



Bus Rapid Transit for Dar es Salaam

City Centre Street Typology



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What are Streets For?

In as complex an urban environment as central Dar es Salaam, streets have multiple functions. They allow cars, daladalas and other vehicles to access buildings and pass through the centre. They allow trucks to make deliveries. They provide space for parking and loading. They are the places where people walk. And streets provide some of the city centre's few open spaces – places for residents, shop owners, employees and visitors to socialize, interact and relax.

At present, most city centre streets are designed in a similar fashion, and cater to cars and trucks, pedestrians, parking and in some cases, daladalas. In most cases, they perform none of these functions particularly well. They are difficult for cars to navigate; and walkways are narrow and frequently blocked by vendors or parked cars.

This chapter recommends a new framework to manage city centre streets. It recognizes that each street cannot perform every function well. Instead, it allows them to focus on one or two core functions. This takes advantage of the circulation changes that will be required for DART construction – namely, reserving Morogoro Road for buses, and reversing the direction of Samora Avenue. However, it goes further in proposing that some streets be reserved for pedestrians, and that some focus on the movement of vehicle traffic.

Existing Planning Framework

A street typology is important in order to make fundamental decisions on the design of individual streets. In essence, the street typology defines the primary users of each street, which in turn govern the design. Some streets can be designed to handle large volumes of vehicles. On other streets, other uses – moving pedestrians, buses and bicycles, or providing space for parking or street trading – can be given priority.

A partial street typology is provided in the Central Area Redevelopment Plan. This identifies certain streets as follows:

- Arterials – Bibiti Mohammed, Morogoro, Uhuru/Railway, Samora, Sokoine, Kivukoni Front, Azikiwe, Ohio and Ocean
- Collectors – Libya, Kisutu, Jamhuri, India, Indira Gandhi, Zanaki, Garden and Ghana

Some arterials (especially Railway/Uhuru) would require building setbacks in order to widen them, according to the plan. The plan also proposes pedestrianization of Kitumbini and Samora between Mission and Azikiwe, although it is unclear how this fits with its arterial function or where traffic would be rerouted.

Recommended Network

This chapter recommends four basic types of street: through, shared, pedestrian and busway. Each type is discussed in turn in the following sections. Figure 1 summarizes the primary functions of each street. Figure 2 maps the existing street network. Figure 3 shows the recommended classification of each street within the CBD.

Through Streets

Through streets prioritize vehicles AND pedestrians. This means that investment in walkways and pedestrian amenities (e.g. curb extensions and median refuges) should be focused on these streets. Samora Avenue is a good example of through street design. It handles a large volume of vehicles, while also providing a wide walkway. Where the walkway is not obstructed by parked cars, the pedestrian experience is good, and it supports a high level of retail activity.

The through street network will handle the majority of traffic through the city centre, and driveway accesses – e.g. to off-street parking garages – should be concentrated on these streets. The network was designed to provide logical routes across the city centre, such as Jamhuri and Zanaki Streets (which will carry much of the traffic currently on Morogoro Road). Figure 4 through Figure 6 illustrate these streets.

Figure 7 shows a sample cross-section for a through street; Figure 8 shows the plan view. The roadway (assuming two travel lanes) must be between 5.5 m and 6.5 m wide – any greater width would encourage speeding. Walkways on each side must be at least 2.5 m, but this minimum is acceptable only in the most constrained situations – a width of 4 m to 6 m is preferable.

If there is sufficient right-of-way, on-street parking can be added (2.1 m to 2.4 m for parallel, or 4.2 m to 5.2 m for perpendicular parking). Parking bays can be interspersed with street trees.



