

6.5 Public Transportation Plan

1) Public Transportation Policy

6.48 A clear policy needs to be formulated for the public transportation sector, delineating the roles of the public and the private sectors. Basic principles include the following:

- (i) Danang, being a large city and the growth centre of CFEZ, needs an efficient and attractive public transportation system.
- (ii) Both the public sector and the private sector must participate.
- (iii) The public sector's task is overall planning, coordination, and monitoring. It is the responsibility of the public sector to use the private sector in a way that gives Danang and its citizens the best possible system.
- (iv) The private sector's task is the operation of public transportation within the legal and regulatory framework provided by the government. It is the responsibility of the private sector to create profits through productivity, cost-efficiency, and good service.
- (v) Transportation companies should not be subsidized by covering their deficits and thus, in effect, rewarding inefficiency. Transfers to the public transportation system as a whole may be necessary, and should be made by subcontracting private companies for specified services, thereby encouraging competition.
- (vi) Public transportation, in the short and medium term provided by buses, should be given priority in traffic by means of reserved space and traffic management actions.
- (vii) Preparations for a possible future conversion to rail transportation along major corridors should be carried out and land reservations be made.

2) Overall Concepts for Public Transportation Development

6.49 Overall concept for public transportation development for Danang City is as follows:

- (a) **Future Prospects:** In the preceding chapter, the number of daily trips in the study area was forecasted to grow from 4 million in 2008 to 7 million in 2015 and 11 million in 2025. The vision for this expanding trip market is to be served by a diversity of transport modes and services in a more balanced fashion, where each mode operates according to its inherent strengths. A significant increase in the usage of public transport (from 4% to 15% by year 2015, thence to 35% by year 2025) is envisaged. Future road traffic will not be at least viable if the bus transportation could not accommodate a greater part of this increasing demand. The proposed road network plan is formulated based on that 35% of future demand is transported by urban buses. These bus fleets would range from small to large in size, offering regular, air-conditioned, express, and shuttle services. Bus route network would be enough dense and expanded. Level of bus service such as frequency, operating hours and fare would be attractive enough to road users.
- (b) **Staged Development Strategy:** A strategy serves as a compass to get from the present to a desired future condition. If current trend continues, the share of public transportation in the daily trips of residents will be insignificant by 2015 and 2025. Trips would rely mostly on private modes of transport - cars (much higher than at present) and motorcycles (lower than today but still a sizeable share). The road space requirements of a car-based city would be very high, and the corollary investments to support it would fall short of what can realistically be provided by Danang City. With

more users and less roads, severe traffic congestion would ensue, at great cost to the economy and to the habitability of the city. To avoid such a dismal fate, Danang City must develop its public transportation system - principally, buses in the short-to-medium term and rail-based mass transit in the long term.

- (c) **Integration with Inter-city Transportation System:** Urban public transportation system shall be developed in integration with inter-city passenger transportation system such as railway station, provincial bus terminal and airport. As for the existing Vietnam Railway, branch line to/from Danang Station will be removed by the North-South High-Speed Railway (NS-HSR) is constructed. The existing station will be move to the north side of New Danang Station of NS-HSR. The premises of abolished branch line will be utilized as ROW for UMRT.
- (d) **Inland Waterway Transport:** It will continue to provide niche services in the medium-to long-term horizon, but its modal share is not expected to be significant. The core demand will be borne by the cross-river ferry and regular routes to remote islands. Use of waterways for tourism purposes has also ample opportunities.

3) Urban Bus Service Improvement (Immediate Action)

6.50 Urban bus services are being promoted by the city for implementation with technical and financial assistance of KfW. In April 2009, the “Feasibility Study for Improvement of Public Transport in Danang 2008–2015” has been completed. This feasibility study was assisted by KfW to determine its project component and cost. For Danang City, this study is considered as a short-term action plan for the development of urban public transportation towards the year 2015. Since the existing urban bus service is a minimum, the project will provide better services to attract the people to use urban buses. The outline of the project is summarized in Table 6.5.1 and included in Figure 6.5.4.

4) Urban Bus Service Expansion (Short/medium-term Project)

6.51 This will build on the KfW bus improvement project and broadens it towards the creation of modern forms of managing and operating the bus fleet to accommodate targeted 15% of the total demand by 2015. Based on the experiences of other cities, bus operation is better accomplished by the private sector, rather than by the government. However, because of the current sluggish demand for buses as well as the unfavorable business climate (fares below bus operating costs, government regulatory policy, etc.) private investors are not likely to enter the urban bus transit business soon. To avoid the proverbial “chicken or egg” situation, the government has to take the lead. With an external technical advisory assistance, a modern urban bus sector can be fostered.

