



Section B Planning and Implementation
Part 4 Infrastructure Development Initiatives

CHAPTER 15

Urban Linkage System

15.1 Introduction

Urban linkages are pivotal to achieve balanced economic growth within SJER. A functional urban linkage system will need to address two key fundamental issues - the movement of goods and the movement of people.

Investments in urban linkages will continue to be important especially on road systems to meet freight and personal mobility needs. Car use is still important, however priority of investment in road systems should be towards improving the safety of roads, managing roads, as well as providing alternative linkages where lacking. Road networks should be safe, efficient and attractive. This must complement investment in comprehensive pedestrian networks as part of the urban linkage system. This integrated urban linkage system must be given priority to enhance the quality of living in SJER.

URBAN LINKAGE GOAL

SJER Integrated Urban Linkage System ensures local community accessibility for better quality of life and contributes towards balanced economic growth.

15.2 Road Networks

Traffic movement in an urban area is, in general a function of roadway capacity, vehicle ownership, the availability and convenience of public transport options, land use along these routes and local traffic management regimes. It is reasonable to anticipate that private vehicle usage will increase in tandem with projected increases in vehicle ownership.

In order to ensure that SJER enjoys the maximum benefits from ongoing as well as planned development projects; it is imperative to manage, improve and upgrade relevant road networks to cater for the new developments.

In recent times, several major road networks have already been proposed, for example, the Eastern Dispersal Link (EDL), Johor Bahru Coastal Road and the Johor Bahru Middle Ring Road. In addition, relevant and pertinent road upgrading and improvement programmes have been recommended for many of the roads where economic activities are envisaged to increase.

Road network is a multi-functional space, providing enclosure and activity, as well as movement. Traditionally, the road or street is an area of public realm that provides for society interactions and activities. This principle shall be translated into implementation of road development in SJER to take account of the needs of all users; vehicular and pedestrian including the handicapped. This involves creating a street network that not only works for vehicles and public transport but also to attract a high level of use by pedestrians and cyclists.

KEY DIRECTION:

UL 1: Planning and development of road network in SJER emphasises on the key principles of connectivity and functions of road spaces to achieve safe, efficient and attractive road networks

Highly interconnected street networks provide effective means of connectivity and accessibility of movement within an urban area. Connectivity refers to how an area can be connected from one place to the other. Highly connected street networks provide alternative routes or choices for vehicles, as well as pedestrians. It also allows for more dispersal and distribution of traffic rather than concentrating it to one street. Connectivity can be measured through identifying the numbers of intersection per kilometre of road. Highly accessible and connected street gives the quality of permeability i.e. a number of alternative ways through a built environment.

15.3 Proposed Road Network System

The principles of the SJER CDP for its road development program are:

- **Utilisation of existing and proposed expressway** to encourage integration of the state and national road development with local SJER road program. The highways are the North South Expressway (NSE), Second Link Expressway and Senai-Desaru Expressway;
- **Enhance the intra-district road linkages** within Johor with synergistic integrated sub-regional development;
- **Functional optimization of local road network system** for inter-settlement mobility within Johor Bahru District and the dispersal of growth to less developed and rural areas; and
- **Improve linkages between urban centres** in SJER by reducing the dependence on existing radial road where major highways are currently at over capacity.

With the proposed road development program it will support the SJER spatial growth plan from CBD to secondary centres such as Pasir Gudang, Nusajaya, Tebrau and the Senai-Kulai development corridor.

A. Road Network Implementation Strategy

The CDP's travel demand analysis and traffic surveys identify and synthesise the existing road network upgrading mandatory within SJER. The proposed road hierarchy plan streamlines these issues according to the CDP objectives.

It is critical that the traffic and transportation improvement are implemented progressively and in an orderly and logical sequence that is commensurate with the CDP. There needs to be provision for an appropriate budget to be allocated from private development contributions, government funds and privatisation schemes to implement the proposals.

B. Road Network Implementation Sequencing

Improvement plans to urban linkages will be implemented in phases. The improvement plans include short-term, medium-term and long-term action plans. The program involves both upgrading of existing primary and secondary roads and the building of new primary and secondary roads to link major areas. The total length of proposed roads in the program is 423.96km with an anticipated cost of RM4.8 billion (excluding land acquisition costs).

C. Ninth Malaysia Plan Projects for Roads

Several projects from the identified list have been committed for the Ninth Malaysia Plan.