Figure 4: Expansive Sidewalk along Samora Avenue



Figure 5: Travel Lanes on Samora Avenue



Figure 6: Busy Sidewalks along Jamhuri Street

Figure 7: Through Street Cross-Section

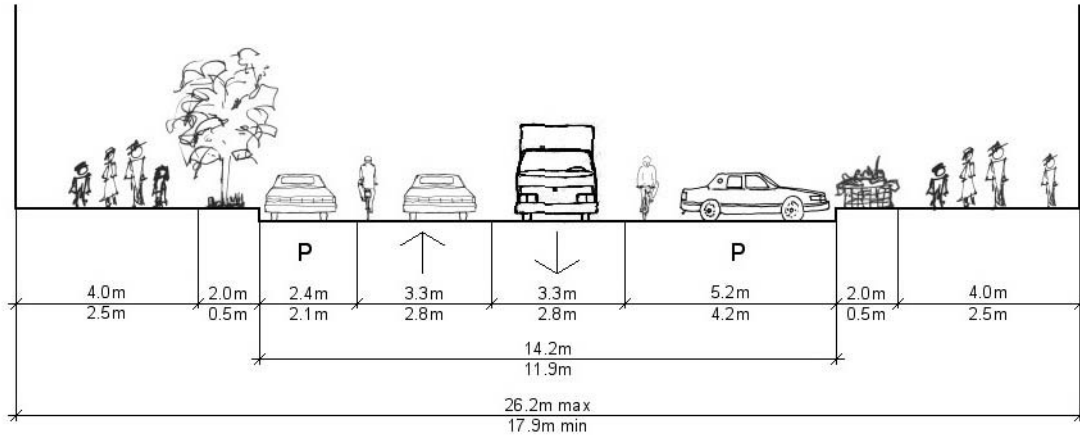
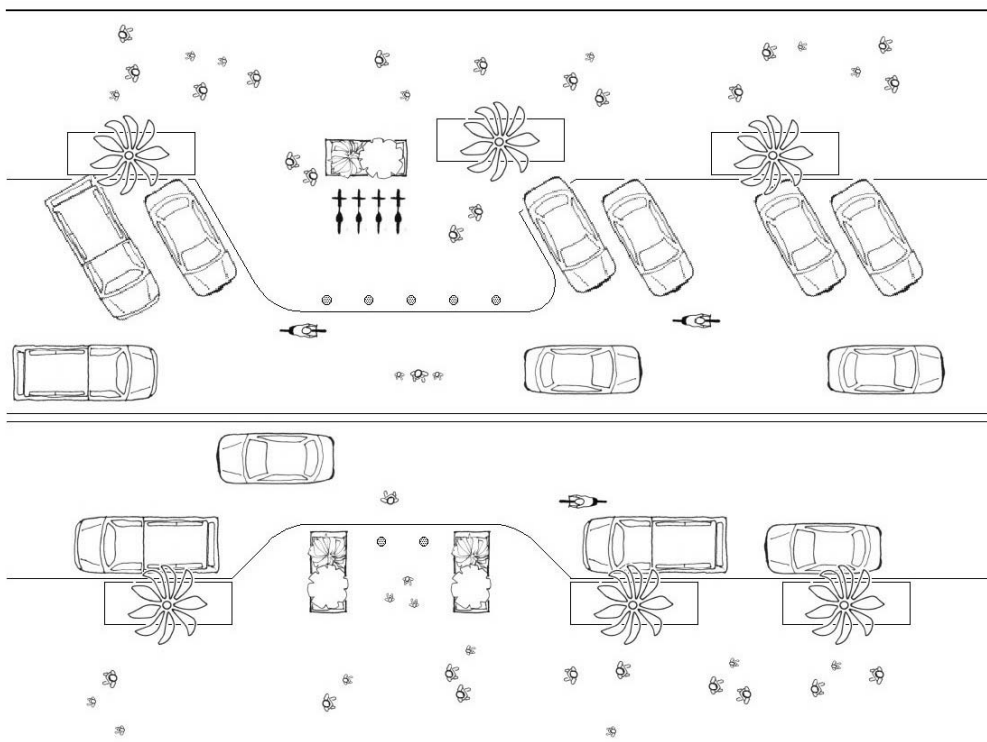


Figure 8: Through Street Plan View



Shared Streets

Shared streets are envisaged as a street where pedestrians are comfortable walking in the middle of the street, but where vehicles are permitted. It is similar to the “woonerf” concept common in the Netherlands, and many existing streets – particularly in Kariakoo – are shared by default. Figure 9 through Figure 11 offer examples of shared streets throughout the world.

