicle quality and comfort.** Vehicles are often overloaded, and tight spacing of seats makes it difficult for passengers to board and alight.

- **Lack of weather protection and lighting at public transport stops.** Most roadside bus stops and terminals lack formal shelters, leaving passengers exposed to the elements.
- **Limited attention to last-mile access.** Pedestrian facilities are often lacking in the vicinity of public transport stops.

The recent process undertaken by KCCA to register commuter taxis indicated 14,000 registered taxis. The minibus taxis are privately owned, and some are operated by the individual owners. In majority of the cases, the owner hires a driver and a conductor to operate the taxi. The minibus taxi operation business model is a target system. The owner (driver) keeps all the fares collected or the driver (non-owner) pays a fixed rent to the vehicle owner and retains what remains after fuel and other overhead expenses (ITDP, 2020). The target system model leads to reckless driving, poor adherence to traffic regulations, poor maintenance of the vehicles, and speeding.

ITDP has been supporting the efforts of MoWT, KCCA and other partners to plan and design an organised and high-quality public transport system. One of the critical first steps is to understand the existing network and services of public transport. In 2015, ITDP in partnership with MoWT, KCCA and other stakeholders conducted surveys and developed the first map of public transport network for the city.

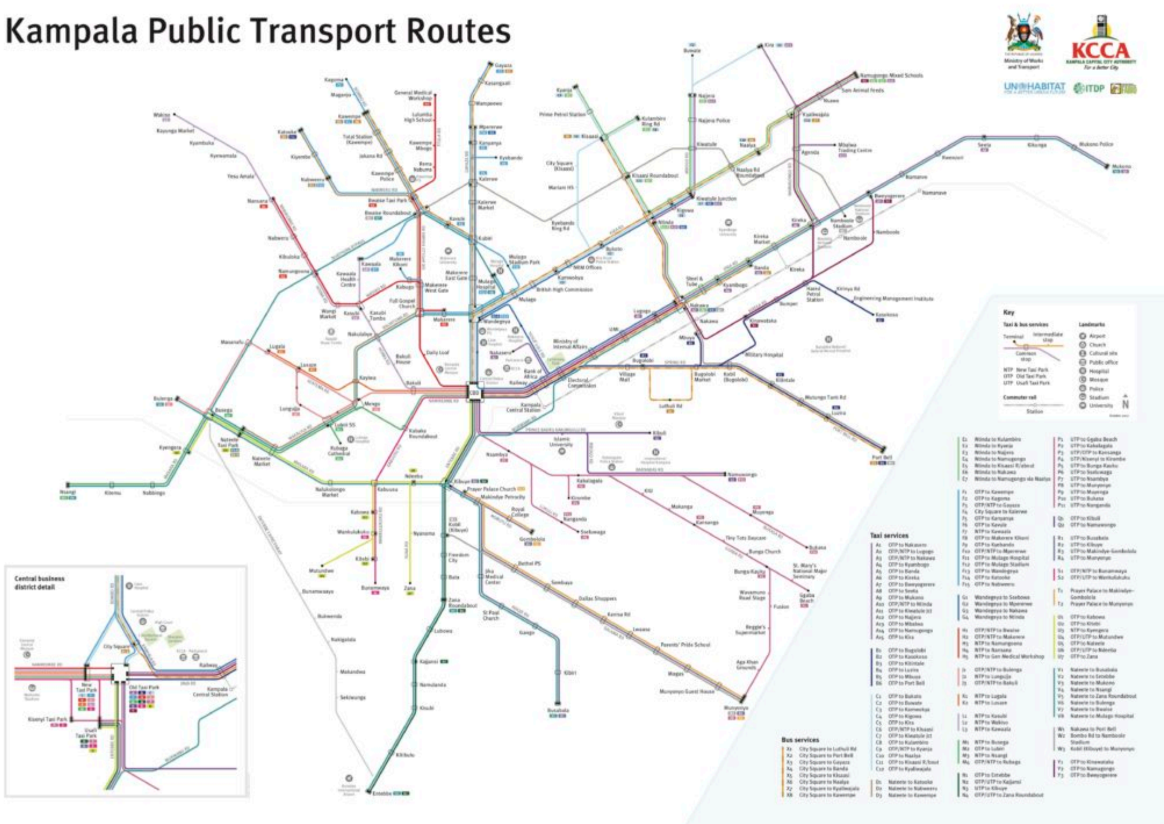

Figure 27. Kampala public transport routes.

3.8 BODA BODAS

Boda bodas offer motorcycle taxi services in Kampala. They are convenient for short trips and last mile connectively in locations that taxis are unable to reach. The boda fleet is estimated at

200,000 in GKMA. The sector poses challenges including traffic violations, over speeding, and a high rate of crashes. Registered boda-bodas operate at designated stages, but a considerable number operate anywhere in the city (ITDP, 2020). KCCA is continuing with its current efforts of regulating boda-bodas through enforcement, tracking unregistered motorcyclists, and assigning more stages.

3.9 LAND USE

In Kampala, transport systems are inefficient in part because of poor land use planning and the delay in adopting an integrated approach towards land use and transport planning (Kiggundu, 2012). The complex land tenure system in Uganda makes the provision of roads and other transport related infrastructure a major challenge. A large percentage of land in Kampala is privately owned under the categories of private mailo (75%) and freehold (3%). According to the Kampala city council development plan 2009-2011, the cost of constructing and tarmacking each urban road is USD 500,000. The high cost of construction is due to the land compensation policy under the 1995 constitution as well as the Kampala Capital City Act of 2010.

Table 5: Land tenure system and occupancy in Kampala (Kampala Capital City Authority, 2012).

Land tenure category	*Percentage (%)*	*Status*	*Planning issues*
Private mailo	75	Fully titled with estimated 45,000 land titles	Slum infestation and unplanned
Leasehold	15	Higher % titled	Largely planned
Kabaka's land	7	Titled	Largely unplanned
Freehold	3	Titled	Partly planned

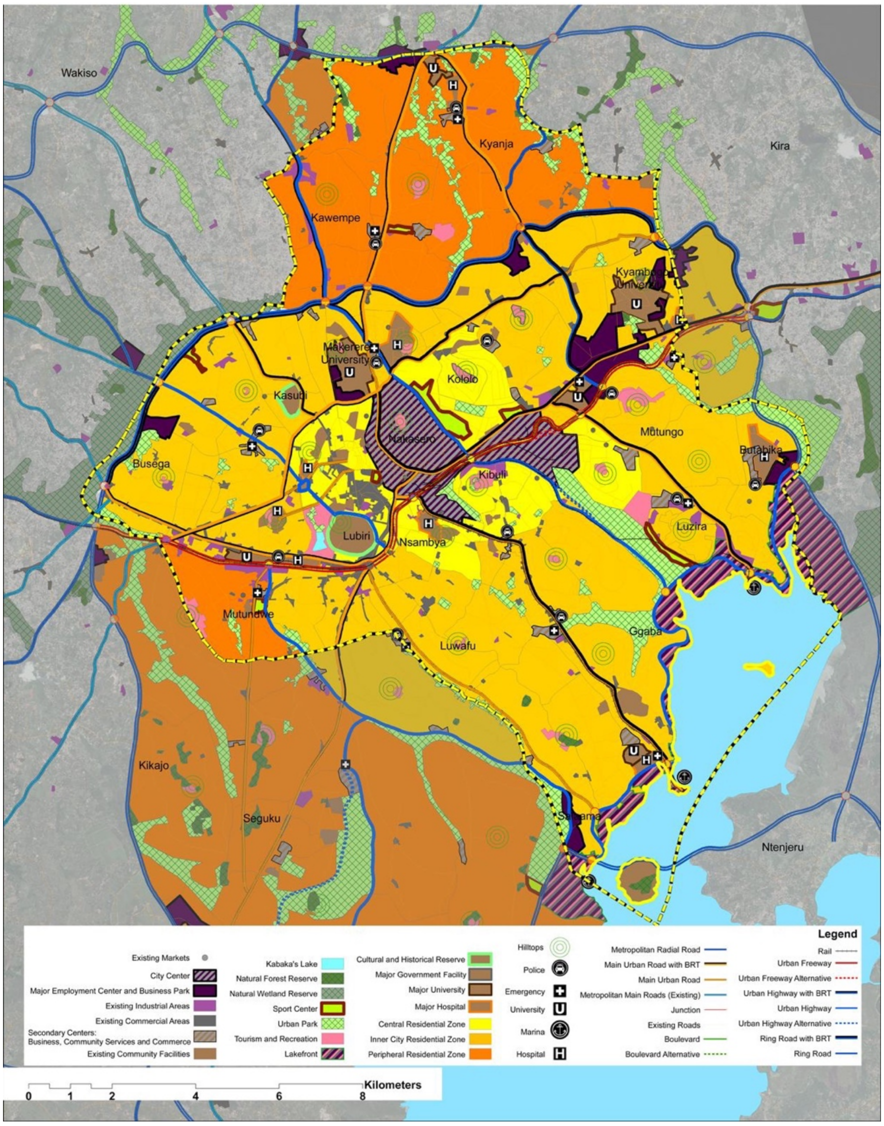

Figure 28. Existing land uses in Kampala (Kampala Capital City Authority, 2012).

3.10 TOPOGRAPHY

Gradients up to 6 percent are generally acceptable for cyclists and slopes up to 10 percent are acceptable for very short segments. Gradients of 2-3 percent are preferable for longer segments (Cycle Highways EU, 2023). Among 2,389 km of analysed street segments in Kampala, about 65 percent of the streets have gentle slopes of less than 3 percent, and 87 percent of the streets are below 6 percent, which is still acceptable for cyclists. Only around 6 percent of the analysed streets have more than an 8 percent gradient, and about 2 percent have very steep slopes of greater than 10 percent.

Table 6: Average street slopes.

Average slope	*Length (km)*	*Share from the total length of assessed streets (%)*

0-2%	1,110.13	46.47%
2.1-3%	440.63	18.45%
3.1-4%	255.49	10.70%
4.1-5%	157.45	6.59%
5.1-6%	121.13	5.07%
6.1-7%	92.65	3.88%
7.1-8%	71.72	3.00%
8.1-9%	56.47	2.36%
9.1-10%	38.36	1.61%
>10%	44.67	1.87%
Sum	2,388.71	100%

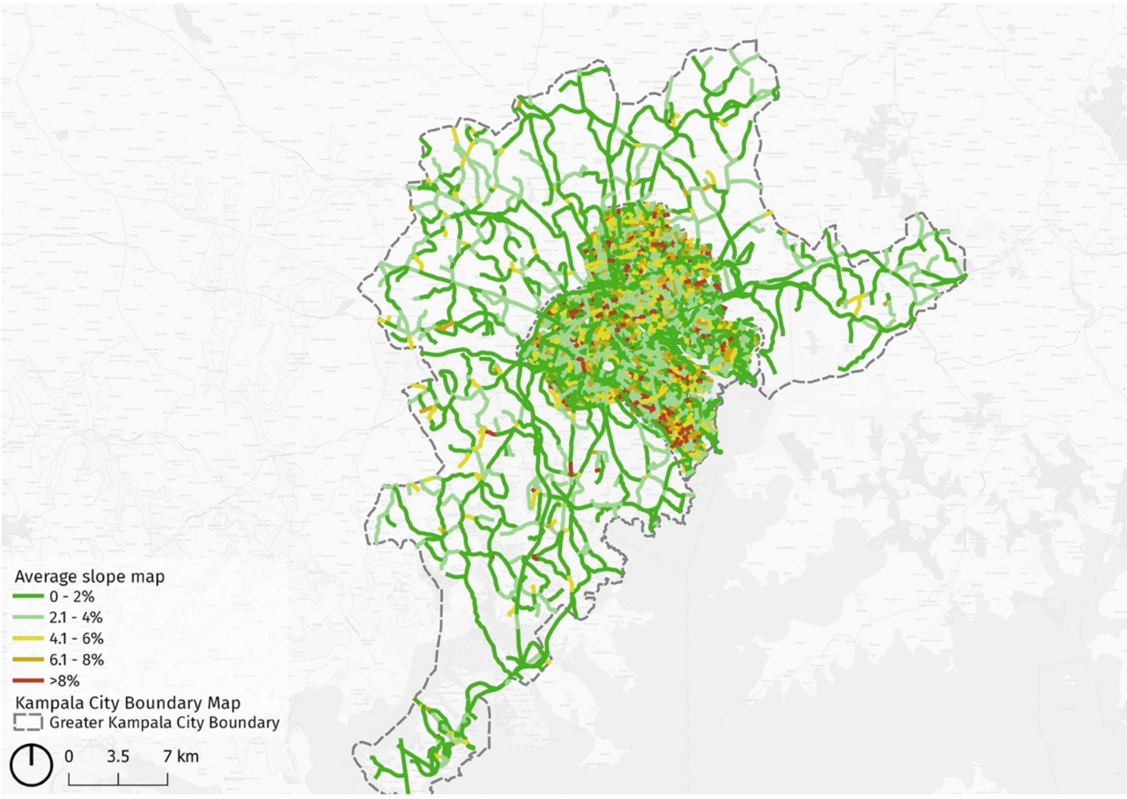

Figure 29: Average Street slopes in GKMA.