- (a) **Subcomponents:** The public transport strategy for Danang City entails three to four large bus fleet companies operating in exclusive transport corridors. These companies are expected to manage 500 to 1,000 standard buses each, eventually. However, no existing operator in Danang City has the track record nor the resources to handle such a task. The external advisory assistance is meant to assist in the formation of large fleet operators, assist these companies in adapting modern transit practices, and advise the government on policy reforms conducive for long-term private sector participation. This project is intended to accomplish the following:

- (i) Define in more detail the set of bus routes to be included in each corridor, and assignable to one of the bus operators;
 - (ii) Determine demand on those routes, and the forces that will push growth in demand;
 - (iii) Determine the appropriate mix of bus services and fleet to meet this demand to year 2015. Required number of bus fleets are estimated (refer to Table 6.5.2);
 - (iv) Conduct engineering studies for depot sites, and other transit infrastructure such as bus sheds/stops, and ticketing systems;
 - (v) Design the organization and staffing model, including modern IT-enabled management systems, in providing these bus services;
 - (vi) Provide financial management advice to the large fleet operators;
 - (vii) Conduct economic analysis from the point of view of the government;
 - (viii) Prepare business or promotional materials to convince private investors to take over and assume a bigger role in the management of bus system; and,
 - (ix) Provide technical assistance to the DOT and bus operators in the performance of their respective roles.
- (b) **Estimated Cost:** Cost of new bus fleets and others are estimated as follows:
- (i) US\$47 million for additional fleets by 2015²
 - (ii) US\$2 million for bus stops, depot and ticketing and management system
 - (iii) US\$2 million for conduct of detailed bus modernization plan for bus services and fleets and infrastructure
 - (iv) US\$1 million for capacity development of DOT and operators (financing, planning, operation and management, etc.)

Table 6.5.1 Estimated Number of Bus Fleets in Danang City

Item	2008	2015	2025	
Total Daily Demand: 000 trips	4,168	6,971	10,976	
Demand on Bus: 000 trips (% to total)	176 (4%)	1,046 (15%)	3,842 (35%)	
Share by bus size (assumed)	Large (80pax)	10%	20%	30%
	Standard (60pax)	50%	50%	50%
	Medium (24pax)	40%	30%	20%
Required No. of Bus fleets	Large (80pax)	15	174	960
	Standard (60pax)	98	581	2,134
	Medium (24pax)	196	871	2,134
	Total	308	1,627	5,229

Source: DaCRISS Study Team

Note:

No. of required bus (Nb) = Tn / Td

Tn: Required No. of bus trips/day (=Pax/Cb/LF)

Pax: No. of bus demand (trips)

Cb: Capacity of bus

Lf: Average load factor of bus (assumed at 60%)

Td: Trips per day for a bus (=KMr/Rave/UF)

KMr: Maximum km a bus can run in a day (assumed at 200km)

Rave: Average route length in km (assumed at 20km)

UF: Average utilization factor of bus (assumed at 90%)

² Assumed unit price of locally-made bus fleets are: US\$50,000 for large bus (80 pax), US\$40,000 for standard bus (60 pax) and US\$30,000 for medium bus (24 pax)

Table 6.5.2 Outline of KfW Bus Project

Item	Description												
Objectives	The feasibility study shall investigate: <ul style="list-style-type: none"> • The need of improved public transport systems in Danang City • Compare possible solutions and recommend preferred measures • Asses it's technical and financial feasibility and • Possible impacts in regard of traffic prevention, environment, energy efficiency and urban development. 												
Project Components	<p>C1. Bus Network: Consist of 6 bus routes</p> <p>C2. Institution: Establish the Danang Public Transport Authority (DPTA) organizing, planning and controlling of bus services and industries, Bus Operator operating buses and managing fleets, and Bus Service Enterprise (BSE) operating repair, maintenance and parking depot.</p> <p>C3. Infrastructure: Develop interchange stations and bus stops with shelter</p> <p>C4. Bus Vehicles: Purchase 65 LPG or EURO IV standard buses</p> <p>C5. Repair, Maintenance and Parking Service (Depot): Receive, fuel and maintain 200 buses</p> <p>C6. Ticketing System: Combine the latest technology of smart cards for the monthly passes and affordable cardboard tickets for the time tickets.</p> <p>C7. Operation Control System: Provide with latest GPS technology to track the operation.</p> <p>C8. Organizational Development and Capacity Building: Provide to all levels of management and decision-making.</p>												
Investment Cost	<p>Total Euro 15 million</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">1) Construction:</td> <td style="text-align: right;">1.866</td> </tr> <tr> <td>2) Equipment Depot:</td> <td style="text-align: right;">0.716</td> </tr> <tr> <td>3) Procurement of Buses:</td> <td style="text-align: right;">9.678</td> </tr> <tr> <td>4) Ticketing & Control System:</td> <td style="text-align: right;">0.400</td> </tr> <tr> <td>5) Others and Implementation Management:</td> <td style="text-align: right;">1.600</td> </tr> <tr> <td>6) Capacity Building (grant):</td> <td style="text-align: right;">0.740</td> </tr> </table>	1) Construction:	1.866	2) Equipment Depot:	0.716	3) Procurement of Buses:	9.678	4) Ticketing & Control System:	0.400	5) Others and Implementation Management:	1.600	6) Capacity Building (grant):	0.740
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Implementation Period	24 months (2010–2011)												