Table 15.1: Summary of Road Infrastructure Upgrading Components and Indicative Cost Estimate

Road Network System	Length (km)	Implementation Phase	Total Cost (RM Million)
Expressways	98.10	2004 – 2020	1,471.65
New and Upgrading Primary Roads	212.00	2004 – 2020	2,317.50
New and Upgrading Secondary Roads	113.85	2004 – 2020	983.65
TOTAL	423.96	2004 - 2020	4,772.80

Source: SJER CDP 2025

Table 15.2: The Ninth Malaysia Plan Road Projects

No	Name of Project	Allocation (RM Million)
1	Entrance to Johor State New Administrative Centre, Nusajaya from Second Link	75.0
2	Upgrade Tampoi Road	60.0
3	Upgrade Ulu-Tiram-Kota Tinggi road	40.0
4	Land Acquisition cost for Senai-Desaru highway	600.0
5	Feasibility Study for Tg Bin-Tg Pelepas bridge	1.5
6	Land Acquisition Cost for Coastal Highway Johor Bahru-Danga Bay-Nusajaya (land cost)	200.0
7	Upgrade Skudai-Senai highway	86.0
8	Traffic Dispersal – Upgrade and Road Widening	680.0
9	Traffic Dispersal – Interchanges	423.0

Source: Economic Planning Unit (EPU)
Note : Coastal Highway is not funded by 9MP except for land acquisition

Table 15.3 : Road Infrastructure Upgrading Components and Indicative Cost Estimates

Priority	Ref.	Project	Length (km)	Reserve (m)	No. of Lanes (Standard)	Implementation Phase	Cost (RM Million/Km)	Total Cost (RM Million)	Authorities
1	PBa	Proposed Southern Link (Pasir Gudang – Bakat Batu)	15.00	60	4 (R5 / U5)	2004 – 2010	10.00	150.00	JKR
2	PBb	Proposed East-West Link	27.50	60	4 (R5 / U5)	2004 – 2010	10.00	275.00	JKR
3	EBb	Senai-Desaru Expressway (Under Construction)*	49.00	60	4 (R6 / U6)	2004 – 2010	15.00	735.00	LLM (Private)
4	SBe	Proposed New Road of Skudai – Kulai	7.00	40	4 (R4 / U4)	2004 – 2010	9.00	63.00	JKR
5	SBf	Proposed New Road of Mount Austin – Ulu Tiram	9.50	40	4 (R4 / U4)	2004 – 2010	9.00	85.50	JKR
6	SBc	Proposed New By pass Road of Tmn Desa Cemerlang - Plentong	5.50	40	4 (R4 / U4)	2004 – 2010	9.00	49.50	JKR
7	PBf	Proposed New Road of Kulai-Senai	14.00	40	4 (R4 / U4)	2004 – 2010	9.00	126.00	JKR
8	SNf (J2)	Upgrading of Jalan Tampoi*	7.50	40	4 (R4/ U4)	2004 – 2010	9.00	67.50	JKR
9	SNe (J105)	Upgrading of State Road J105	15.00	40	4 (R4 / U4)	2004 – 2010	9.00	135.00	JKR
10	SNb (J1)	Upgrading of State Road J1 (Tampoi – CBD of Johor Bahru)	7.00	40	4 (R4/ U4)	2004 – 2010	9.00	63.00	JKR
11	PNa (FR17)	Upgrading of Pasir Gudang Highway	45.50	60	6 (R5 / U5)	2004 – 2010	13.00	591.50	JKR
12	PNb (FR1)	Upgrading of Federal Road 1 (Kulai – Johor Bahru)	26.00	50	6 (R5 / U5)	2004 – 2010	13.00	338.00	JKR
13	PNd (FR3)	Upgrading of Federal Road 3 (Johor Bahru - Ulu Tiram)	4.00	50	6 (R5 / U5)	2004 – 2010	13.00	52.00	JKR
14	PNe (FR3)	Upgrading of Federal Road 3 (Tiram – Kota Tinggi)*	3.25	50	4 (R5 / U5)	2004 – 2010	9.00	29.25	JKR
15	PNc (FR94)	Upgrading of Federal Road 94	11.75	50	4 (R5 / U5)	2004 – 2010	9.00	105.75	JKR
16	SNc (J4)	Upgrading of State Road J4 (Skudai - Gelang Patah)	14.00	40	4 (R4 / U4)	2004 – 2010	9.00	126.00	JKR
17	SNa (J8)	Upgrading of State Road J8 (Kulai – Sungai Tiram)	34.50	40	4 (R4 / U4)	2004 – 2010	9.00	310.50	JKR
18	EBa	Proposed Eastern Despersal Link	8.00	60	4 (R6 / U6)	2004 – 2010	15.00	120.00	JKR
19	PBd	Proposed of New Road Johor Bahru – Nusajaya	11.00	60	4 (R5 / U5)	2004 – 2010	10.00	110.00	JKR
20	PBe	Proposed Outer Ring Road	43.00	40	4 (R5 / U5)	2016 – 2020	10.00	430.00	JKR
21	PBc	Proposed SELUDANG Seludang – PLUS Link	11.00	60	4 (R5 / U5)	2016 – 2020	10.00	110.00	JKR
22	SBa	Proposed By Ppass of Bakar Batu Pandan	3.60	40	4 (R4 / U4)	2004 – 2010	9.00	32.40	JKR
23	SBb	Proposed of New Road Layang-layang – Kulai	10.25	40	2 (R4 / U4)	2004 – 2010	5.00	51.25	JKR
24	EBC	Proposed New Johor Bahru – Mersing Expressway	14.50	60	4 (R6 / U6)	2016 – 2020	15.00	217.50	LLM (Private)
25	EBd	Proposed Seludang Expressway	26.61	60	4 (R6 / U6)	2016 – 2020	15.00	399.15	LLM (Private)
TOTAL			423.96			TOTAL		4,772.80	