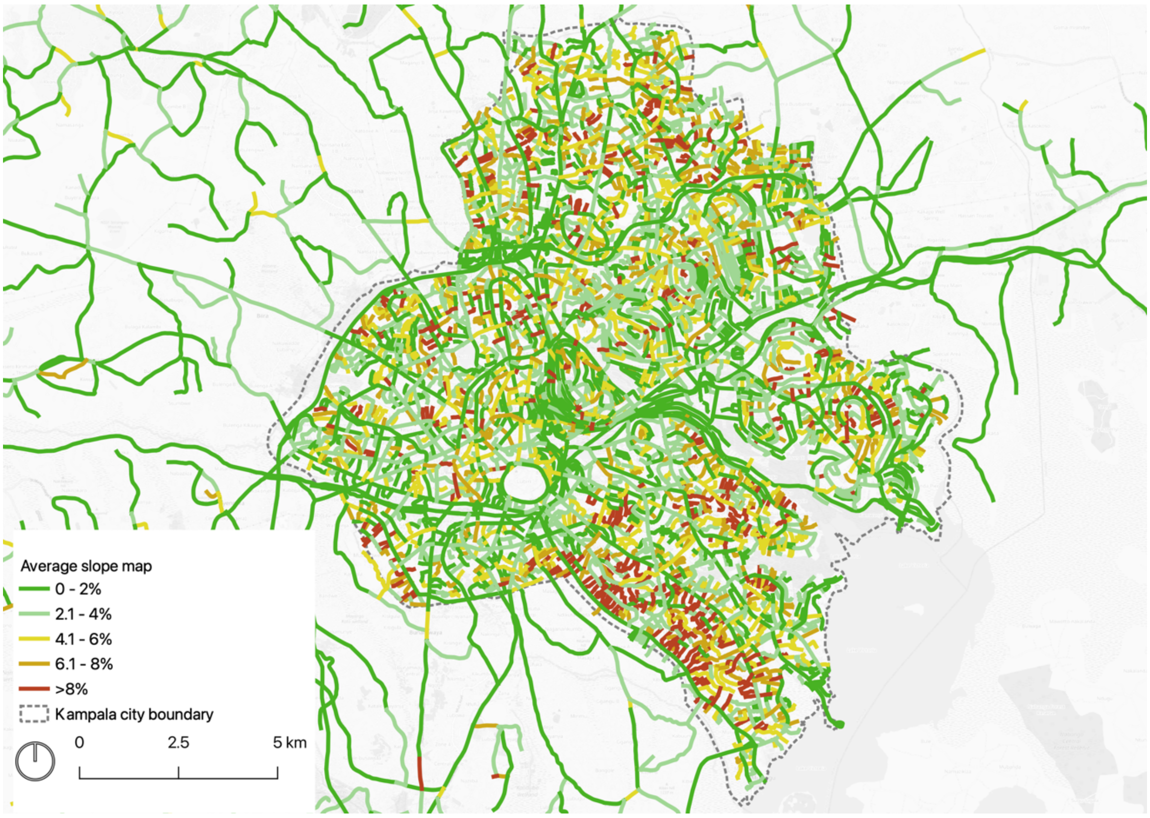

Figure 30: Average Street slopes in the KCCA area.

3.11 LEVEL OF TRAFFIC STRESS

The level of traffic stress (LTS) is a composite measure of the amount of stress felt by cyclists when they interact with traffic. When a street has a moderate or high level of stress, it may be a sign that bicycle infrastructure, such as a dedicated cycle track, is needed for people, especially female and disabled people, to feel comfortable riding. Stress is affected by a number of variables, including the number of carriageway lanes; intersection designs; the presence of large vehicles; frequent stops by public transport vehicles; and other kerbside activities. It is important to account for the changing sources of stress during the day as the traffic volume fluctuates. While the morning and afternoon peaks cause queuing stress, lower volumes off-peak can lead to uncomfortably high car speeds.

The Mineta Transportation Institute has developed a classification scheme with four levels of traffic stress, as defined in the table below. This classification corresponds to Geller's first three classes of the adult population, plus a fourth level for children which is obtained by separating the "interested but concerned groups" further into categories for children and adults because of the lower ability of children to control a bike along a narrow course, negotiate with traffic, and cross streets safely.

Table 7. Level of Traffic Stress Source: (Mineta Transportation Institute, 2012).

LTS1	Presents little traffic stress and demands little attention from cyclists and is attractive for a relaxing bike ride. Suitable for almost all cyclists, including children trained to safely cross intersections, on road sections, cyclists are either physically separated from traffic or are in an exclusive bicycling zone next to a slow traffic stream with no more than one lane per direction, or are in mixed traffic with a low-speed differential and demanding only occasional interactional with motor vehicles. Next to a parking lane, cyclists have ample operating space outside the zone into which car doors are opened. Intersections are easy to approach and cross.
LTS 2	Presents little traffic stress but demanding more attention than might be expected from children. On road sections, cyclists are either physically separated from traffic or are in an exclusive bicycling zone next to a well-confined traffic stream with adequate clearance from a parking lane or are on a shared road where they interact with only occasional motor vehicles with a low-speed differential. Where a bike lane lies between a through lane and a right-turn lane, it is configured to give cyclists unambiguous priority where cars cross the bike lane and to keep car speed in the right-turn lane comparable to bicycling speeds. Crossings are not difficult for most adults.
LTS 3	Offers cyclists an exclusive cycling zone (e.g., cycle track) requiring little negotiation with motor traffic, but in close proximity to moderately high-speed traffic; or mixed traffic requiring regular negotiation with traffic with a low-speed differential. Crossings may be stressful but are still considered acceptably safe to most adult pedestrians.
LTS 4	Requires riding in close proximity to high-speed traffic, or regularly negotiating with moderately high-speed traffic, or making dangerous crossings.

The LTS influences the type of cyclists who will be willing to use the corridor. As discussed above, LTS 1 represents a low-stress environment, which is suitable for all types of cyclists including the child/novice groups, while LTS 4 represents an environment that can be used only by the “strong and fearless” groups of cyclists. Adults that are in the “interested but concerned” group can cycle on LTS 2 and those that are within the “enthused and confident” groups can deal up to LTS 3.

To classify the streets of Kampala based on the degree of stress imposed on cyclists, the following factors were considered:

- **Prevailing speed:** The speed of motorised vehicles can affect the level of comfort and safety felt by cyclists. The study considers the speed limit plus 10 km/h as a proxy for the prevailing speed.
- **Number of carriageway lanes:** An increase in the number of motorised carriageway lanes can have a negative impact on cyclists because it encourages higher vehicle speeds. It also impacts the visibility of cyclists at crossings and makes it more difficult for people to cross the road.
- **Presence of cycle track or protected bike lane:** People, especially women, are more likely to feel comfortable while riding on a street that has a dedicated bicycle lane than riding together with the motorised vehicles. On those streets that have bicycle infrastructure in place, bike lane blockages due to on-street parking and vendors are considered on the evaluation since these force cyclists to use the carriageway instead of the bikeway.
- **Properties of streets to be crossed:** A dangerous street crossing can increase the stress level of a cycling corridor. The assessment considers the number of lanes, speed, and availability of a median on each street that intersects with a given block. In Kampala, Entebbe Road, Jinja Rd, Bombo Rd, and Mbuya-Ntinda Road are among the corridors with medians. For the given street, the assessment takes the highest stress level found among the intersecting streets.

After each street centre line is given a score based on the table below, a numeric stress level is assigned to each street.

Table 8. Weight assigned for Level of Stress metrics.

Metric	*Value*	*Individual weight*	*Total weight (%)*
Prevailing Speed	< 25 km/h	0	30
	≤ 40 km/h	20	
	≤ 60 km/h	75	
	60+ km/h	100	
Total carriageway lanes	0	0	15
	2	20	
	4 with median	75	
	4 with no median or 6+	100	
Presence of cycle track or protected bike lane	Present, no problems	0	30
	Present, minor problems	35	
	Present, major problems	60	
	Not present	100	
Street to be crossed	< 25 km/h	0	25
	≤ 40 km/h, 1-3 total lanes, or 4-6 total lanes with 2 m wide median	20	
	≤ 60 km/h, 1-4 total lanes, or 5-6 total lanes per direction with 2 m wide median	60	
	60+ km/h and/or 6+ total lanes per direction	100	

An LTS analysis of about 539 km of roads in GKMA found that almost all of them (98 percent) have a high-stress level of 3 or 4, which means they are only suitable for cyclists who are “enthused and confident” or “strong and fearless.” Only a few roads (1.4 percent) have a lower stress level of 2, which is more comfortable for adults who are “interested but concerned” about cycling. All of the LTS 2 corridors have a speed limit of 30 km/h. Unfortunately, none of the streets have the lowest stress level of 1, not even the existing cycle lane on Namirembe Street, where children and beginners would not feel safe to cycle because it is used by motorcyclists (boda-bodas) whose speeds often exceed 30 km/h. This shows that a lot of work needs to be done to make Kampala’s streets safer for all kinds of cyclists.

Table 9. Level of traffic stress score obtained from existing road analysis.

LTS	*Length (km)*	*Fraction of street length (%)*
LTS 1 (0-25)	0.00	0%
LTS 2 (26-50)	7.6	1.4%

LTS 3 (51-75)	238.5	44.2%
LTS 4 (76-100)	293.2	54.4%
SUM	539.3	100%

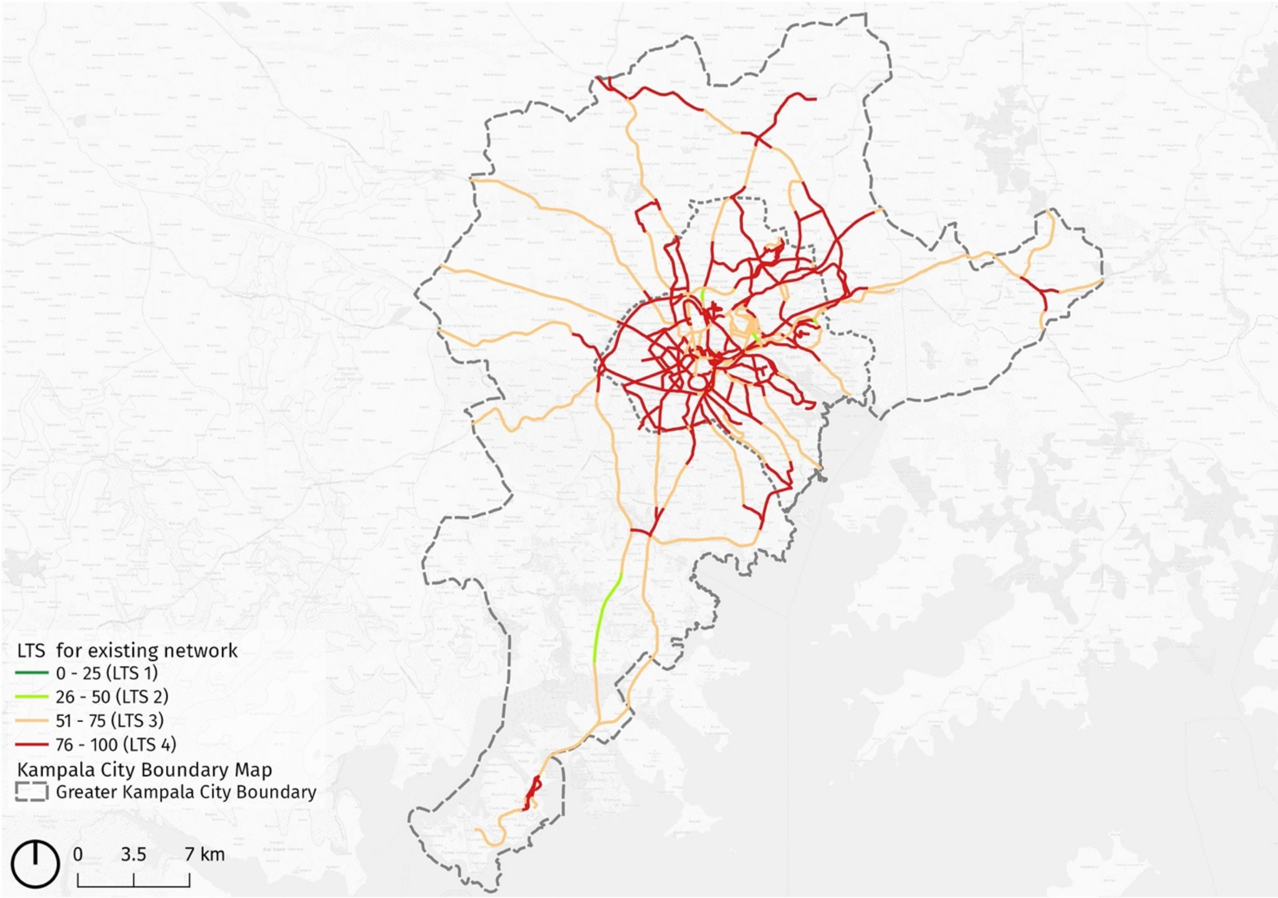

Figure 31: Level of Traffic Stress for existing streets in GKMA.