Shared streets have the advantage of reducing the impacts of traffic, while avoiding any loss of parking or access that might result from pedestrianization. Shared streets can be viewed either as a final state, or on some streets as a prelude to full pedestrianization (see next section) once funding is available for design improvements and the loss in parking revenue can be absorbed.

For streets where traffic volumes or speeds have the potential to be a problem, diverters can be installed (i.e., one end of a street is blocked for motor vehicles to allow access only, as on Jamhuri at Bibititi Mohammed). Diverters are shown as red lines in Figure 3, where they will both discourage through traffic from using shared streets, and help protect the pedestrian streets and busway from interference.

Many streets in the Dar CBD already function as shared streets, see Figure 12 through Figure 14. Because of the distances between buildings, there is simply not enough room to separate all modes of travel. So markets take spill out into the sidewalks, people walk in the roadway, vehicles are parked in the walkway. It is a very organic and natural way to accommodate all users.

Figure 15 and Figure 16 show a sample cross-section and plan view of a shared street. In most cases, no physical changes

to the street are required; shared streets are low cost. If reconstruction or other paving work is undertaken, the surface should be constructed as a single, shared surface with no curbs or walkways. The street can drain to centre or to the sides. Bollards should be used to demarcate parking spaces, and prevent vehicles from blocking building entrances; while most pedestrians will walk in the center of the street, a 1m to 1.5 m access way is required.



