

# **Policy Guidelines for Inclusion in National Policy on Road Transportation**



**Daffodil**  
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## **Report On Integrating Pedestrian Circulation with Proposed Rapid Transit Route: Design Proposal of a Skywalk for Smart Dhaka**

**Prof. Khairul Enam & Sk. Md. Rezwan**  
Department of Architecture  
**Daffodil International University**

**November, 2019**

**INTEGRATING PEDESTRIAN  
CIRCULATION WITH PROPOSED  
RAPID TRANSIT ROUTE:  
DESIGN PROPOSAL OF A SKYWALK  
FOR SMART DHAKA**

## **Executive Summary**

The average traffic speed of Dhaka, one of the most densely populated megacity in the world, has fallen to 6 km per hour according to World Bank, which is almost similar to the usual walking speed and this congestion eats up 3.2 million working hours per day. Till now, a lot of policy measures and plans have been taken and some of the developmental works i.e. the construction of MRT (Mass Rapid Transit) BRT (Bus Rapid Transit), Elevated Expressway, numerous flyover etc. are in progress. But the proposals barely accommodated the pedestrian mobility issue and to some case is accidental, that needs to be taken into consideration.

In this backdrop, this research conduct extensive field survey in new market area where there is a proposal for elevated BRT line. The land use, traffic, pedestrian behavior, street vendor's information etc. were surveyed. The impact of proposed BRT line and the station is analyzed by analyzing the proposed design by the Government and then connecting the literature survey with field survey. Then an integrated elevated skywalk below the BRT line is proposed which has the possibility to minimize traffic congestion and ensure a safe pedestrian walking. The connection with adjacent land uses and walking level functions are carefully considered along with the energy efficient measures and pollution reduction. Not only this, the wide skywalk may promote art and culture through the design strategy. The proposed design of the skywalk dovetailed with urban life requirements will certainly contribute towards a smart Dhaka.

### **1. Introduction:**

Dhaka, the most densely populated megacity in the world, became the second least livable city by the Economic Intelligent Unit (EIU) of Economist's Global Livability Index 2018 and eventually, it surpassed the war-torn Damascus, Syria in the lower infrastructural score. Right now, the average traffic speed of Dhaka city has fallen to 6 km per hour according to World Bank, which is almost similar to the usual walking speed and this congestion eats up 3.2 million working hours per day. According to UK based firm Zipjet, Dhaka is the second least livable city after Lagos, Nigeria in terms of physical health condition. Generally, cities are considered as the hubs for ideas, business, culture as well as a home of regulators which enable humanity to advance both socially and economically. For us, it's become burdensome that are really hammering to all sorts of our activities including country's productivity.

Till now, a lot of policy measures and plans have been taken and some of the developmental works i.e. the construction of metro rail, BRT (Bus Rapid Transit), elevated expressway, numerous flyover etc. are in progress. Definitely, after ending the ongoing city projects, people's mobility around the city would definitely increase. Only metro line-6, itself, (Uttara to Motijheel) will carry 60,000 passengers per hour at both ends, according to Japan International Cooperation Agency (JICA). Moreover, after the inception of the Padma Bridge, mobility around the city would manifolds. One fact needs to be pointed out here that the ongoing project wouldn't meet the growing demand as the city population is expected to double by 2035. Expert's always focus on a major point that - 'The roads of Dhaka City is made for Vehicles not for People.' It is indeed a major topic to discuss. Designing for people has the potential to reduce traffic pressure on road which is a passive but very efficient way. Other smart cities have acknowledged it well and practicing this option. After all, what must be said that the above plans barely accommodated the pedestrian mobility issue that must need to be taken into consideration. This study is an approach to propose the concept of skywalk in the city by integrating it with the proposed infrastructure and thus solving the pedestrian mobility issue.

## 2. Objective of the research

- The objective of the research is the systematic management of pedestrian circulation due to introduction of BRT, MRT and Elevated expressway in the city.
- Encouraging walking by providing supporting facilities and ease of access, thus reducing the pressure on the road
- New innovative options of walking as an enjoyable journey for the world's most densely populated city
- Alternate options for hawkker
- Promoting art and culture through design strategy

## 3. Literature review

### 3.1 Smart Solution for Pedestrian in a Smart city

An essential to the achievement of cities and the quality of life they offer is how people move around them. Every trip begins and ends with walking.