3.12 ONGOING PROJECTS

Kampala has a road network of 2,110 km, of which only 30% percent is paved. To help address the above challenges, KCCA is implementing the Kampala City Roads Rehabilitation Project (KCRRP). The KCRRP is aimed at improving the road network, upgrading junctions, and improving drainage. The KCRRP project entails improvement of 62 km of roads, 123 km of NMT facilities, provision of street lighting, and provision of scheduled eco-bus services with bus depots and dedicated lanes. The KCRRP implementation period is five years (2020-2024). In addition, KCCA is implementing the Kampala City Roads and Bridges Upgrade Project (KCRBUP). The project covers 201 km, including 42 km in the CBD.

Figure 32: KCRBUP: designed routes.

KCCA is planning to develop several open spaces that can incorporate cycling facilities. One project is the renewal of the wetland near Bugolobi and Luzira as a central park (Kampala Capital City Authority, 2012). In addition, KCCA plans to develop the waterfront along Lake Victoria.

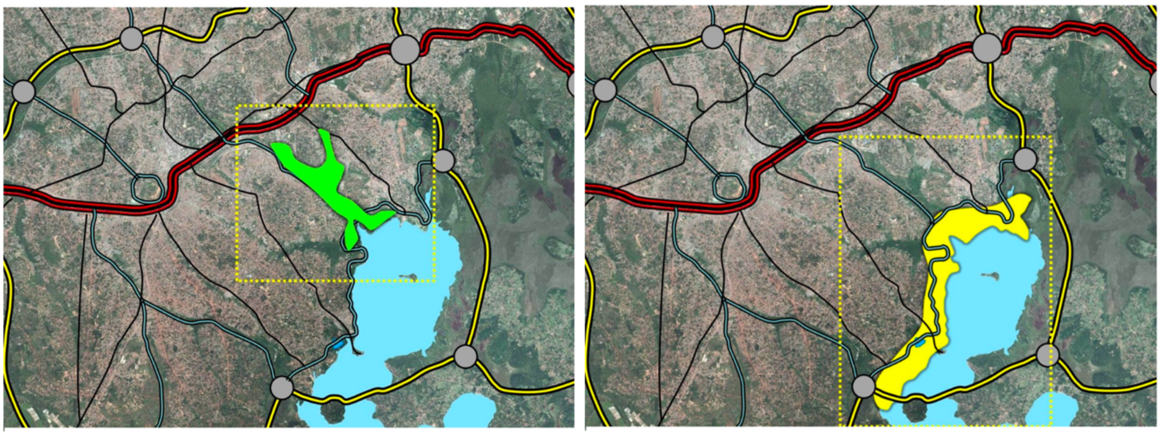

Figure 33. Central urban park SDP (left) and Lakefront SDP (Right). Source: (Kampala Capital City Authority, 2012).

Further to the projects described above, Kampala has a number of natural resources and open spaces that can be developed as greenways with walking and cycling routes. The existing natural resources and open spaces are shown below.

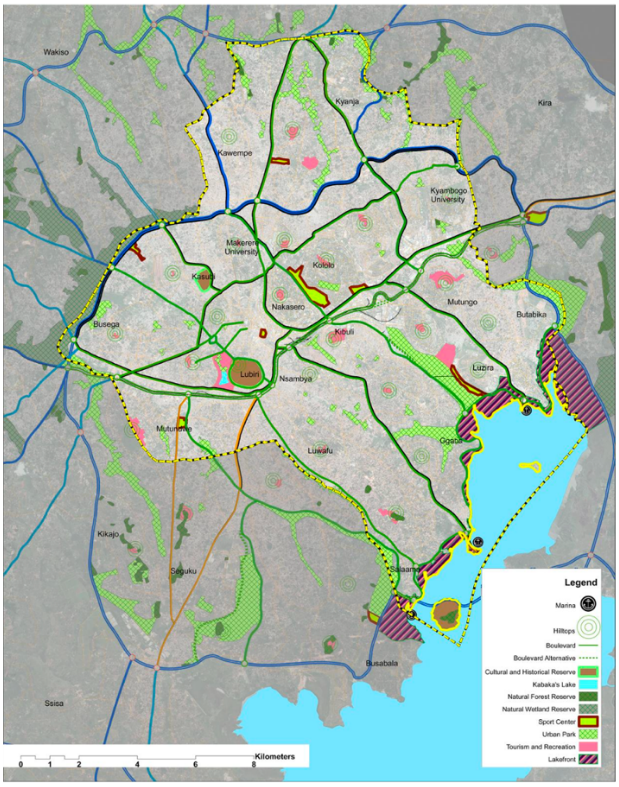

Figure 34. Natural resources and open spaces (Kampala Capital City Authority, 2012).

4. PROPOSED BICYCLE NETWORK

4.1 PRIORITISATION OF CYCLE NETWORK DEVELOPMENT

ITDP selected a set of factors to guide the selection of the routes for implementation in a phased manner:

- **Cycle volumes**: The earlier phases prioritise corridors with high existing cycle volumes.
- **Planned NMT and road development projects**: Planned NMT corridors, including KCRBUP projects, are included in the earlier phases.
- **Black spot locations**: The network prioritises routes that fall on the high-risk road network in the Kampala Road Safety Report 2021.
- **Riverfront and waterfront developments**: Routes in proximity to the planned greenway projects receive priority
- **Rapid transit network**: Routes that provide last-mile access to the planned BRT network receive priority.
- **Gradient**: Streets with gentle slopes are prioritised for earlier phases.
- **Geographic distribution**: Once the short term and medium-term cycling network coverage goals have been achieved, the network seeks to achieve even coverage across GKMA.

We selected assigned cycle corridors across the short-, medium-, and long-term implementation such that short-term/phase 1 corridors accounted for approximately 20 percent of the total network length; medium-term corridors, 30 percent; and long-term corridors, 50 percent.

4.2 IMPLEMENTATION PLAN

The KCNP may be implemented in a phased manner as proposed below.

4.2.1 PHASE 1 (1-2 YEARS)

Short-term routes include corridors with high cycles, planned NMT corridors, BRT routes, and some routes under KCRBUP. Routes proposed for the short-term total to 84 km.

Typical cross-sections for the proposed phase 1 routes is added under Appendix D.

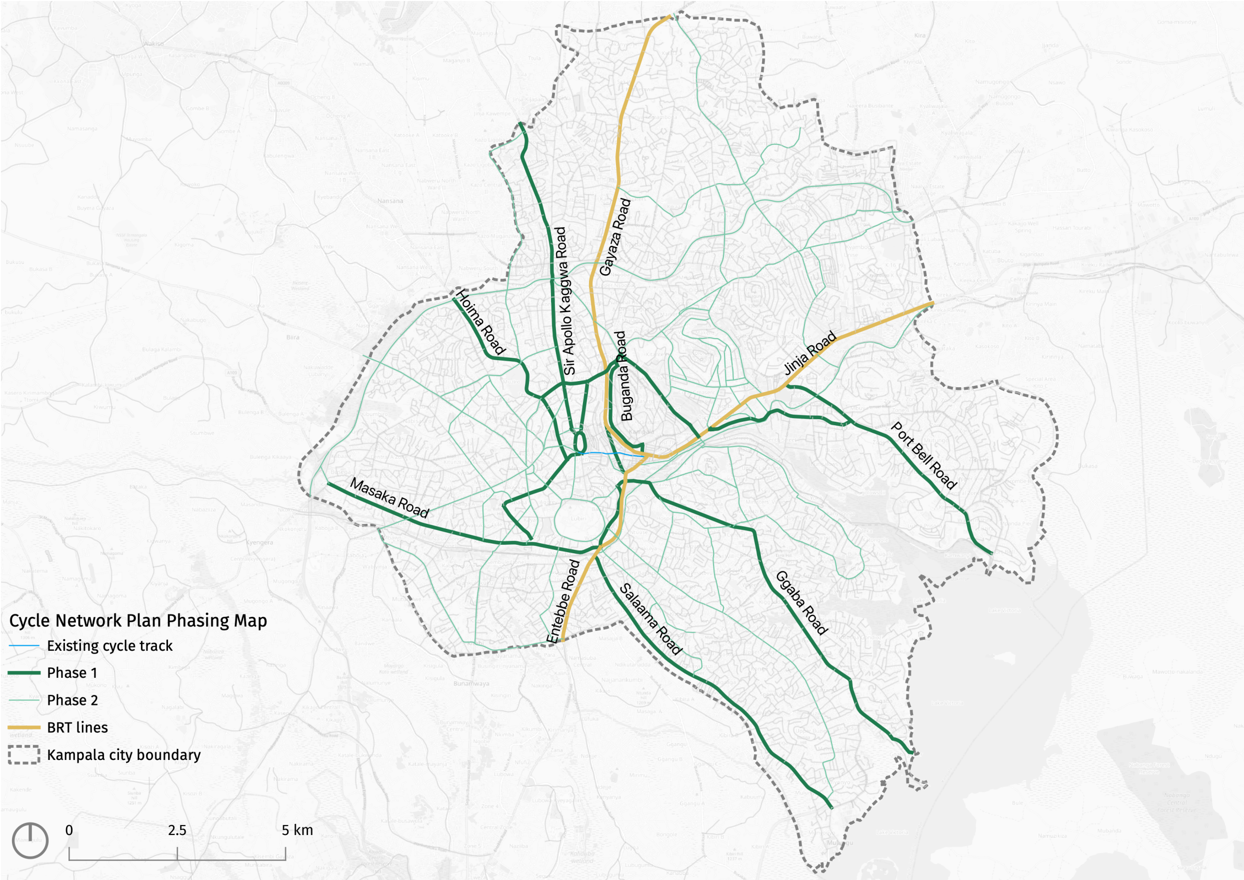

Figure 35: Bicycle network: phase 1.

Table 10: Bicycle network under phase 1.

ROW	*Street Type*	*Intervention*	*Length (Km)*
15	Collector street	Uni-directional	26.9
15	Collector	Bi-directional	2.2
20	Collector	Uni-directional	2.7
20	Collector	Bi-directional	12.4
28	Major Arterial	Uni-directional	1.8
28	Major Arterial	Two-way	18.7
28	Minor Arterial	Uni-directional	14.1
28	Minor Arterial	Uni-directional	0.0
30	Major Arterial	Uni-directional	0.0
30	Major Arterial	Bi-directional	4.9
Grand Total			83.9

4.2.2 PHASE 2 (3-5 YEARS)

In the medium term, the network includes additional BRT routes, additional routes under KCRBUP, and high-risk fatal and serious injury corridors identified in the Kampala Road Safety Report. Routes proposed for phase 2 total to 166 km.

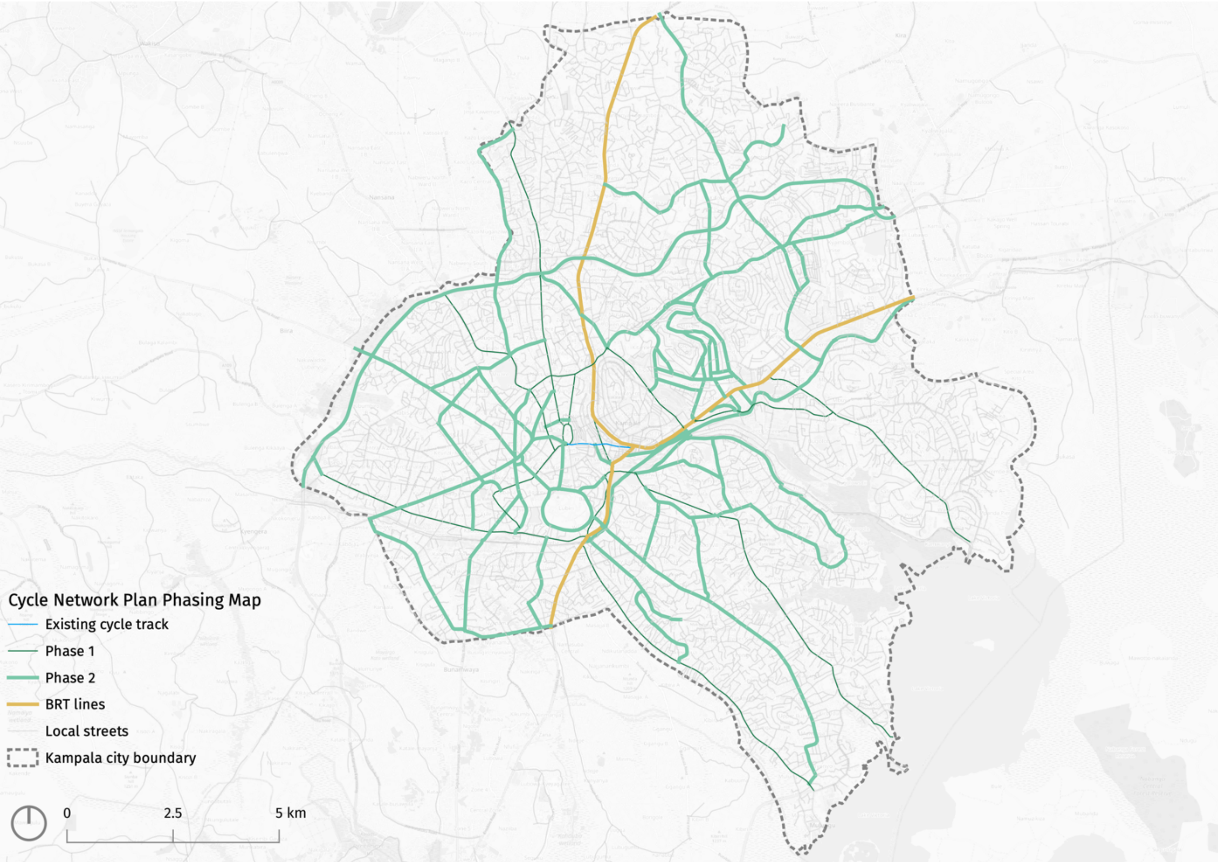

Figure 36. Bicycle network: phase 2.