Figure 9: Shared Street in Bangkok, Thailand



Figure 12: Shared Street in Dar – Aggrey Street



Figure 10: Historic Shared Street in Siena, Italy¹



Figure 13: Shared Street in Dar – Kisutu Street



Figure 11: Shared Street with Bollards in Tokyo, Japan²



Figure 14: Shared Street in Dar – Indira Gandhi Street

¹ courtesy Ben Hamilton-Baillie

² ibid

Figure 15: Shared Street Cross-Section

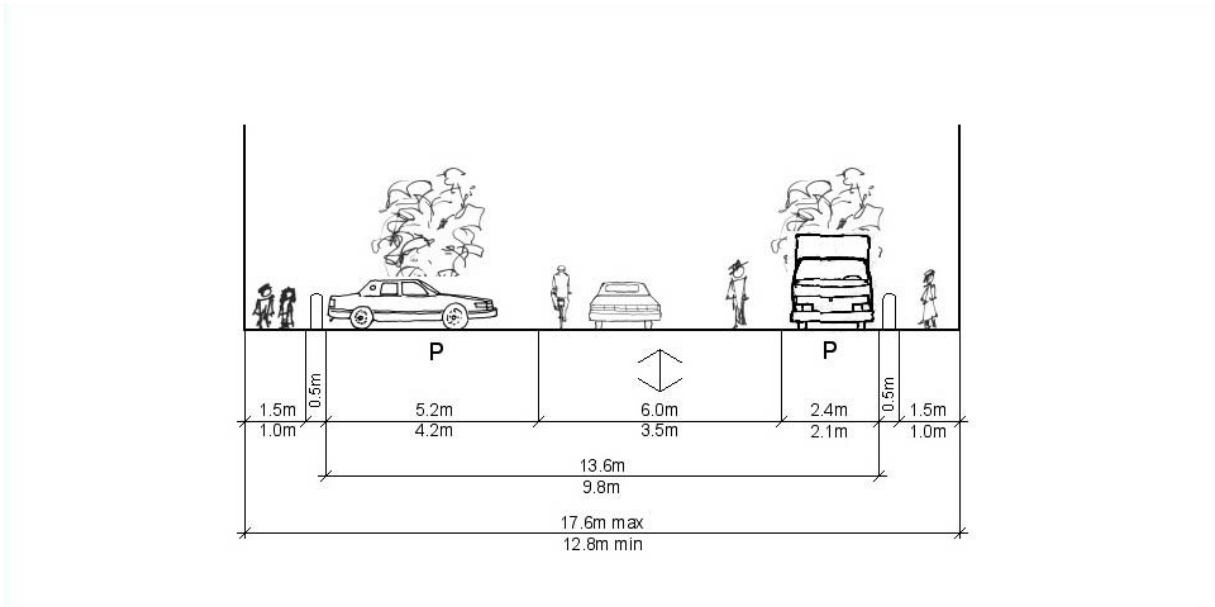
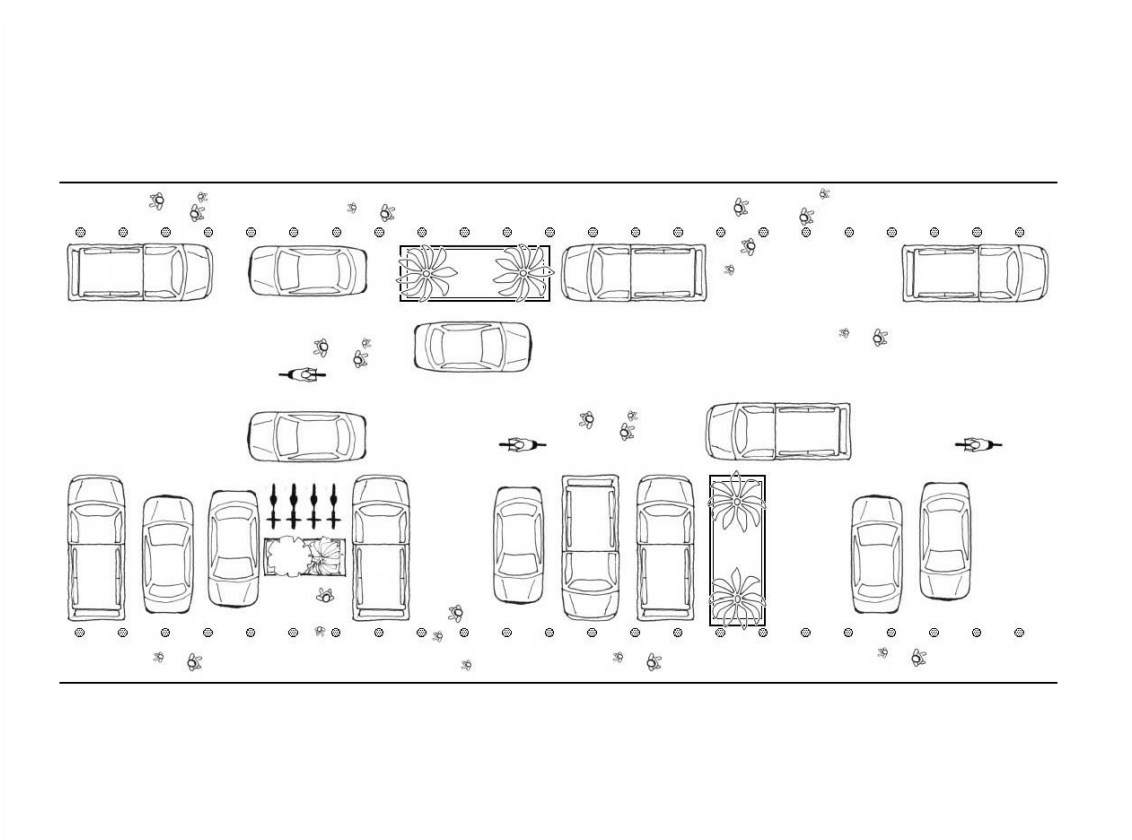


Figure 16: Shared Street Plan View



Pedestrian Streets

Pedestrian Streets would be reserved largely for non-motorized traffic: people on foot, riding bikes and pushing carts. Restrictions on motor vehicle use can be full-time (such as the present-day Zanaki Street, see Figure 17), or part-time. A typical arrangement is to allow delivery traffic in the morning, set up markets in the afternoon and cafes in the evening. In that the street proper does not need to physically bear the weight of constant traffic, it can be rebuilt like a galleria, plaza or outdoor mall. A typical cross-section and plan view are shown in Figure 26 and Figure 27.