'As a fish needs to swim, a bird to fly, a deer to run, we need to walk, not in order to survive, but to be happy'-Enrique Penalosa, mayor of Bogota, in j. speck, "walkable city," 2012

Walking, which is too often taken for granted. Walking needs to be considered as a primary focus among the smart city features to see transformative change in towns and cities, many of which undergo from a legacy of being designed around cars. Besides having health benefits due to walking, there are many economic benefits for developers, employers and retailers. After all, walking has the lowest carbon emission, does not pollute the environment, and is the cheapest and most reliable mode of transportation.

### 3.2 Skywalk

A skyway, sky bridge, or skywalk is a type of pedestrian walkway consisting of an enclosed or covered footbridge between two or more buildings in an urban area.

In North America skyways are usually owned by businesses, and are therefore not public spaces. However, in Asia, such as Bangkok's and Hong Kong's skywalks, they are built and owned separately by the city government, connecting between privately run rail stations or other transport with their own footbridges, and run many kilometers.

### 3.3 Skywalk in Canada and Bangkok- design and policy

The world's largest continuous skyway +15 network a total length of 18km(11mi) connecting 80 blocks in downtown Minneapolis. The system is so named because the skywalks are approximately 15 feet (approximately 4.5 meters) above street level. Opening in 1970, the +15 network has expanded to include 59 enclosed bridges connecting dozens of downtown Calgary buildings. The central core of the system is a series of enclosed shopping centers, and the city's flagship department stores.

New developments were required to connect to the walkway system; in exchange for this, they were offered more floor space (the "bonus density"). When not physically able to connect to nearby buildings, developers contribute to the "Plus 15 Fund", managed by the city, used to finance other missing connections.

Calgarians have a love-hate relationship with downtown's +15 system –the public loves them, the planners and politicians hate them. The public (downtown workers) loves them as it means on poor weather days, they don't have to put on a coat to attend a business meeting, meet a friend for coffee, lunch or a happy hour drink, or find a quiet place to get away from the hustle and bustle of the office.

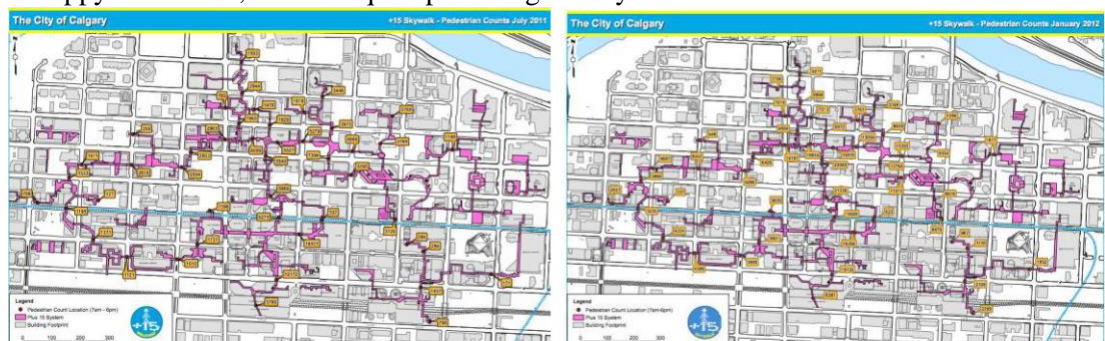


Figure 1 Pedestrian Counts July 2001 and Pedestrian Counts January 2012. The City of Calgary website

The City of Calgary conducted +15 pedestrian counts in January 2011 and again July 2011. They found use of the +15 drops about 70% in the summer. This proves that when the weather is nice, downtown workers love to walk outside but when it isn't, they are happy to use the +15 as their indoor sidewalk. We have the best of both worlds.

Asian Example: The Central Elevated Walkway is an extensive footbridge network spanning Admiralty, Central and parts of Sheung Wan, near Victoria Harbour in Hong Kong. The system was built in phases by the Hong Kong Government and various developers. has escalators and staircases for access. Parts of it are air-conditioned. There is another system in Admiralty that is currently not connected to the Central system.