Table 11: Bicycle network under phase two

ROW	*Street Type*	*Intervention*	*Length (km)*
15	Collector	Bi-directional	1.4
20	Collector	Bi-directional	146.8
20	Major Arterial	Uni-directional	0.9
30	Major Arterial	Uni-directional	17.3
Grand Total			166.4

4.2.3 PHASE 3 (6-10 YEARS)

In the long term, the network expands to provide connectivity to multiple commercial areas and offer good coverage on all major corridors in GKMA. Routes proposed for phase 3 total to 241 km.

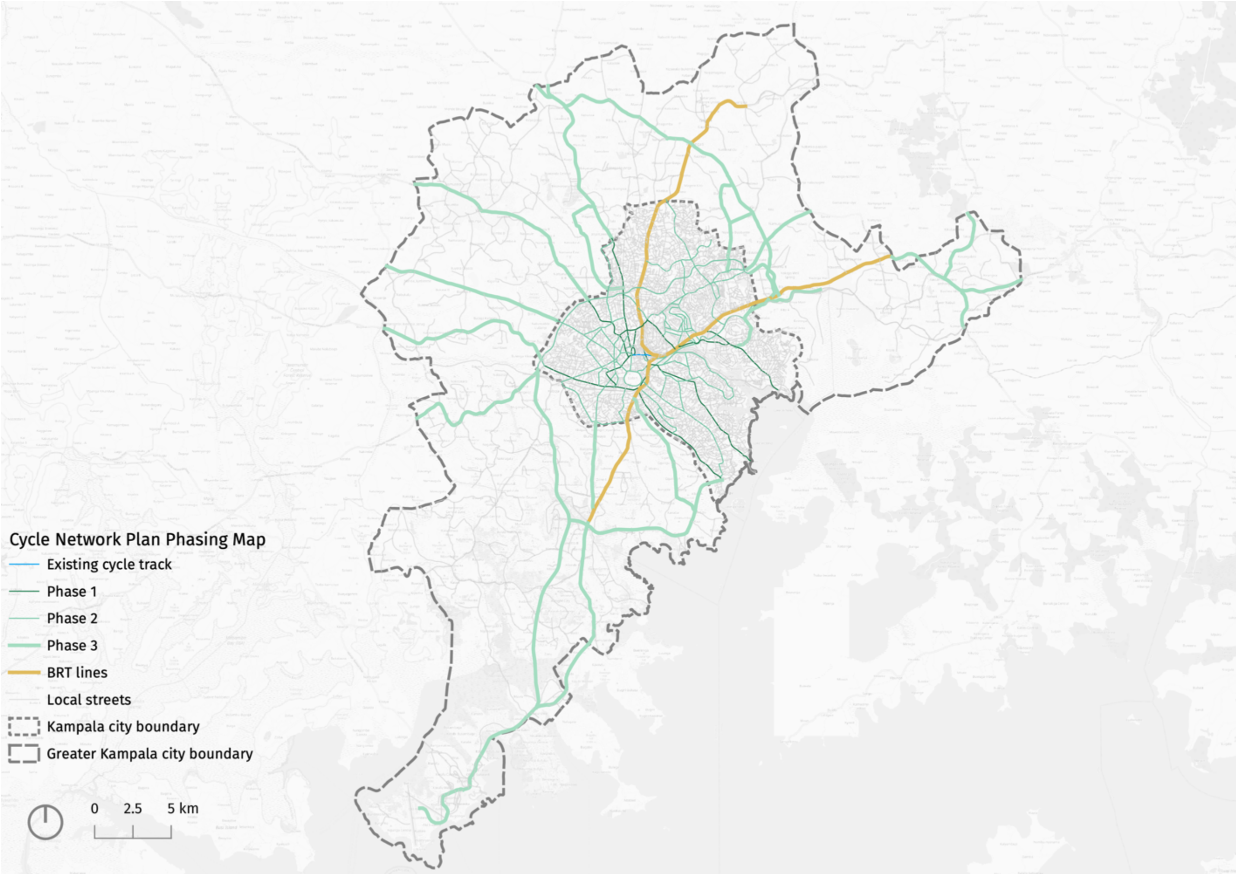

Figure 37: Bicycle network: phase 3.

Table 12: Bicycle network under phase 3.

ROW	*Street Type*	*Intervention*	*Length (km)*
15	Collector	Bi-directional	22.8
20	Collector	Bi-directional	67.1
28	Major Arterial	Uni-directional	11.8
28	Major Arterial	Bi-directional	18.9
28	Minor Arterial	Uni-directional	49.2
28	Minor Arterial	Bi-directional	0.1
30	Major Arterial	Uni-directional	63.1
30	Major Arterial	Bi-directional	5.4
30	Major Arterial	Bi-directional	2.0
Grand Total			240.5

4.2.4 SUMMARY: PHASES 1-3

Kampala will have a cycle network totalling to 493 km after implementation of phases 1-3.

Table 13: Bicycle network summary

Phase	*Length (km)*
Existing	2.0
Phase 1	83.9
Phase 2	166.4
Phase 3	240.5
Total	492.7

4.3 LEVEL OF TRAFFIC STRESS FOR FINAL CYCLE NETWORK

To determine the stress level for the proposed cycle network, we made the following assumptions:

- The presence of a median was assumed for corridors with more than 2 total carriageway lanes.
- The prevailing speed was assumed to be a maximum of 50 km/h, as the interventions are expected to reduce traffic speed in accordance with speed limits.
- One carriageway lane was deducted from the existing total number of carriageway lanes for bidirectional cycle tracks, and two carriageway lanes were deducted for unidirectional cycle tracks.
- Availability of cycle facilities was assumed for the corridors included in the proposed cycle network.

Based these assumptions, there is a substantial decrease in stress levels, with approximately 92 percent of the analysed streets having a lower stress level of 1 or 2. These stress levels are also comfortable for adult users who have an "interested but concerned" attitude toward cycling. It is worth noting that all the corridors with planned cycle network fall in the LTS 1 and 2 categories. Among those streets lacking cycle tracks, 89 percent of them fall under LTS 3, while the remaining streets fall under LTS 4, indicating lower stress levels than the previous LTS analysis. This improvement is primarily due to the overall enhancements, including the reduction of citywide speed limits to 50 km/h.

Table 14: Final cycle network LTS summary

LTS (after)	*Length (Km)*	*Total LTS (%)*
LTS 1 (0-25)	40.5	7.5%
LTS 2 (26-50)	452.2	83.8%
LTS 3 (51-75)	41.6	7.7%
LTS 4 (76-100)	5.0	0.9%
Total	539.3	100.0%

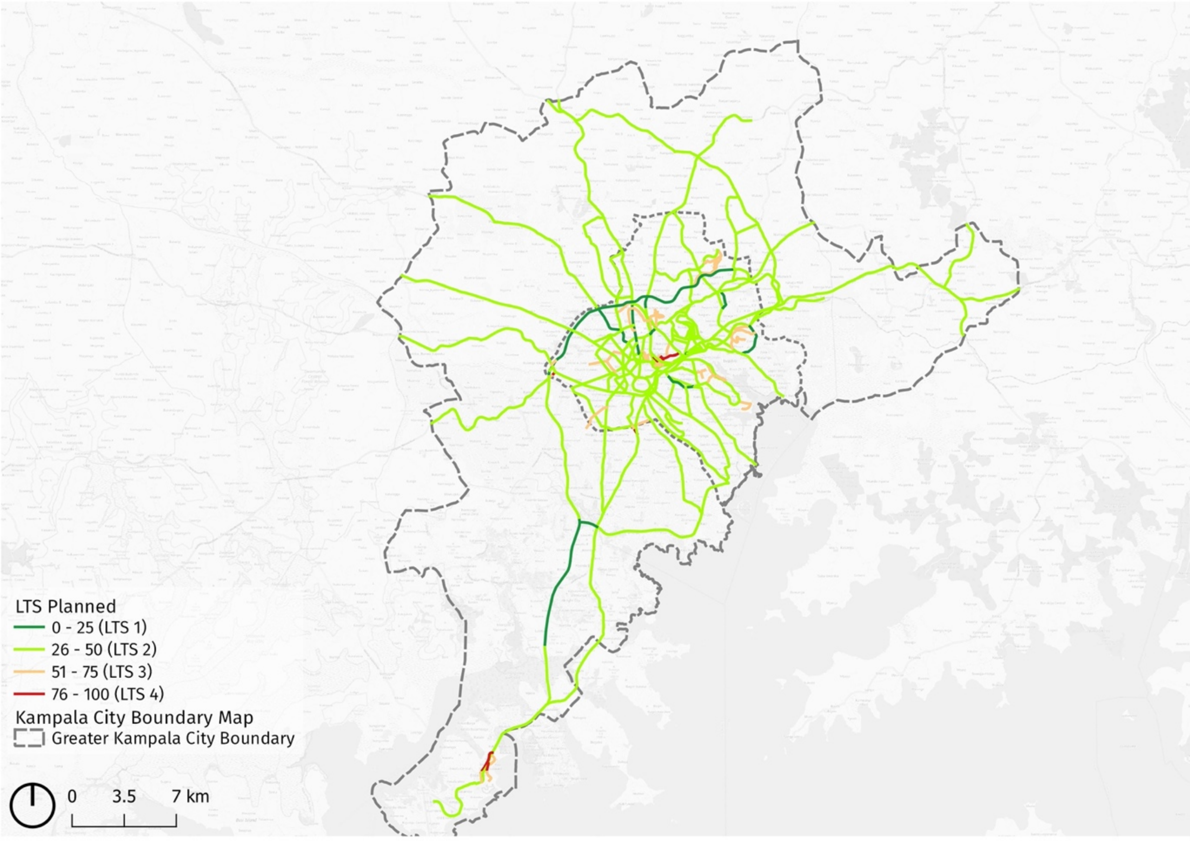

Figure 38: Level of Traffic Stress for the planned network

4.4 COMPLEMENTARY ACTIVITIES

Bicycle programmes have the potential to complement the cycle network by raising awareness and increasing cycle ridership. The city can promote cycling education by expanding learn-to-ride programmes at community centres or other locations in partnership with civil society groups and schools. It is crucial to find strategies to encourage more women to cycle. Women-only classes or family classes can help bridge gender gaps and create an inclusive cycling environment. Cycle training grounds and cycling instructor workshops can be established at schools to strengthen cycle culture, as recently promoted at Makerere University (ITDP, 2022).

Supporting policy measures include forming a multi-stakeholder cycling advisory committee or working group. Building control regulations should include minimum cycle parking levels. Complementary facilities include cycling facilities, such as bicycle parking, lockers, toilets, and showers, and changing areas. Lower taxes on imports of cycles and other products could incentivise cycling (ITDP, 2022).

Financial incentives for commuters and employer benefit schemes to subsidise cycle purchases can serve as a further boost to cycling. Delivering a cycling subsidy strategy requires the appropriate funds and adequate human resources. KCCA could team up with local employers who can contribute funds and enjoy benefits such as better employee productivity and lower parking costs (ITDP, 2022).

4.5 COST ESTIMATES

Based on construction costs for the Kampala NMT project, we estimate that the implementation of a safe, connected cycle network in Kampala would cost approximately UGX 1 billion (USD 271,890) per km of network. The rate considers the construction of uni-directional cycle tracks on two sides of the street, inclusive of 20 percent contingency and 18 percent VAT. The total cost of the 491 km network is UGX 505 billion (USD 133 million). The construction cost required per route for each phase is included under Appendix C.

Table 15: Indicative budget for the cycle network.

Cost per km (UGX)	*Cost per km (USD)*	*Network length (km)*	*Total cost (UGX)*	*Total cost (USD)*
1,028,961,888	271,890	491	504,955,637,743	133,428,011

Table 16: Cost summary per phase

Network phase	*Network length (Km)*	*Total cost (UGX)*	*Total cost (USD)*
Phase 1	84	86,535,694,781	22,865,941
Phase 2	166	171,243,746,206	45,248,950
Phase 3	240	247,417,194,689	65,376,801

4.6 AGENCY RESPONSIBILITIES

Table 17 indicates Stakeholders best positioned to implement the Kampala Cycle Network Plan (KCNP).

Table 17: Stakeholder roles in KCNP implementation.