Figure 3 above proposes several pedestrian streets, based on architectural quality, retail and pedestrian activity, and traffic network:

- **India Street** between Uhuru Street and Jamhuri Street
- **Mosque Street** between Libya Street and Samora Avenue, see Figure 18
- **Morogoro Road** outside City Hall
- **Zanaki Street** between Samora Avenue and the waterfront

India Street was chosen because:

- It cuts across the “grid”, it is not necessary for the traffic network, and removing traffic would simplify many intersections;
- It is narrow, curving street which cannot accommodate much traffic;
- Historically it appears to link the railway station and the north;
- It is centrally located and could be the spine of a good pedestrian network.

Mosque Street is another choice because:

- It is not necessary for the traffic network;
- Architecturally it has merit;
- It is centrally located in the area to the west of Morogoro Road.

Morogoro and Zanaki Streets were chosen because of the DART alignment.



Figure 17: Zanaki Street – pedestrianized for a block at Samora Street for security around United Nations



Figure 18: Mosque Street – aesthetically pleasing street ripe for pedestrianization

Implementation & Management

Past experience suggests that a successful pedestrianization program begin with a few select streets. One should not simply ban

traffic on these streets, as the resulting ruckus might prove untenable. Many cities around the world have successful pedestrian streets, but like any civic venture it must be properly managed.

First we suggest a concerted effort to gather support from local stakeholders, especially the auto parts merchants on India Street. One must decide that these streets are the best choice. It is quite possible that another street has better local support. The stakeholders need to understand how pedestrianization would benefit them, i.e. higher rents from outdoor cafes, more organized deliveries, less noise and air pollution.

Second we suggest an effort to “sell” pedestrianization to the public. Just as the BRT project has yielding renderings and models, a walking street needs to be presented in a positive light: people sitting at cafes in the shade of trees, children playing in playgrounds set up in the street, neighbours talking without the roar of traffic. The city could also begin a series of events (parades, carnivals, weekend closings) to get people used to the idea that this is a special street.

Third, a management plan for deliveries needs to be developed. Below are outlined a few options.

- **Hand carts.** This is the practice in much of Kariakoo, where it is easier to manoeuvre a cart than a car (see Figure 19).
- **Time limits.** Trucks and other vehicles could be allowed during certain hours: early morning for example.
- **Bollards.** In the sketch below we have shown bollards at the entry to a pedestrian street, see Figure 26. There is a 1.7m gap between bollards, which will accommodate

most hand carts. One could eliminate the centre bollard (leaving a 3m gap) so that trucks could access the street. Figure 20 shows an example of a wooden, removable bollard.

- **Curbs.** Near the UN, Zanaki Street has been rebuilt as a pedestrian mall and raised to walkway level. Vehicles can still mount the curb and access the street, but it is clear they are queuing.
- **Parking agents.** Parking in Dar is presently management by attendants; they could also manage access to the pedestrian streets.

Like deliveries, the use of the street needs to be managed. The city should issue permits for cafes and markets. This will generate revenue which can be used to support security and other aspects (trees, planters, special pavement). While merchants will likely be opposed to paying for permits, they should see the benefits soon enough.

Lastly, the design of the street should be articulated. A single level surface is the most appropriate design treatment. Typically pedestrian streets drain to the centre to keep water away from cafes and shops. Street furniture and trees need to be organized and coordinated so as to make the most efficient use of the space. In essence one is creating an urban room, which must be designed.



Figure 19: Hand trucks in Kariakoo



Figure 20: Removable bollards in Bogotá, Colombia

Examples from Elsewhere

Other cities in the world have had good experience with pedestrian streets, given the right context and management. Below are a few examples from developing countries which seem transferable to Dar. Finally we list some positive example from Europe.