Skywalk systems are usually planned to be closely integrated with a variety of activity hubs and residential projects. Hence, apart from the transport-related function, there is a wide variety of attractions as the user moves along the system. (Patricia Woo, 2014)



Figure 2: Different view of central elevated walkway, Bangkok Pedestrian activity, street life and vertical access

There is debate about the negative impact on urban areas of skyways. Robertson (1988) noted the negative impacts to street activities, and reductions to the property value at ground level. Patricia Woo (2014) found that skywalk systems could be negatively associated with promoting consumerism. Cui (2015) called for more research into the impact of skyways in developing countries.

### 3.4 Skywalk as Public place

There is a good number of debate of skywalk that it reduces the activities on street and hence in urban design it separates users from the street life. But at the same time, researchers are working on this issues to make skywalk as a public space. How the characteristics of public place and sense of public place can be ensured in the skywalk, is the main research topic. A good number of research findings are compiled in the following diagram (Wiranata, Dwisusanto 2018)

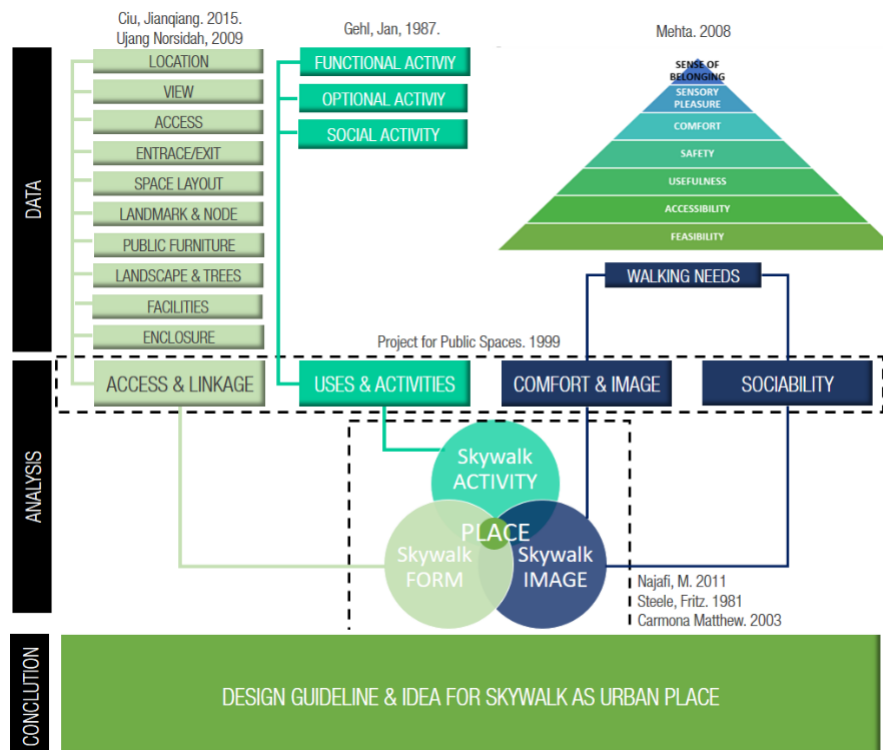


Figure 3: Diagram of Research Analysis and Theory

### 3.5 BRT, MRT proposal in Strategic transport plan

Most of the MRT and BRT design shows that around 20000-30000 person will be carried per hour (JICA study) at both ends. In its long route around 5000-6000 person will interchange a particular station per hour. The design shows that all this passengers will come to the footpath which is accidental as our narrow footpaths are not prepared for this huge load. This footpaths are also encroached in many places by many means. Due to the narrow footpath, the MRT stations follow the same design of existing foot over bridge to disperse the passenger. A highly used footbridge in Dhaka carry 1000 person/hour (DIU urban study- 2018). So it is obvious that, this huge passengers need to be dispersed in different land uses and different. Destination. In this backdrop, skywalk may be a solution for the majority pedestrian walking which might cover from very short distance to long distances.