Implementing agency	Responsibility
Kampala Capital City Authority (KCCA)	• Develop and approve the Kampala Cycle Network Plan (KCNP). • Coordinate with all other stakeholders to successfully implement the KCNP. Align on-going projects with the KCNP. • Design and construct high-quality cycle facilities. • Administer the built cycle infrastructure. • Mire and manage bikeshare operators. • Install bicycle parking, especially at public transport hubs. • Organise open streets events.
Ministry of Works and Transport (MoWT)	• Support KCCA in implementing the KCNP. • Update the NMT policy. • Oversee implementation of the NMT policy • Revise urban street manuals to include complete cycling guidelines. • Organise open streets events with KCCA
Uganda National Roads Authority (UNRA)	• Design and construct high-quality cycle facilities.

Implementing agency	Responsibility
Uganda Traffic Police (UTP)	• Manage traffic enforcement on the constructed cycling infrastructure. • Organise open streets events together with KCCA.
Civil society organisations and cycling groups	• Organise open streets events with KCCA. • Facilitate informative campaigns cycling, including the use of cycle infrastructure.

This section gives insights on bikeshare system that can be initiated to supplement the Kampala Cycle Network Plan upon.

5. APPENDIX A

Table 18: Cycle network data collection matrix.

*Data needed/requested**	*Data received*	*Source/Organisation*
Road network plan with centreline, width, number lanes, centreline, median presence	Crash data	KCCA
Topography map	Kampala Geo crash data	KCCA
Crash data	Motorcycle Fatal Geocoded	KCCA
Georeferenced map of GKMA	PDF Report "High risk fatal and serious injury crash locations 2019-2020)	KCCA
Land use maps and data (existing and proposed land used)	GKMA Roads - shape file	KCCA
Speed data per corridor (limit and operating speed)	GIS files	KCCA
Population density maps	Contour lines	KCCA
Public transport routes and stations	GKMA boundary - shapefile	KCCA
Greenway network (existing, under construction, planned)	GKMA land use and income classes - shapefile	KCCA
Trip counts and travel pattern study data	GKMA parishes - shapefile	KCCA
	Kampala Roads Inventory Data 2014 - shapefile	KCCA
	Kampala Roads 2022 - shape file	KCCA
	KPDP final map - pdf	KCCA

Table 19: Primary data collection form

Survey name		*Station Code (GPS):*		*Location name:*	*Date:*		
		Direction of cycling			Gender		Children
Morning Peak duration (6:30-9:30) AM	Evening Peak duration (3:30-6:30) PM	Inbound (Towards the city centre)	Outbound (Out of the city centre)		Male	Female	
6:30-6:45	3:30-3:45						
6:45-7:00	3:45-4:00						
7:00-7:15	4:00-4:15						
7:15-7:30	4:15-4:30						
7:30-7:45	4:30-4:45						
7:45-8:00	4:45-5:00						
8:00-8:15	5:00-5-15						
8:15-8:30	5:15-5:30						
8:30-8:45	5:30-5:45						
8:45-9:00	5:45-6:00						
9:00-9:15	6:00-6:15						
9:15-9:30	6:15-6:30						

Total (6:30-7:30)	Total (3:30-4:30)						
Total (7:30-8:30)	Total (4:30-5:30)						
Total (8:30 to 9:30)	Total (5:30-6:30)						
Totals							

6. APPENDIX B

Table 20: Morning peak hours demand raw data

No	*Routes*	*Station locations*	*Total (6:30-7:30)*	*Total (7:30-8:30)*	*Total (8:30-9:30)*	*Max hourly demand*	*Inbound (towards city centre)*	*Outbound (away from the city centre)*	*Total volume in 3 hours*	*Male*	*Female*	*Children*
1	Salaama road	Makindye Secondary School	131	182	136	182	372	77	449	449	0	0
2	Kampala-Entebbe Road	Zana road	44	92	76	92	114	98	212	212	0	1
3	Salaama road	Rubis Gas Station	333	441	315	441	754	335	1089	1089	0	6
4	Kampala-Entebbe Road	SEB hotel/Busabala junction	148	181	124	181	349	104	453	453	0	8
5	Katwe	Mungazirwaza	376	422	338	422	924	212	1136	1136	0	0
6	Kampala-Entebbe Road	Queen's way	109	146	128	146	177	206	383	383	0	3
7	Katwe	Katwe near V.K Bikes	370	398	199	398	672	295	967	967	0	1
8	Bombo road	Wandegeya-Gayaza roundabout	87	137	233	233	104	353	457	457	0	12
9	Gayaza road	Kalerwe roundabout	298	317	309	317	563	361	924	924	0	4
10	Gayaza road	Mpererwe trading centre	131	187	124	187	333	109	442	442	0	7
11	Bombo road	Makerere hill road	229	487	361	487	813	264	1077	1076	1	40
12	Bombo road	Queen's lane junction	186	323	223	323	659	73	732	731	1	47
13	Kampala road	Cham towers	88	107	60	107	191	64	255	255	0	3
14	Gayaza road	Sindani Contractors Ltd near Vision Petroleum	63	56	42	63	118	43	161	161	0	29
15	Bukoto -kisaasi	Yusuf lule road	149	140	80	149	277	92	369	367	2	0
16	Portbell road	Airtel roundabout	185	168	99	185	320	132	452	452	0	1

No	*Routes*	*Station locations*	*Total (6:30-7:30)*	*Total (7:30-8:30)*	*Total (8:30-9:30)*	*Max hourly demand*	*Inbound (towards city centre)*	*Outbound (away from the city centre)*	*Total volume in 3 hours*	*Male*	*Female*	*Children*
17	Bukoto-Kisaasi	Northern Bypass	17	43	23	43	54	29	83	83	0	6
18	Bukoto-Kisaasi	Kabira Country Club	47	71	46	71	111	53	164	164	0	12
19	Namugongo-Kyaliwajjala	Najjera police station	17	17	11	17	23	22	45	45	0	1
20	Bukoto-Kisaasi	Bahai-Kisaasi road junction	25	27	15	27	27	40	67	67	0	2
21	Mbogo road-Kira town	Kyaliwajjala trading centre	70	65	53	70	97	91	188	188	0	7
22	Sir-Apollo Kaggwa-Bwaise Roundabout	Bwaise roundabout (Christian life church close)	163	332	242	332	616	121	737	737	0	3
23	Masaka road	Weranga-Kalinda station	410	426	354	426	883	307	1190	1190	0	1
24	Masaka road	Kibuye market	204	208	168	208	358	222	580	580	0	1
25	Sir-Apollo Kaggwa-Bwaise Roundabout	Sir Apollo-Bwaise junction (Total energies close)	151	83	136	151	265	105	370	370	0	4
26	Sir-Apollo Kaggwa	Nsalo road-Sir Apollo Kaggwa junction	37	58	46	58	106	35	141	141	0	17
27	Kampala road-Banda-Kireka	Lugogo mall	168	175	78	175	273	148	421	421	0	22
28	Kampala road-Banda-Kireka	Spear Motors	170	175	96	175	264	177	441	441	0	12
29	Portbell road	Spring-portbell Road junction	137	154	79	154	281	89	370	368	2	4

Table 21: Evening peak hours demand raw data.

No	*Routes*	*Station locations*	*Total (3:30-4:30)*	*Total (4:30-5:30)*	*Total (5:30-6:30)*	*Max hourly demand*	*Inbound (towards city centre)*	*Outbound (away from the city centre)*	*Total volume in 3 hours.*	*Male*	*Female*	*Children*
1	Salaama road	Makindye Secondary School	74	70	74	74	103	115	218	218	0	30
2	Kampala-Entebbe Road	Zana road	41	46	52	52	67	72	139	139	0	10
3	Salaama road	Rubis Gas Station	93	145	161	161	154	245	399	0	0	2
4	Kampala-Entebbe Road	SEB hotel/Busabala junction	63	80	111	111	122	132	254	254	0	6
5	Katwe	Mungazirwaza	122	101	133	133	205	151	356	356	0	1
6	Kampala-Entebbe Road	Queen's way	46	59	65	65	44	126	170	170	0	2
7	Katwe	Katwe near V.K Bikes	102	94	121	121	113	204	317	317	0	1
8	Bombo road	Wandegeya-Gayaza roundabout	365	379	250	379	833	161	994	989	5	4
9	Gayaza road	Kalerwe roundabout	122	199	290	290	188	423	611	611	0	9
10	Gayaza road	Mpererwe trading centre	59	82	92	92	97	136	233	233	0	7
11	Bombo road	Makerere hill road	145	264	398	398	63	744	807	807	0	51
12	Bombo road	Queen's lane junction	74	138	142	142	124	230	354	354	0	58
13	Kampala road	Cham towers	46	49	59	59	95	59	154	154	0	0
14	Gayaza road	Sindani Contractors Ltd near Vision Petroleum	27	44	56	56	49	78	127	125	2	14
15	Bukoto -kisaasi	Yusuf lule road	23	76	110	110	45	164	209	208	1	0
16	Portbell road	Airtel roundabout	62	72	98	98	161	71	232	231	1	1
17	Bukoto-Kisaasi	Northern Bypass	19	13	28	28	26	34	60	60	0	4
18	Bukoto-Kisaasi	Kabira Country Club	22	32	40	40	35	59	94	94	0	9

No	Routes	Station locations	Total (3:30-4:30)	Total (4:30-5:30)	Total (5:30-6:30)	Max hourly demand	Inbound (towards city centre)	Outbound (away from the city centre)	Total volume in 3 hours.	Male	Female	Children
19	Namugongo-Kyaliwajjala	Najjera police station	19	11	22	22	24	28	52	52	0	2
20	Bukoto-Kisaasi	Bahai-Kisaasi road junction	23	22	35	35	25	55	80	80	0	0
21	Mbogo road-Kira town	Kyaliwajjala trading centre	30	50	65	65	61	84	145	145	0	6
22	Sir-Apollo Kaggwa-Bwaise Roundabout	Bwaise roundabout (Christian life church close)	150	143	181	181	247	227	474	474	0	1
23	Masaka road	Weranga-Kalinda station	220	235	450	450	299	606	905	905	0	2
24	Masaka road	Kibuye market	93	93	125	125	174	137	311	311	0	14
25	Sir-Apollo Kaggwa-Bwaise Roundabout	Sir Apollo-Bwaise junction (Total energies close)	94	106	166	166	73	293	366	365	1	14
26	Sir-Apollo Kaggwa	Nsalo road-Sir Apollo Kaggwa junction	30	32	35	35	33	64	97	97	0	19
27	Kampala road-Banda-Kireka	Lugogo mall	51	72	155	155	121	157	278	277	1	0
28	Kampala road-Banda-Kireka	Spear Motors	63	134	145	145	94	248	342	342	0	7
29	Portbell road	Spring-portbell Road junction	40	69	96	96	70	135	205	205	0	9

7. APPENDIX C

Table 22: Routes considered for the short term/phase one and corresponding costs.

Route name	*Length (Km)*	*Cost (UGX)*	*Cost (USD)*
Ben Kiwanuka Street	1.3	1,337,650,454	353,457
Bombo Road	2.4	2,469,508,531	652,536
Boundary close	0.2	205,792,378	54,378
Coronation Road	0.6	617,377,133	163,134
Entebbe Road	3.1	3,189,781,853	842,859
Gadafi road	1.2	1,234,754,266	326,268
Gayaza Road	7.5	7,717,214,160	2,039,174
Ggaba Road	8.9	9,157,760,803	2,419,820
Haji Musa Kasule Road	0.5	514,480,944	135,945
Hoima Road	4.9	5,041,913,251	1,332,261
Jinja Road	6.3	6,482,459,894	1,712,906
Kampala Road	2.0	2,057,923,776	543,780
Katwe Road	1.6	1,646,339,021	435,024
Makerere Hill Road	1.7	1,749,235,210	462,213
Martia Mulumba road	1.1	1,131,858,077	299,079
Masaka Road	6.6	6,791,148,461	1,794,473
Mengo Hill Road	0.2	205,792,378	54,378
Nsambya Road	1.0	1,028,961,888	271,890
Old Portbell Road	1.5	1,543,442,832	407,835
Pope Paul Road	0.5	514,480,944	135,945
Port Bell Road	6.4	6,585,356,083	1,740,095
Queens Way	1.9	1,955,027,587	516,591
Rubaga road	2.2	2,263,716,154	598,158
Salaama Road	8.1	8,334,591,293	2,202,308
Sir Apollo Kaggwa Road	7.3	7,511,421,782	1,984,796
Spring Road	2.0	2,057,923,776	543,780
Stensera Road	0.5	514,480,944	135,945
Yusuf Lule Road	2.6	2,675,300,909	706,914
Grand Total	**84**	**86,535,694,781**	**22,865,941**

Table 23: Routes considered for medium term/phase two and corresponding costs.