Source: SJER CDP 2025

Note :*Ninth Malaysia Plan Projects

Figure 15.1: Proposed Expressway Development



Source: SJER CDP 2025

15.4 Junctions and Interchanges

Modern traffic signal control systems are available to allow a series of diverse functions which cater for the continually changing traffic patterns at various times of the day within a city. Systems are available to link the number of signalised junctions proposed for the Johor Bahru District to the Traffic Control Centre. The existing control centre operated by Majlis Bandaraya Johor Bahru is located at the Metropolis Tower along Jalan Abdullah Tahir.

Monitoring can also be carried out using a Closed Circuit Television (CCTV) Surveillance network. The CCTV networks are used to monitor the traffic flow data and congestion levels continuously to verify and validate the system's performance. Further adjustments may then be made to the system to enhance its performance. Priority measures for bus lanes and emergency vehicles can also be incorporated.

Detailed analysis has been prepared for each junction located within the SEC. Table 15.4 shows the location of each of the major intersections analysed with recommended lane turning directions, number of lanes and recommended queue and weave lengths. Each intersection should be re-analysed prior to implementation using the latest surveyed traffic volume at that time and projected volumes from the future projection traffic analysis.

Table 15.4: Summary of Intersection Infrastructure Upgrading Components and Indicative Cost Estimates

Implementation Phase	Nos Numbers & Type of Intersection	Cost (RM Million)
• Short-Term Proposal (2006–2010)	21 Interchanges	1,276.00
	3 Signalised Junctions	10.50
• Long-Term Proposal (2016–2025)	3 Interchanges	150.00
	2 At-Grade Junctions	5.50
TOTAL COST		1,442.00