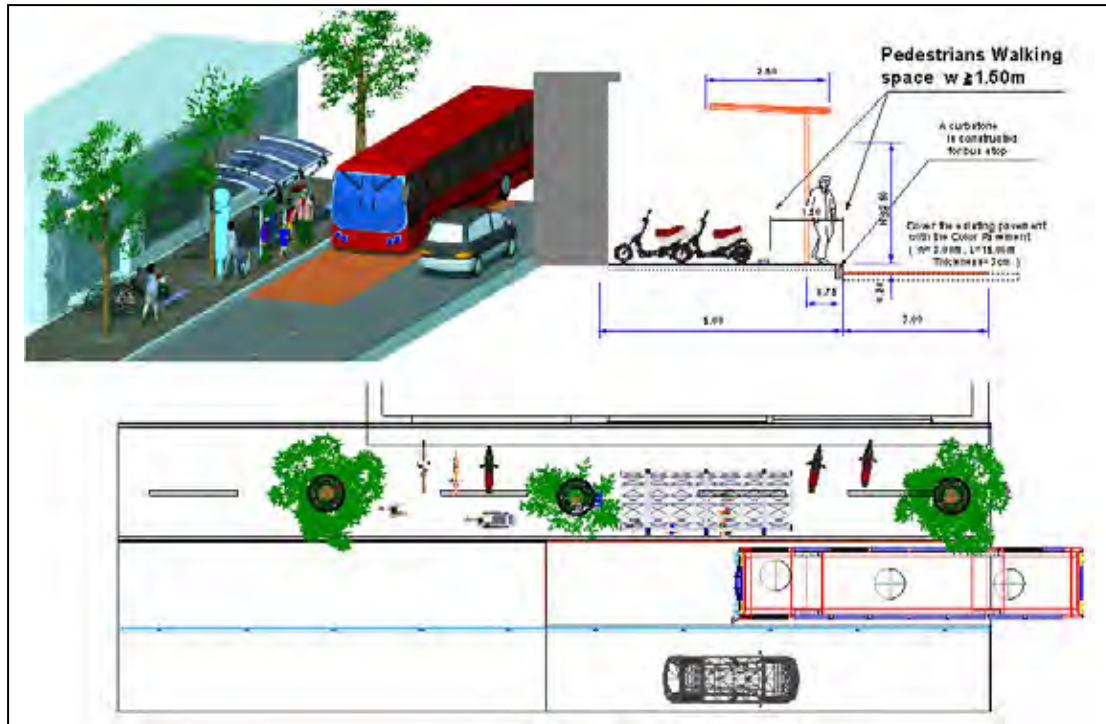
Source: The Feasibility Study for Improvement of Public Transport in Danang 2008–2015, KfW (2009)

5) Improvement of Bus Operation and Utilization Environment

6.52 Alternative and effective bus services need a good environment which ensures smooth and safe operation of buses for bus operation, and convenience to / from and at bus stops. On board comfort is also important. Unless bus services are attractive, it is difficult to encourage a shift from motorcycle and car use to public transport. Following basic aspects need to be considered:

- (a) **Bus Operation Environment:** exclusive bus lane and bus priority lane, PTPS (public transportation priority system), on-street parking management, control of private vehicles such as cars and motorcycles
- (b) **Walking Environment:** widening of sidewalk, planting of street trees, installation of plants, flowers and amenities, establishment of green-pedestrian network
- (c) **Bus User's Environment:** exclusive space and shed for waiting passengers, safe and easy boarding and alighting, separation of bus waiting passengers with other pedestrians
- (d) **Bus Stop Design:** There are several design types of bus stops. For the proposed green transit network in the city center, installation of overhanging type bus stop is effective though there is a constraint on ROW. Overhanging bus stop will decrease a conflict between buses and parking vehicles and make safe and easy boarding and alighting due to close distance and less bump between bus door and bus stop. Also, it will equip bus waiting space and shed and it will make separate between bus waiting passengers and other pedestrians.