Route name	*Length (Km)*	*Cost (UGX)*	*Cost (USD)*
A.H Kisekka Road	0.3	281,769,444	74,453.94
Acacia avenue	1.7	1,775,295,781	469,099.00
Albert Cook Road	0.6	624,145,929	164,922.51

Route name	*Length (Km)*	*Cost (UGX)*	*Cost (USD)*
Archer road	0.5	489,166,529	129,255.94
Bahai Road	3.5	3,593,253,476	949,470.86
Balintuma Road	1.7	1,709,574,523	451,733.01
Ben Kiwanuka Street	0.0	44,678,153	11,805.63
Binaisa Road	1.0	1,010,059,372	266,895.15
Bombo road	1.4	1,482,165,040	391,642.98
Bukasa Ring Road	0.6	645,149,656	170,472.47
Bukasa Road	3.1	3,147,467,458	831,677.66
Bukoto Kisaasi Road	2.3	2,400,187,294	634,218.52
Bukoto-Ntinda Road	2.6	2,703,239,396	714,296.12
Bulange Way Road	0.2	179,351,798	47,391.40
Cardinal Nsubuga Road	1.4	1,489,894,945	393,685.51
Eigth Street	0.6	647,641,252	171,130.84
First street	0.4	426,377,003	112,664.62
Fourth street	0.5	520,348,322	137,495.33
Gabunga road	0.7	674,241,740	178,159.68
Hanlon Road	1.4	1,490,045,574	393,725.31
Impala Avenue	1.0	1,015,830,566	268,420.12
John Mutenda Road	0.2	237,906,575	62,863.74
Kabaka Anjagala Road	0.9	950,336,178	251,114.07
Kabusu Road	1.1	1,155,262,948	305,263.33
Kalinda Access	1.7	1,752,123,824	462,976.11
Kawaala Road	2.3	2,321,963,058	613,548.77
Kayemba Road	1.3	1,339,307,388	353,894.69
Kigobe Road	1.4	1,443,943,996	381,543.57
Kimera Drive	0.9	941,340,022	248,736.95
Kira road	2.5	2,594,950,754	685,682.25
Kirombe Road	2.0	2,074,267,357	548,098.38
Kisaasi Road	6.5	6,652,009,853	1,757,707.76
Kisingiri Road	0.2	214,146,978	56,585.58
Kivebulaya Road	0.6	581,402,634	153,628.14
Kulambiro Ring Road	2.2	2,278,854,741	602,157.96
Kyadondo road 1	1.3	1,287,434,680	340,188.00
Kyadondo I Road	0.1	69,244,323	18,296.92
Lower Kololo terrace	1.1	1,110,005,060	293,304.51
Lubiri Ring Road	3.5	3,557,937,783	940,139.14
Lugoba Road	3.8	3,919,000,763	1,035,545.38
Lugogo Bypass	2.4	2,437,350,975	644,038.54

Route name	*Length (Km)*	*Cost (UGX)*	*Cost (USD)*
Lukuli Road	7.7	7,949,549,270	2,100,565.80
Luwafu road	2.4	2,503,236,594	661,447.96
Mabua road	0.7	719,714,100	190,175.16
Makamba Road	1.8	1,823,503,887	481,837.37
Malcom X Avenue	1.5	1,589,671,190	420,050.10
Mapera Road	1.6	1,618,258,910	427,604.03
Martyrs Way	1.4	1,468,761,322	388,101.22
Masiro Road	2.1	2,135,763,766	564,348.01
Mbogo Drive	1.8	1,848,868,363	488,539.60
Mengo Hill Road	0.8	777,805,835	205,525.15
Mobutu Road	3.1	3,169,090,776	837,391.34
Mubende Road	0.5	463,917,799	122,584.29
Mugwanya Road	1.4	1,469,972,743	388,421.33
Mukwano Road	1.6	1,655,497,593	437,443.87
Musajja Alumbwa road	1.0	1,065,197,359	281,464.66
Mutundwe Road	3.7	3,790,582,149	1,001,612.41
Muyenga Road	0.8	842,716,954	222,677.08
Muzito Road	2.1	2,149,153,728	567,886.14
Naalya Road	1.4	1,401,830,511	370,415.62
Nabulagala Road	1.5	1,594,767,635	421,396.77
Nabunya Road	1.3	1,323,359,959	349,680.79
Nakawa Jinja Road	0.6	593,527,399	156,831.96
Nakivubo Street	0.7	708,573,740	187,231.47
Namirembe Road	0.9	879,745,361	232,461.36
Namuwongo Road	2.1	2,191,900,957	579,181.54
Nasser road	0.7	745,246,146	196,921.68
Nawula Church Road	0.7	704,124,396	186,055.78
Northern Bypass	16.9	17,382,772,361	4,593,173.27
Nsalo Road	0.6	596,491,801	157,615.26
Nsambya Road	0.5	479,307,727	126,650.88
Ntinda Road	2.7	2,791,641,794	737,655.32
Ntinda-Kiwatule Road	1.5	1,498,259,400	395,895.71
Old Kira Road	1.2	1,250,439,641	330,412.54
Old Masaka Road	0.7	756,568,759	199,913.53
Prince Badru Kakungulu Road	1.8	1,888,765,396	499,081.88
Prince Charles drive	2.7	2,826,612,734	746,895.94
Railway	10.8	11,116,666,683	2,937,435.71
Roscoe road	0.5	467,757,196	123,598.80
Second street	0.3	300,448,010	79,389.51

Route name	*Length (Km)*	*Cost (UGX)*	*Cost (USD)*
Sentema Road	4.7	4,810,160,268	1,271,022.77
Southern Bypass	1.3	1,360,078,898	359,383.30
St. Barnabas Road	0.0	20,732	5.48
Station Approach	0.3	298,942,927	78,991.81
Station road	0.6	635,502,461	167,923.32
Tank Hill Road	1.8	1,872,362,667	494,747.67
Third street	0.5	504,205,662	133,229.84
Upper Kololo terrace	2.0	2,035,829,713	537,941.73
Wakaliga Road	3.0	3,042,480,819	803,936.29
Wampewo avenue	1.1	1,146,563,419	302,964.59
Wankulukuku Road	2.5	2,577,106,882	680,967.24
Willis Road	0.6	605,766,411	160,065.96
York terrace	0.5	545,982,264	144,268.77
Total	**166**	**171,243,746,206**	**45,248,950**

Table 24: Routes considered for long term/phase three and corresponding costs.

Route name	*Length (Km)*	*Cost (UGX)*	*Cost (USD)*
A109	13.8	14,218,487,773	3,757,052
Bombo road	11.8	12,172,994,058	3,216,557
Busubala road	8.9	9,139,707,391	2,415,050
Buwate road	3.3	3,372,661,630	891,182
Gayaza road	6.5	6,650,556,787	1,757,324
Hoima road	14.8	15,204,405,263	4,017,568
Jinja road	22.9	23,555,551,798	6,224,251
Kampala-Entebbe Expressway	36.1	37,114,311,700	9,806,978
Kampala-Entebbe Road	21.7	22,344,301,440	5,904,193
Kampala-Northern bypass highway	3.3	3,445,598,367	910,455
Kira road	6.3	6,505,378,415	1,718,962
Kireka road	4.6	4,755,937,778	1,256,695
Kiti road	3.2	3,342,493,612	883,211
Kyaliwajjala-Naalya road	2.2	2,314,721,007	611,635
Manyangwa road	3.0	3,072,535,507	811,878
Masaka Road	10.6	10,911,461,843	2,883,213
Matuga road	6.3	6,432,949,041	1,699,824
Mbogo road 1	4.8	4,962,817,509	1,311,360
Mityana road	2.4	2,477,289,122	654,592
Nabweru road	8.1	8,362,796,469	2,209,761

Namugongo road	7.8	8,029,579,860	2,121,713
Railway	4.5	4,681,564,893	1,237,043
Seguku-Bunamwaya	5.8	5,984,171,700	1,581,240
Semuto road	1.3	1,367,153,518	361,253
Sentema Road	11.7	12,076,049,274	3,190,940
Southern Bypass (NA)	12.7	13,066,967,546	3,452,778
Ssonde road	1.8	1,854,751,389	490,094
Grand Total	240	**247,417,194,689**	**65,376,801**

Table 25: Routes under KCRBUP preliminary design.

Route name	*Length (Km)*
Prince Charles Road	*2.8*
Bagambaki Road	*0.6*
Bbosa Road	*0.2*
Church Road	*0.4*
Clement Road	*0.6*
Dewinton Road	*0.5*
First Street Road	*0.7*
Kasato Road	*0.5*
Lower Kololo	*1.1*
Mabua Road	*0.7*
Malcom X Avenue	*1.6*
Naava Road	*0.1*
Nakayima Road	*0.2*
Third Street	*0.5*
Wampewo Avenue	*1.0*
Lugogo By- Pass	*2.4*
Musaja Alumbwa Road	*1.0*
Kampala Road	*3.1*
Jinja Road	*0.8*
Windsor Loop	*0.3*
Mutagubya Road	*0.5*
George Street	*0.4*
Gaddafi Road - Incl Structures	*1.2*
Shimoni Road	*0.4*
Tehrnan Avenue	*0.5*
Kagera Road	*0.3*
Katonga Road	*0.2*
Mackinnon Road	*0.8*
Sezibwa Road	*0.8*
Total	*24.1*

8. APPENDIX D

Typical existing and proposed cross-sections for phase 1 of the Kampala cycle network plan are displayed below.

8.1 BOMBO ROAD 28M

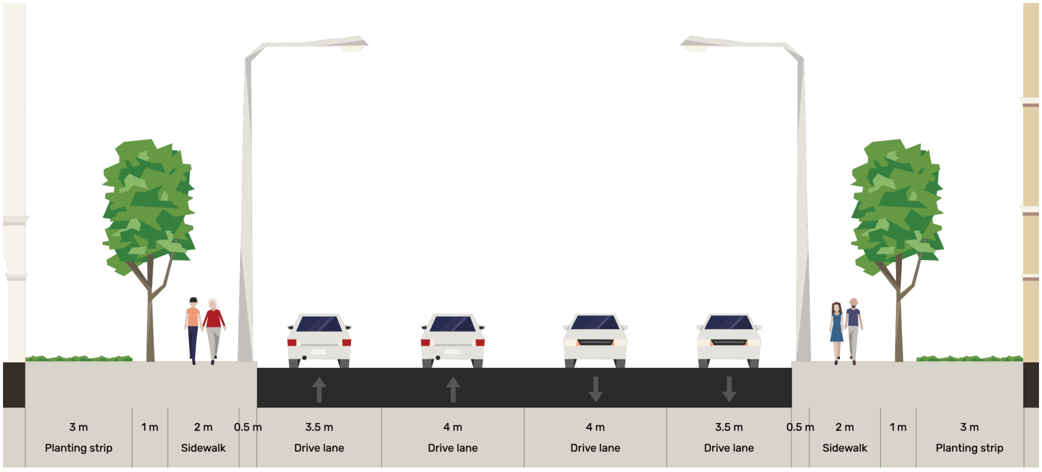

Figure 39: Existing cross section.

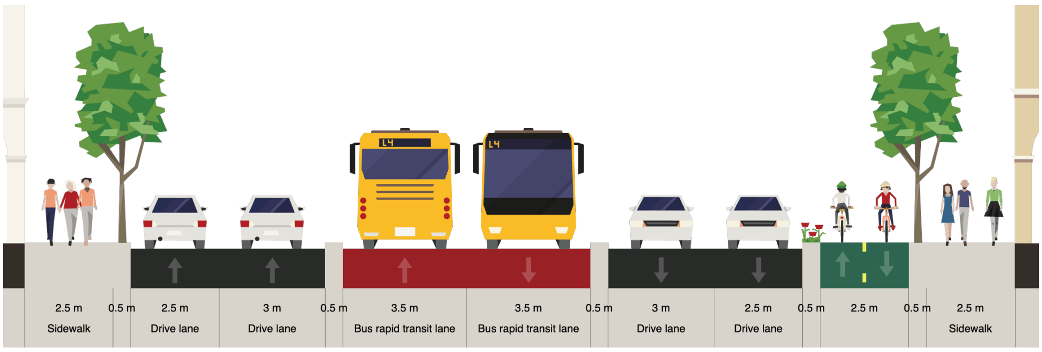

Figure 40. Proposed typical cross section.

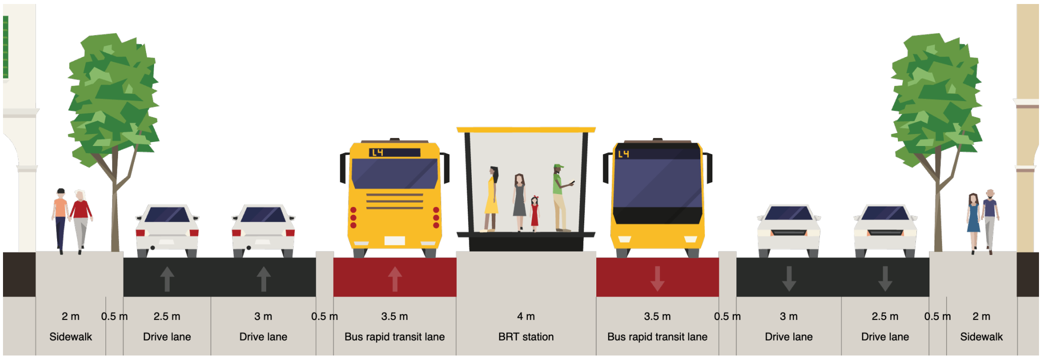

Figure 41: Proposed cross section with a station.