Figure 21 shows a pedestrian street in **Mexico City**. It is part of a tourist area (the Zona Rosa) where all the streets have been rebuilt with bricks, trees, wider sidewalks, pedestrian walkways, etc. The street leads directly to a Metro station, which ensures a steady stream of foot traffic.

Figure 22 shows Beijing Road in **Guangzhou**, China. This street was recently closed to vehicle traffic and rebuilt as a pedestrian street. It connects a series of indoor shopping malls and is becoming a destination in it's own right.

The pedestrian area of **Cape Town**, South Africa is shown in Figure 23. Here a series of streets and plazas are populated with cafes, shops, water features and outdoor stages.

Bapu Bazaar in **Jaipur**, India is a textile market that was completely pedestrianized in 2000, see Figure 24. After objections from shopkeepers (who had trouble making deliveries during the day) motorcycles are now allowed. Efforts to pedestrianize other areas have so far failed because of equity issues.

During the construction of the TransMilenio BRT in **Bogotá**, Colombia, an entire network of streets in the city centre were pedestrianized. Figure 25 shows a street where both busses and people share the space, ala Morogoro Road.

Copenhagen, Denmark has been steadily pedestrianizing streets in their city centre since the early 1970's. They convert about one street or plaza a year so that the impacts can be studied and mitigated.

In **Germany** a study of 331 pedestrianization schemes found that sales increased for 83% of businesses within the pedestrianized area, compared to just 24% outside the area.³

In the **United Kingdom** various studies have found lower vacancy rates, increased foot traffic and higher sales on pedestrianized streets. One evaluation of schemes in 14 UK towns found that rents

³ Lloyd Wright (2005), *Car-Free Development*. Module 3e of *A Sourcebook for Policy-Makers in Developing Cities*. Deutsche Gesellschaft für Technische Zusammenarbeit.

increased by more than double on pedestrianized streets compared to those where traffic was allowed (43% on pedestrianized streets, compared to just 20% on vehicular streets).⁴



Figure 21: Pedestrian Street in Mexico City, Mexico



Figure 22: Pedestrian Street in Guangzhou, China



Figure 23: Pedestrian Street in Cape Town, South Africa



Figure 24: Pedestrian (and motorcycle) Street in Jaipur, India

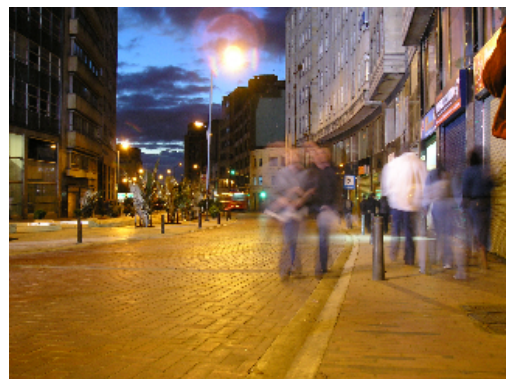


Figure 25: Pedestrian (and BRT) Street in Bogotá, Colombia

⁴ Ibid

Figure 26: Pedestrian Street Cross-Section

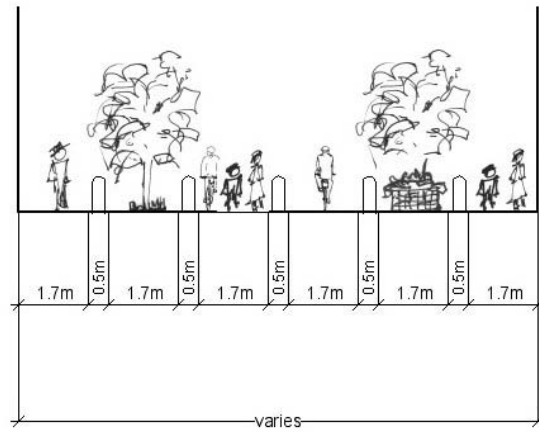


Figure 27: Pedestrian Street Plan View