Table 1. Number of MRT/BRT passengers by line, 2025 and 2035

	2025		2035	
	Daily Ridership (pax/day)	PPHPD	Daily Ridership (pax/day)	PPHPD
MRT Line 1	13,65,800	34,740	18,87,200	37,770
MRT Line 2			10,84,6000	23,020
BRT Line 3	18,32,700	23,730	18,14,100	25,960
MRT Line 4			3,32,000	17,930
MRT Line 5			14,78,600	28,340
MRT Line 6	4,83,200	16,440	18,16,700	45,860
BRT Line 7			5,41,800	22,330
Total	36,81,700		89,55,000	

Source: JICA Study Team

### 3.6 BRT, expressway in the study area

The 10.5km-long expressway will be constructed over the Mirpur Road corridor under a PPP initiative of the prime minister's office. Finance will be provided by Maisha Group Ltd. Feasibility study officially known as the integrated elevated Bus Rapid Transit (BRT), the expressway has been designed as a six-lane flyover with two dedicated bus lanes and four express toll lanes. It will have eight BRT stations and pedestrian crossovers at Gabtoli, Technical, Shyamoli, Manik Mia Avenue, Russell Square, Science Laboratory, New Market, Azimpur and Palashi areas. It will also have 15 exit ramps at different point.

The prime minister directed officials to conduct a feasibility study and shift the project to Satmasjid Road. "The flyover will be based on the existing median of Mirpur Road," he said. "Although it is not listed in the Revised Strategic Transport Plan (RSTP), when it gets revised again, the plan for the expressway will be included." Consultant to Maisha Group.

The proposed rapid transit infrastructure has a major design limitation. They fail to address pedestrian disperse issue. All the proposed project drop off passenger at the footpath. The existing footpath has no space to hold this amount of passenger, which in return can be accidental. A highly used foot over bridge in Dhaka carry 1000 person apprxx/per hour (DIU URBAN STUDIO STUDY-2018)



Figure 2: proposed pedestrian drop off and anticipated chaos at street level

## 4. Existing situation analysis

The area is famous for shopping specially for ladies garments, fabrics and knitting accessories. This area attracts people from all over Dhaka and even outside of Dhaka (Sub urban, Gazipur, Narayanganj etc.). Also there are many educational institutions (public universities, colleges, schools, training institutions etc.) within 1 km radius. The station is supposed to be in Nilkhet Node. So existing area need to be analyzed in terms of land use, traffic and pedestrian circulation. The filed survey was carried for 1 week in the month of September, 2018 by the students of Daffodil International University. 12 students were involved in data collection. Photograph, video documentation, interviews, structured observation was doe for the data collection.

#### 4.1 Land use of the selected area

The yellow color shapes are for Shopping centers. Famous Nilkhet book market is at the south east corner of the intersection. The dominant land use are residential (orange color) which includes a govt. residential colony, hostels and apartment buildings. The violet colors are for educational institutions. From land use analysis it is clear that the passengers who will come at this point needs to be dispersed in various direction to ease the movement. Shopping area entrance, entrance from residential colony, entrance from educational institutions should get priority.

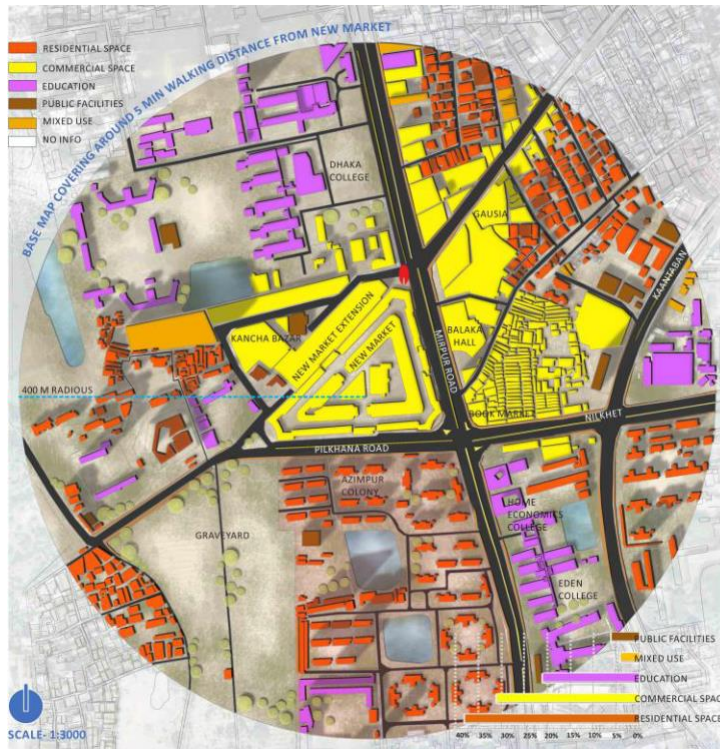


Figure 3 existing land use analysis (Source: BUET 4<sup>th</sup> year study)