8.2 KIBUYE TO ENTEBBE ROAD 37M

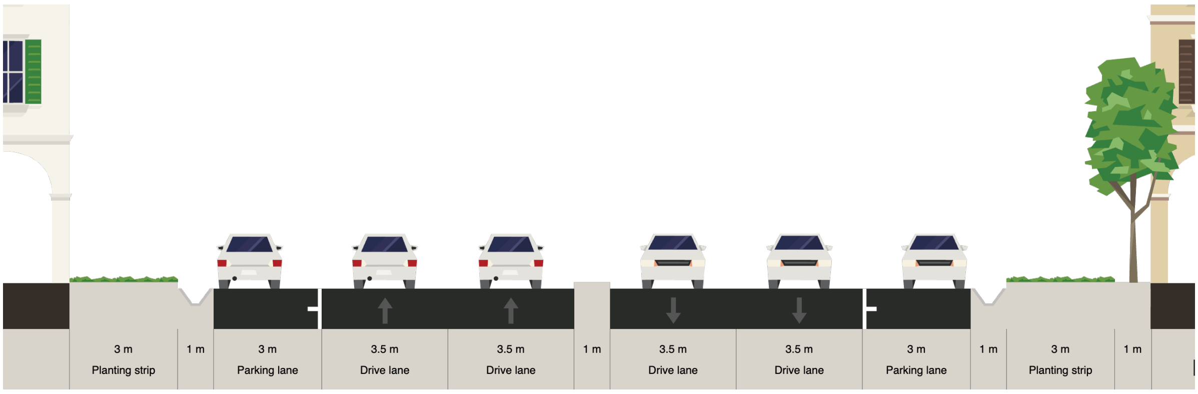

Figure 42: Existing cross section

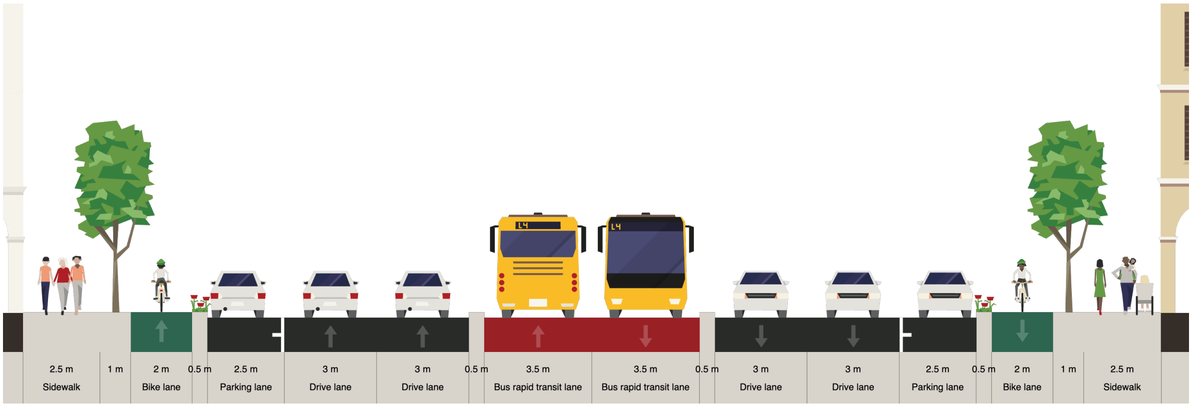

Figure 43: Proposed typical cross section.

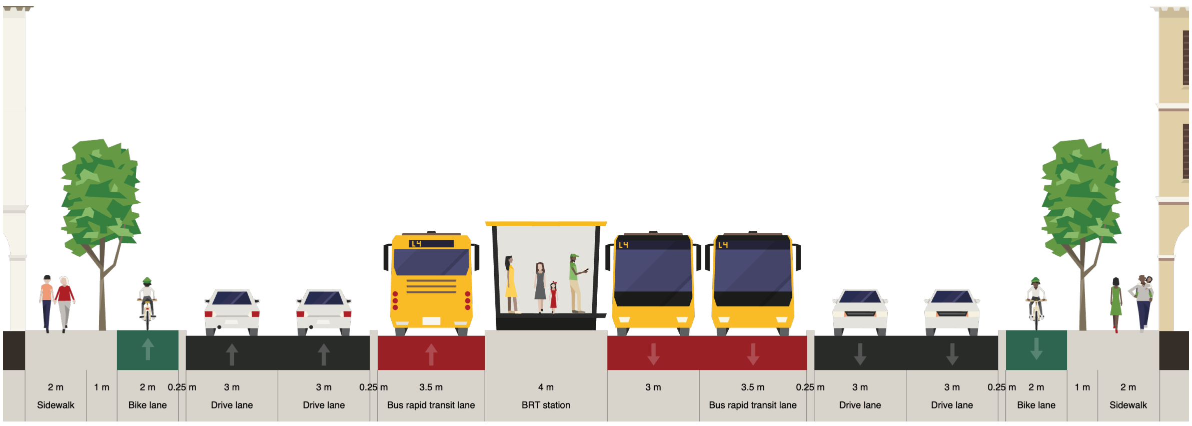

Figure 44. Proposed cross section at the station.