Source: SJER CDP 2025

Figure 15.4: Streetscapes in Johor Bahru



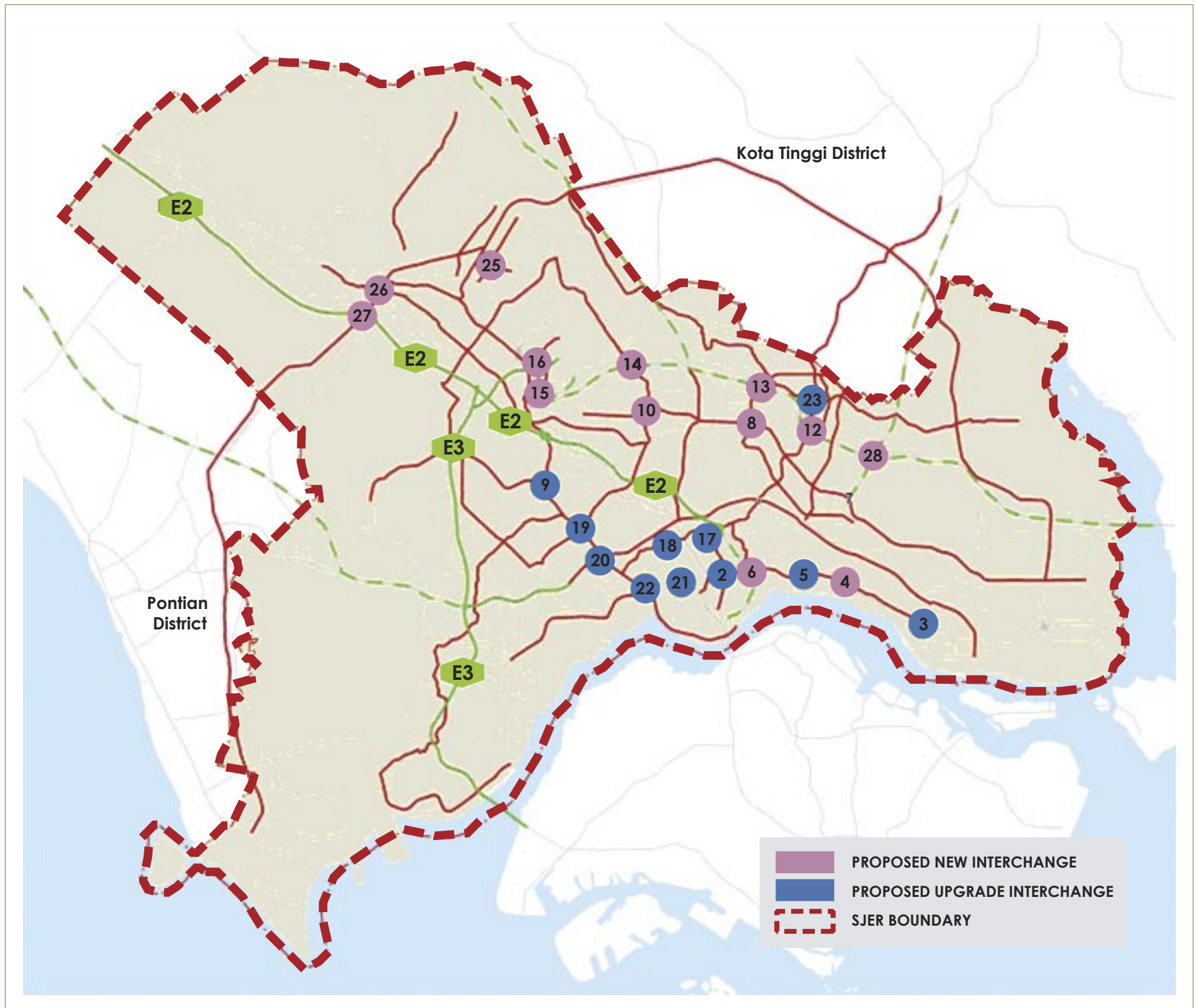
Source: SJER CDP 2025

Table 15.5: Detailed Intersection Infrastructure Upgrading Components and Indicative Cost Estimates

Ref. No.	Intersection	Short-Term Proposal (2006-2010)	Long-Term Proposal (2016 – 2025)	Cost (RM Million)	Authorities
1	Pandan Diamond Interchange	3-Tier Diamond Interchange (Under Construction)		140.0	JKR
2	3-arm Signalised Junction of Jalan Tebrau / Jalan Bakar Batu	2-Tier Half Diamond Interchange		50.0	JKR
3	Trumpet Interchange of Jln Pekeliling Pasir Gudang	Cloverleaf Interchange		30.0	JKR
4	Intersection of Southern Link / Jalan Kota	Diamond Interchange		50.0	JKR
5	Intersection of Southern Link / Jalan Permas Utara	Diamond Interchange		50.0	JKR
6	Intersection of Jalan Southern Link / Eastern Dispersal Link (EDL)	Diamond Interchange		50.0	LLM (Private)
7	Intersection of East-West Link / By-pass Road of Desa Cemerlang – Plentong	4-Arm Signalised Junction		3.5	JKR
8	Intersection of East-West Link/ New Road of Mount Austin – Ulu Tiram	4-Arm Signalised Junction		3.5	JKR
9	3-Arm Signalised Junction of Skudai Highway / Jalan Pontian	3-Tier Modified Trumpet Interchange (Under Construction)		100.0	JKR
10	Intersection of East-West Link / State Road J105	4-Arms Signalised Junction		3.5	JKR
11	Intersection of Senai – Desaru Expressway / State Road J10	Double Trumpet Interchange		100.0	LLM (Private)
12	Intersection of Senai – Desaru Expressway / Federal Road 3	Double Trumpet Interchange (Under Construction)		100.0	LLM (Private)