Figure 4 Vehicular traffic study, pcu-passenger car unit (Source: DIU 4<sup>th</sup> year study)

#### 4.2 Traffic movement and Vehicular load

The traffic analysis shows that the primary road is over pressurized due to traffic. The overload is due to huge amount of car. The new market has no Car parking and car parks on street side. Drop off- pick up is done on the main road. Also public bus has no definite stoppage which creates traffic jam. Comparatively in a science lab intersection the ratio of Car: Bus is 49%:25% and in new market 83%: 5%

#### 4.3 Pedestrian circulation and Hawker

The whole study area is crowded with street hawker/vendor. The adjacent shop along the street side rent the front space to the hawkers. The hawkers also pays daily fare in an illegal way. The footpath becomes overcrowded from afternoon till 8pm and it's very difficult to use the footpaths. Different sexual incident happens with the girls. Govt. can't control this hawkers as they have organization which protest against any decision. Holiday market/ weekend market options were carried out but eventually they occupy the space. People have to use the main road, as they can't use the footpath comfortably. Hawker's is a political/social issue, as many hawkers are victim of climate change and had to move to the city for better living.



So if the expressway station drop off the passengers in the footpath, the situation will get worse, passengers need to be dispersed in various markets ensuring security.

Figure 5 Hawkers occupying the all market front

### 5. Design Proposal

#### 5.1 General Consideration

There are some important condition and character of physical elements in skywalk as a public space that can affect the feelings of the skywalk users [Ujang, Norsidah. 2009]. The Form / Physical Setting of the Skywalk associated with cognitive relationships, namely the perception of a person in understanding the geometry of the space and oriented within the skywalk, based on Skywalk Theory related to location, entrance, room layout, node, public furniture, landscaping and trees, facilities, shelter, materials etc. These points are explained with architectural drawings and explanation.

The skywalk system may work by connecting metro rail, BRT as well as other transport stations and buildings (civic buildings such as shopping malls, hospitals etc.). It may be built solely by the Government, private or Public-Private Partnership basis. If we look at the developed countries example especially for Canada, Thailand and USA, we have seen that they already implemented this as the best solution for pedestrian walking.