8.3 BUGANDA ROAD 15M AND 23M

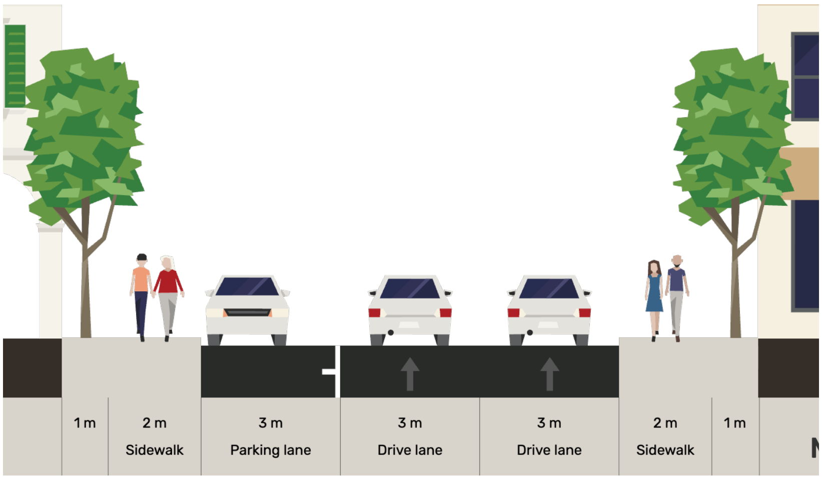

Figure 45: Buganda road existing layout with 15m RoW

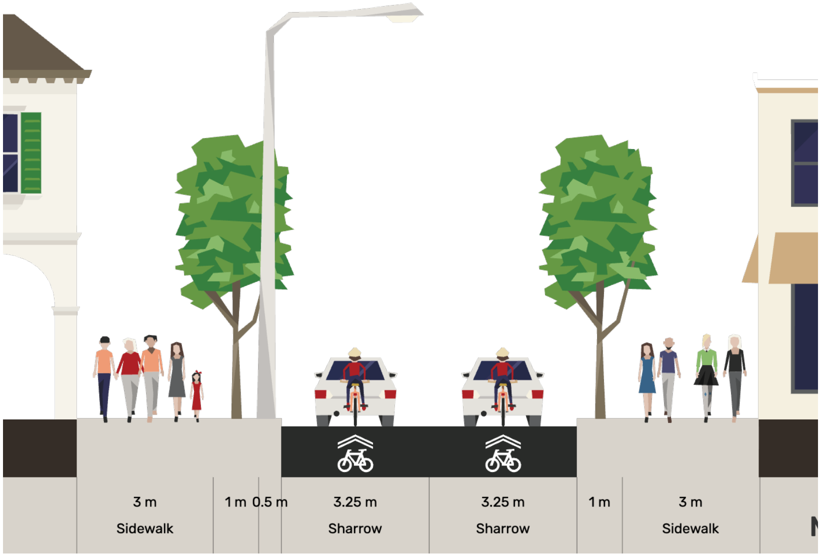

Figure 46: Buganda road proposed cross-section with 15m RoW

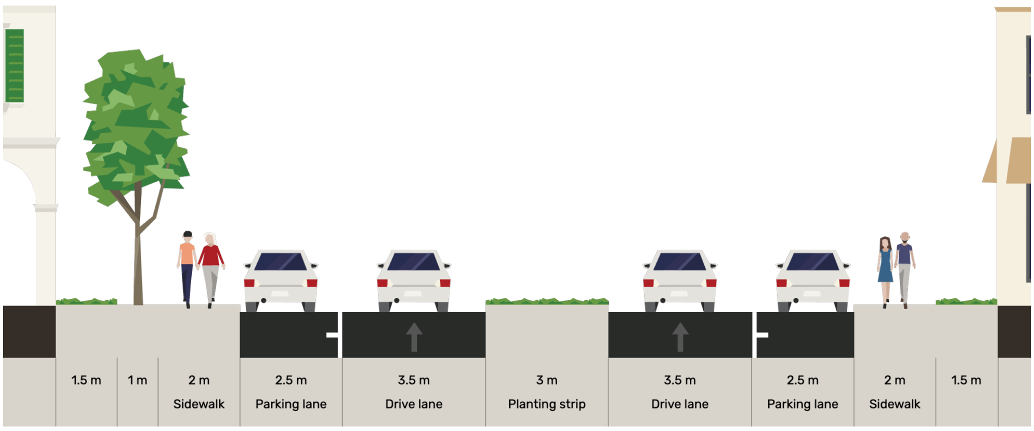

Figure 47: Buganda road existing layout with 23m RoW

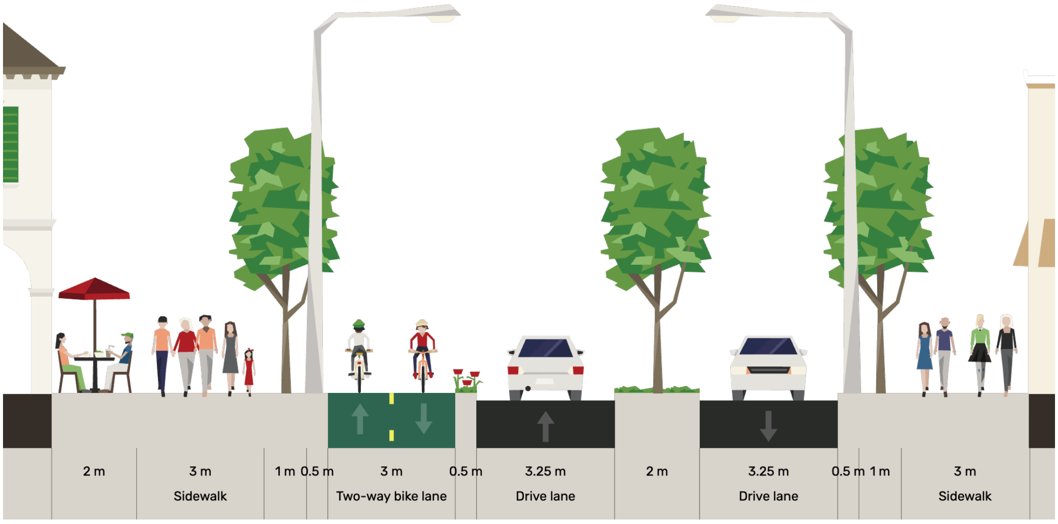

Figure 48: Buganda road proposed cross-section with 23m RoW

8.4 HOIMA ROAD 20M

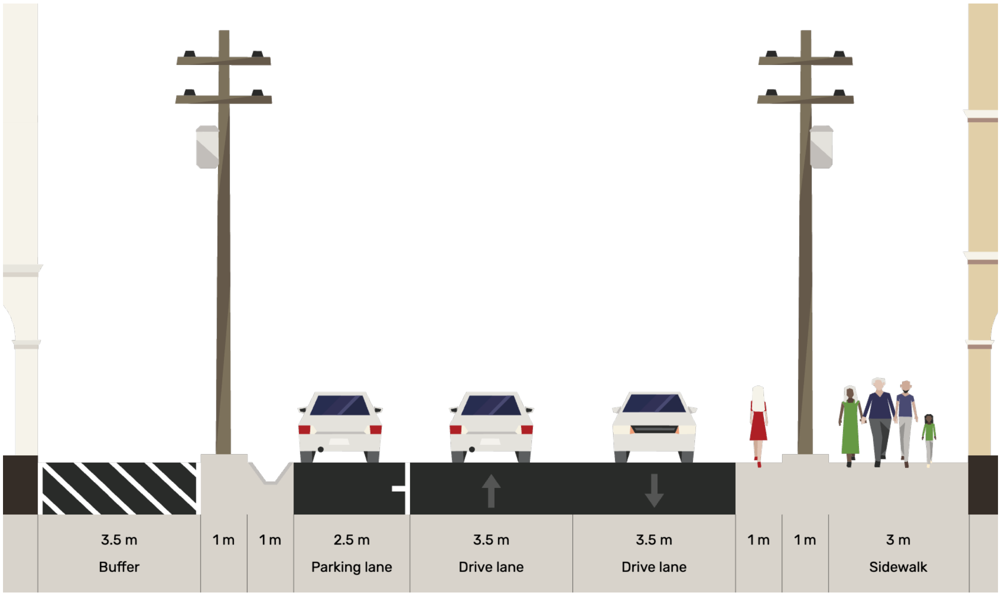

Figure 49: Hoima road existing layout

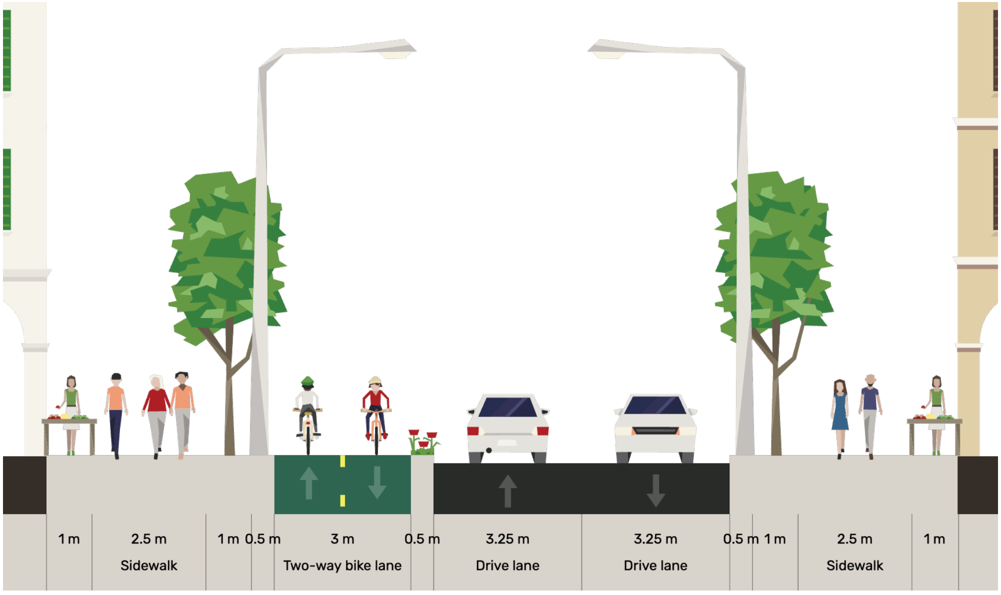

Figure 50: Hoima road proposed cross-section

8.5 SALAAMA ROAD 20M

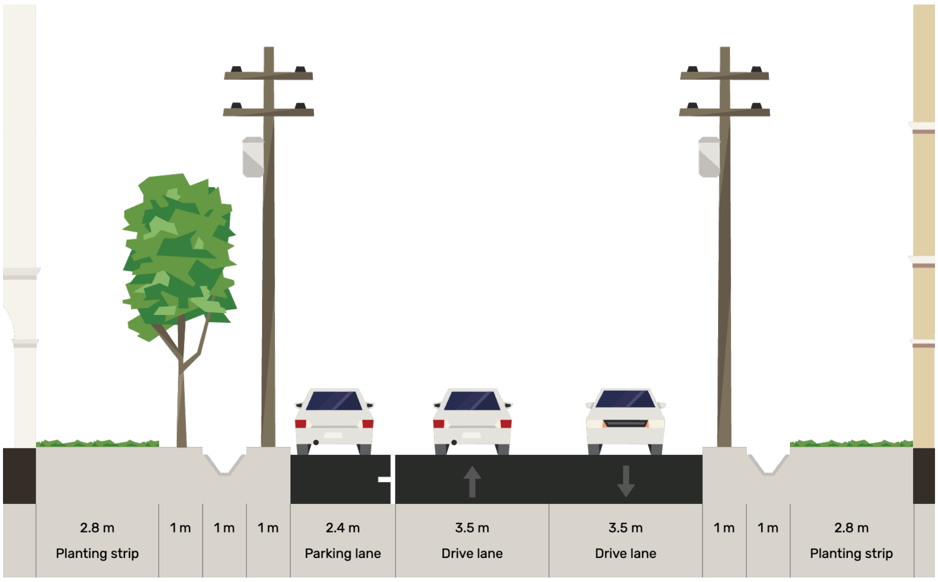

Figure 51: Salaama road existing layout

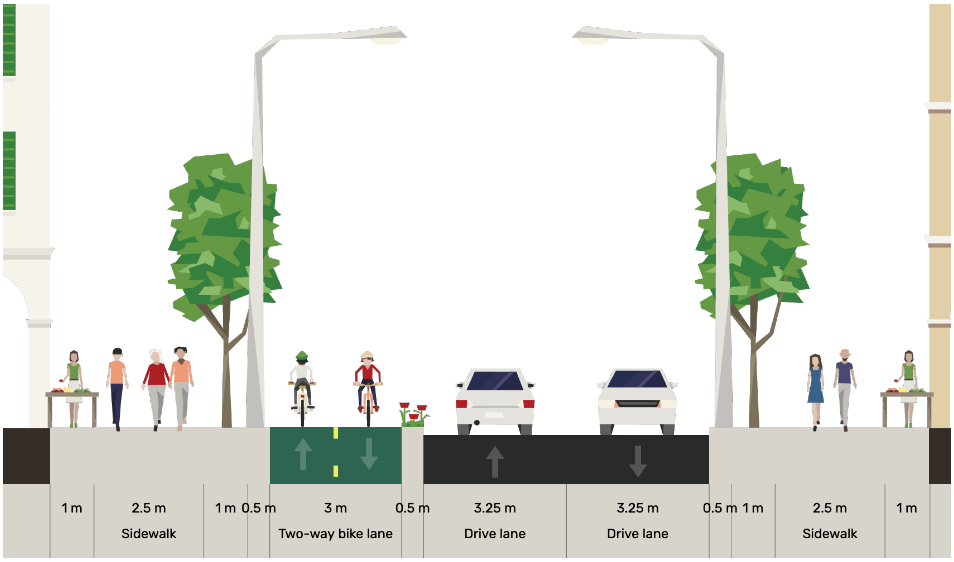

Figure 52: Salaama road proposed cross-section

8.6 SIR APOLLO KAGGWA ROAD 20M

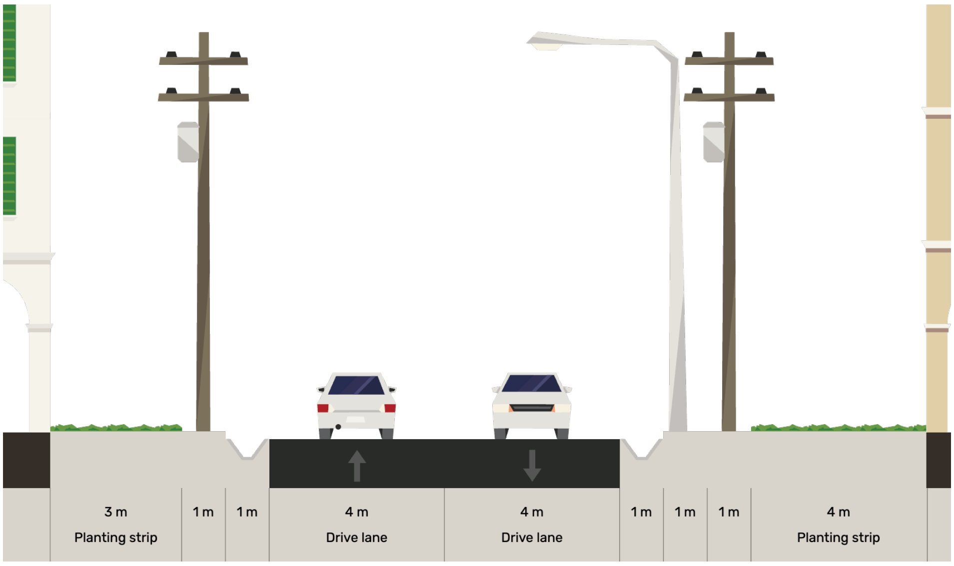

Figure 53: Sir Apollo Kaggwa road existing layout

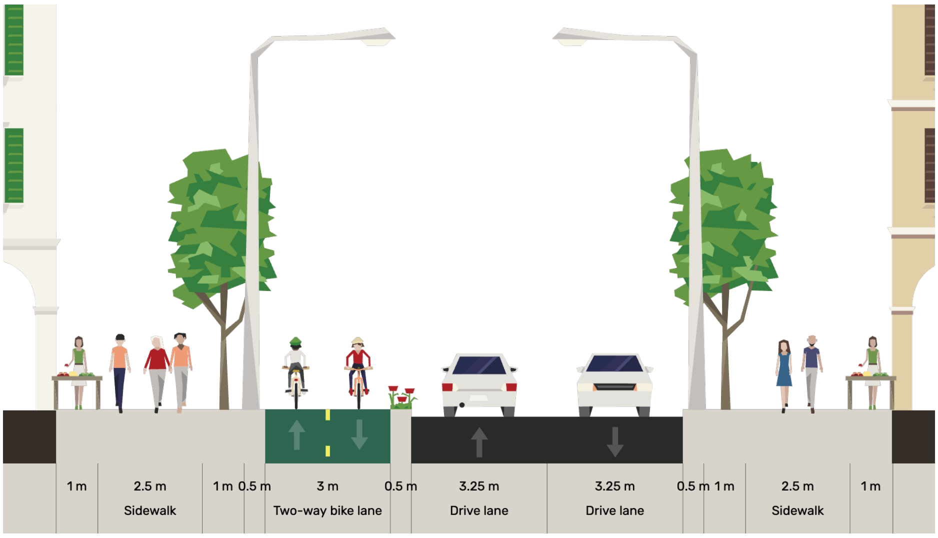

Figure 54: Apollo Kaggwa road proposed cross-section

8.7 YUSUF-LULE ROAD 28M

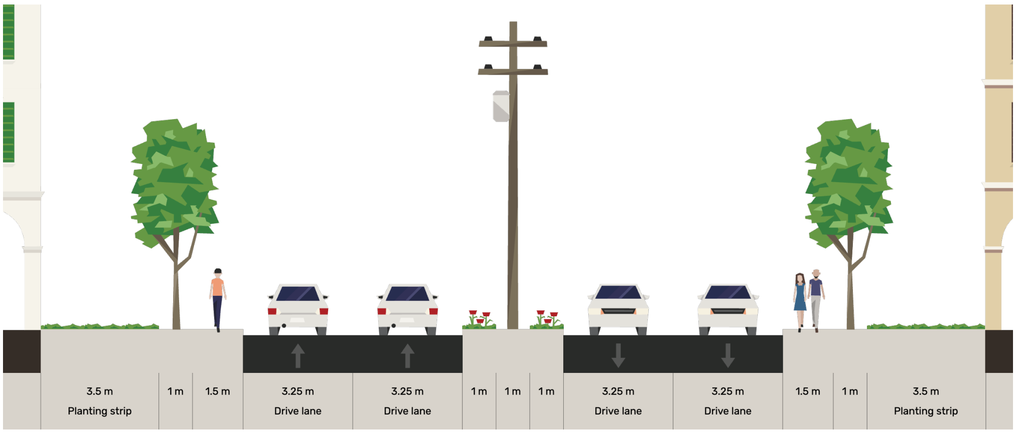

Figure 55: Yusuf-Lule road existing layout

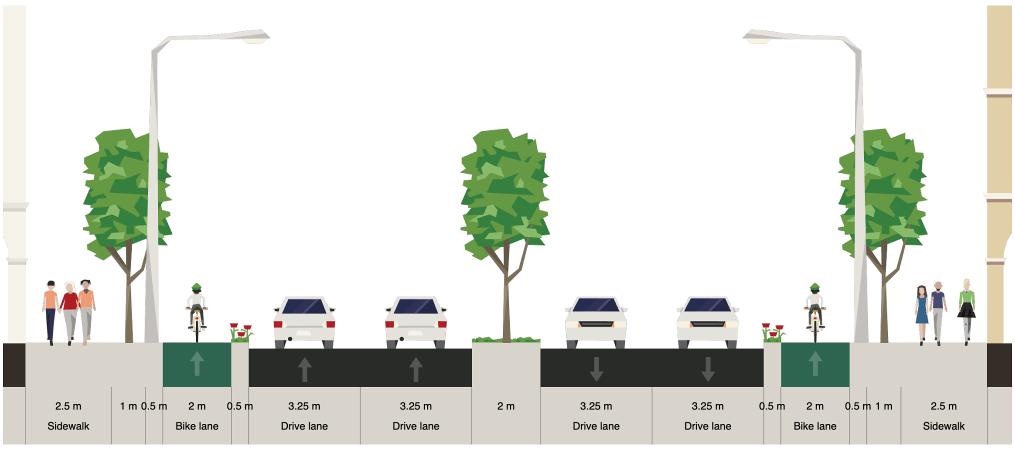

Figure 56: Yusuf-Lule road proposed cross-section

8.8 BIKESHARE SYSTEM

ITDP developed a bikeshare planning guide that serves as useful resource to cities planning to implement a bikeshare system. The following list of resources and case studies could be used in developing a bikeshare study for Kampala.

- The bikeshare planning guide
- Cairo bikeshare cycling moment
- Planning bikeshare for everyone
- The path ahead for bike sharing

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