13	Intersection of Senai – Desaru Highway/ New Road of Mount Austin – Ulu Tiram	Overpass		18.0	LLM (Private)
14	Intersection of Senai – Desaru Highway / State Road J105	Overpass		18.0	LLM (Private)
15	Intersection of Senai – Desaru Expressway / Federal Road 16	Diamond Interchange		50.0	LLM (Private)
16	Intersection of Senai – Desaru Highway / Second Link	Modified Cloverleaf Interchange		60.0	LLM (Private)
17	3-Arm Signalised Junction of Jalan Tampoi / Jalan Tebrau	3-Tier Trumpet Interchange		40.0	JKR
18	4-Arm Signalised Junction of Jalan Datin Halimah / Jalan Tampoi	3-Tier Diamond Interchange		60.0	JKR
19	Left Turn Junction of Jalan Kampung Maju Jaya / Taman Sutera / Skudai Highway	Diamond Interchange		50.0	JKR
20	Perling Diamond Interchange	3-Tier Diamond Interchange		100.0	JKR
21	Larkin Cloverleaf	Modified Cloverleaf		50.0	JKR
22	RAT Auto Interchange	Modified Trumpet Interchange		50.0	JKR
23	Tiram 4-Arm Signalised Junction	Diamond Interchange		50.0	JKR
24	Intersection of New Road Johor Bahru – Nusa Jaya / Jalan Tebrau	3-Tier Diamond Interchange		60.0	JKR
25	Intersection of Outer Ring Road / Federal Road 94		3-Arm Signalised Junction	3.0	JKR
26	Intersection of Outer Ring Road/ Federal Road 1		Roundabout	2.5	JKR
27	Intersection of Outer Ring Road / North – South Highway		Trumpet Interchange	50.0	LLM (Private)
28	Intersection of Johor Bahru – Mersing Expressway / Senai – Desaru Expressway		Double Trumpet Interchange	100.0	LLM (Private)
TOTAL COST				1,442.0	