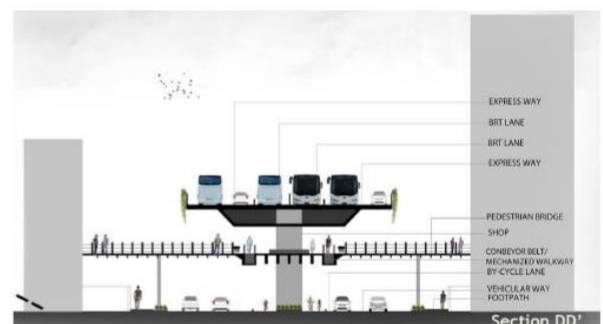




Figure 6: The proposal showing skywalk below expressway

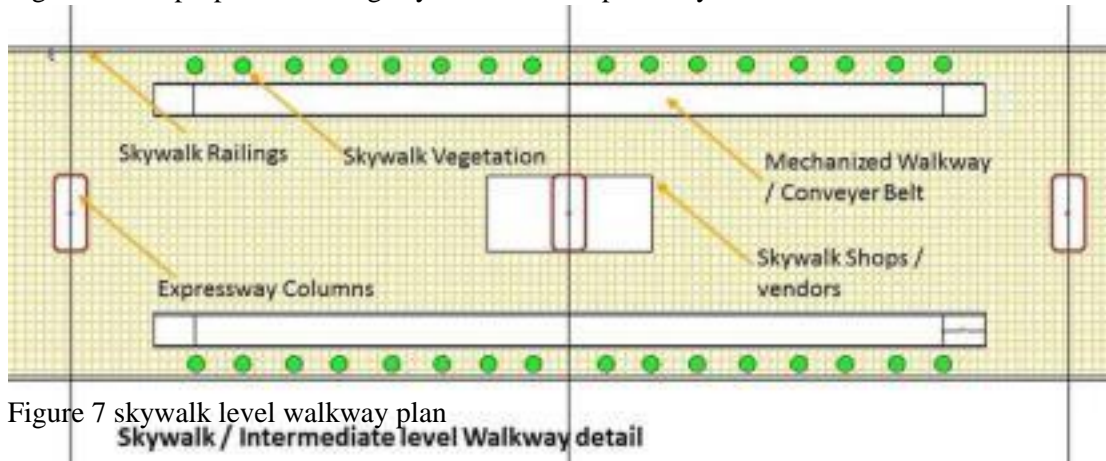


Figure 7 skywalk level walkway plan

**Skywalk / Intermediate level Walkway detail**



Figure 8 Conceptual expressway with intermediate sky walk connected to the adjacent buildings. Existing road at ground level works a local road and cycle lane. Median and sidewalks are lined by plantation

### 5.2 Technical Data

The proposed skywalk system can be extended below the MRT station level keeping a minimum 9 feet height. The structural support of the MRT/ BRT can support the skywalk without building new columns if it is decided in design phase of MRT/BRT. A continuous walkway below the transport route, extending 8'-10' on the both side of the pier will be cost effective also. This will need no shed. Electric fan can be used to make the skywalk comfortable as the heat in the urban areas is a major problem. Thinking about the elderly person moving walkway (as used in the airport) can also be installed. This features will also attract users of all age to use the skywalk and increase mobility.

### 5.3 Reflection of urban life: amenities and celebration

The multiple planning benefits of Bangkok skywalk include a seamless integration with transport nodes, support for land use intensification, integration into the lifestyles of community users, and offering a diversity of activity options. (Patrica Woo, 2014)

The walkway can offer a vibrant lifestyle by offering different civic function in its way, such as restaurants, parks, play zones etc. The government can play a vital role in deciding the proposed functions in different zone of skywalk. Even the existing buildings land use may be revised to make it more vibrant and economic. The best design of public spaces is the one that can trigger Optional Activities and Social Activities more frequently [Gehl, Jan, 1987] if we can ensure a safe pedestrian walkway, then definitely traffic congestion would be minimized by bringing to an end the pedestrian to the road. In this case, air pollution will be reduced by reducing the uses of personal cars.

The integration of interaction between humans and the built environment to create the suitable sense of place becomes one of the benchmarks in creating public space as a place [Metha, Vikas. 2008.] Not only this, the wide skywalk may promote art and culture through design strategy and the median and sidewalks may be used for tree plantation. Small kiosk can be provided by City Corporation to accommodate registered hawker using the both side of pier. This kiosk can have uniform design which can be a sculptural design to promote art in the city. In this way the skywalk can become an integrated system to urban life of Dhaka city.



Figure 9 proposed interior of the skywalk and scope of art work

#### 5.4 Skywalk and SDG goal achievement

The horizontal surface of this infrastructure (platform, roof top of the stations etc.) will give the opportunities to harvest rainwater as well. The rainwater can be used in public toilet, watering trees, water filter etc. So this project will also contribute in achieving SDG-7 Affordable and Clean energy.



Figure 10 sustainability issues of skywalk

The solar panel on roof shed of the stations/ on light post can contribute to the energy demand of the skywalk. The skywalk project will definitely enhance the health status by promoting walking and separating pollution level (noise and smoke) of the source and the user, that helps health-related SDG (SDG-3 Good health and Well-being). The social spaces in the skywalk has positive mental health benefits also.

#### 6. Conclusion

Bangladesh validated exceptional performance in the Millennium Development Goals (MDGs) and likewise unswerving to achieving most of the targets of Sustainable Development Goals (SDGs) by 2030 when Dhaka is conjectured to be the 4th largest Mega City in the world. Thus, sustainable cities and communities (SDGs-11) are also sustained by the government's development vision. The proposed skywalk can help in achieving that vision. Lot of infrastructural development are carried out in Dhaka in transport sector and the pedestrian circulation incorporation should get the priority for a smart future of the city. Actually the priority of the people should be at the center for any transport related development.

**7. Acknowledgment:** This proposal has been produced in partnership with the Friedrich-Naumann-Stiftung für die Freiheit.

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