Source: SJER CDP 2025

Figure 15.5: Proposed Upgrading Existing Interchanges and Proposed New Interchanges



Source: SJER CDP 2025

▼ Cyclist and Pedestrian Facilities

Pedestrian facilities include those located within street right-of-ways that are adjacent to or parallel with the roadway, such as sidewalks, walkways, and roadside shoulders used for pedestrian travel. Sidewalks and walkways function as integral components of pedestrian-friendly street systems where pedestrians can experience safety, comfort, accessibility, and efficient mobility. Sidewalks and walkways increase pedestrian safety by separating pedestrians from vehicle traffic. Wide shoulders may be installed in some locations as an interim solution when it is not feasible to build a full sidewalk improvement.

Pedestrians want facilities that are safe, attractive, convenient, and easy to use. Good pedestrian details attract more pedestrians, thus making urban areas feel safer and helping commercial areas succeed.

KEY DIRECTION

UL 2: Priority for pedestrians and cyclists

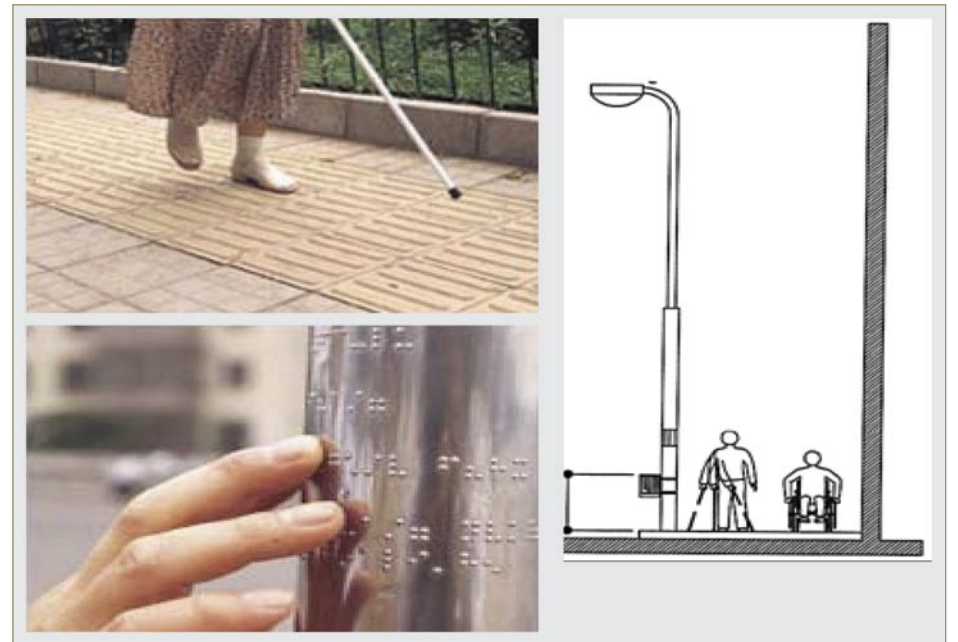
A. Pedestrian in Urban Areas

Development plans for urban areas should provide for pedestrian linkages with many walkways segregated from traffic, such as overhead walkways which are directly connected to buildings. Most journeys by public transportation require passengers to get off and walk the last leg to their desired destination. Covered walkways, which provide a pleasant environment to walk in, would be an attractive feature for pedestrians. This alternative is practical and affordable in terms of construction and operating costs, and would greatly encourage walking in urban areas. Pedestrians of urban areas together with special preferential access for public transport should be developed to limit the use of automobiles. Providing the right environment for pedestrians and cyclists is crucial. A sense of comfort, safety and convenience need to be deployed. Hence, more space should be allocated for pedestrian and cyclist lanes.

B. Barrier Free Pedestrian Route

Providing a safe pedestrian environment is a development priority for SJER in order to provide quality built environment for residents and visitors. The design of 'Safe Street' in SJER will take account of the provision of dedicated pedestrian walkways that are barrier free for all groups of people including the handicapped. This is to be incorporated in the provision of clear sidewalk zone along primary and secondary pedestrian routes connecting places of interest and focal points for pedestrians.

Figure 15.6: Examples of Facilities for the Handicapped along Pedestrian Route

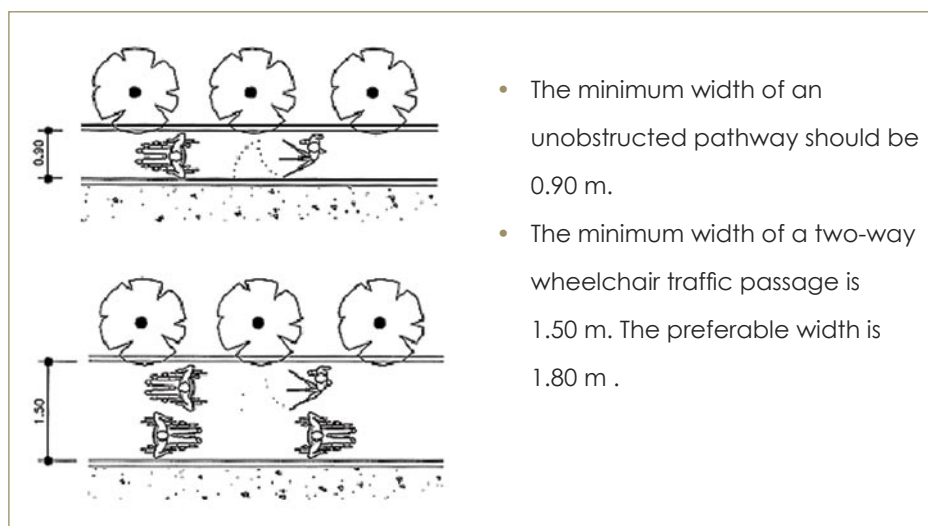


Source: SJER CDP 2025

Clear Sidewalk Zones are zones within the streetscape where pedestrian flow is continuous and uninterrupted by any structures such as columns or any landscape furniture such as trees, benches, kiosks and utility elements such as covers and gratings.

The design of new, or improvements to, existing pathways in SJER is to provide clear, obstruction-free, level and wide pathways for the convenience of all users, especially the sightless and people with mobility problems. Design and development of pedestrian routes and facilities along primary and secondary pedestrian routes will incorporate and implement the criteria and guidelines as specified by the **MS 1331:2003, Code of Practice for access of disabled persons outside buildings** in order to create a pedestrian environment that is accessible and useable by all.

Figure 15.7: Requirement for Access for the Handicapped within Sidewalk



Source: MS 1331:2003, Code of Practice for access of disabled persons outside buildings

C. Bicycle way

Bicycle ways within the Johor Bahru District will promote cycling for recreation and personal transport provided that these facilities are attractive and safe. The promotion of travel by bicycle to work destinations will result in fewer car trips.

A bicycle way network can be incorporated into the road hierarchy via limited access streets where reduced speed limits for motor vehicles are proposed, by the provision of cycle facilities integrated with the footpath network, and by parking and storage that is secure and conveniently located. A fully segregated cycle network, such as along the foreshore, incorporated into a wider network outside the Central District would be utilised for both recreational and work-based trips.