Figure 6.5.1 Bus Stop Image



Source: DaCRISS Study Team.

Figure 6.5.2 Bus Stop Types and Layout



Source: DaCRISS Study Team

6) UMRT Development

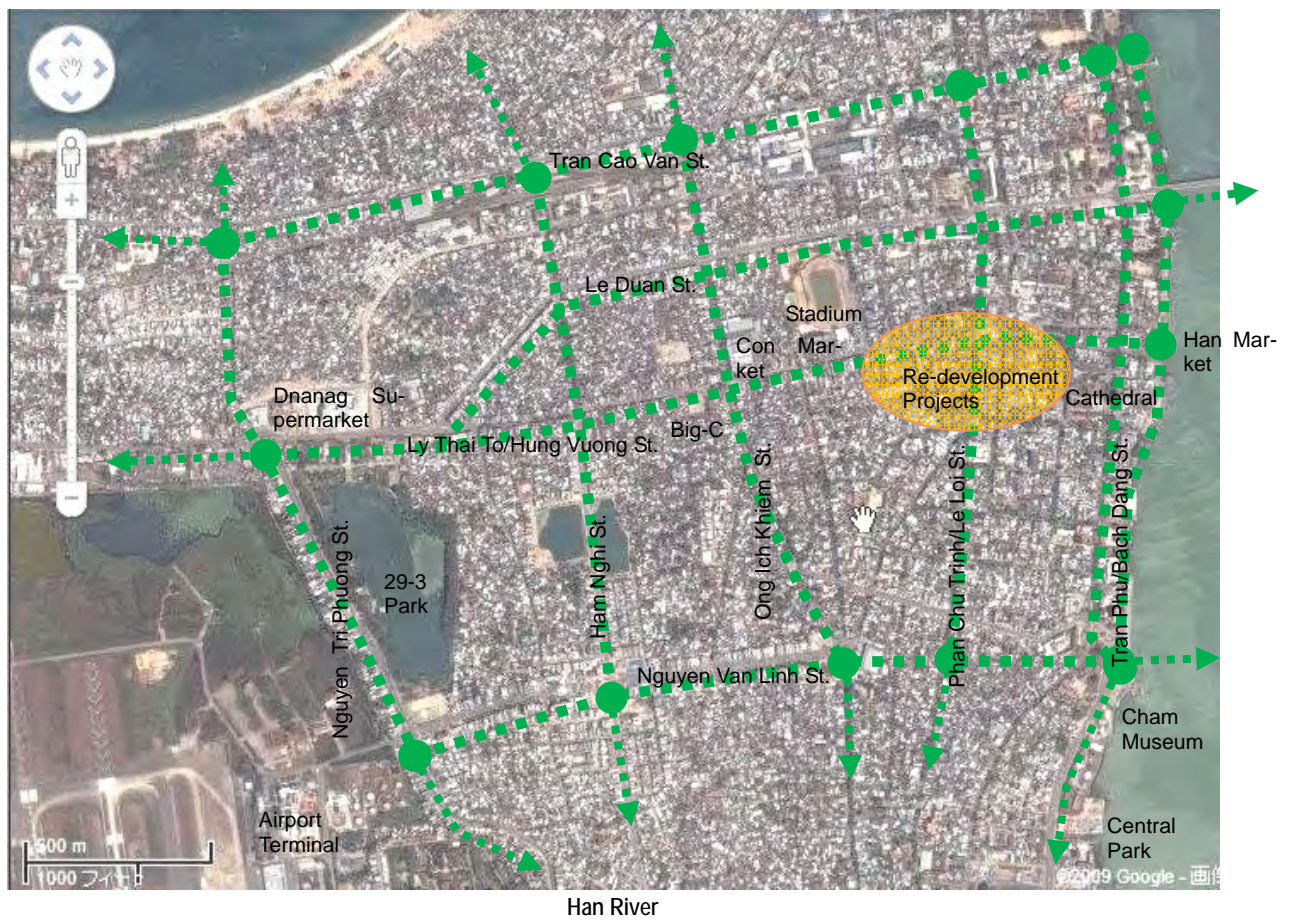
6.53 Details will be elaborated in Chapter 6.6.

7) Development of Green Transit Network

6.54 The concept of green transit network is to provide accessible conditions to public transport, particularly urban bus services, in the center of Danang where a huge transportation demand is generated and attracted. It is different from so-called “transit mall” For this, the following innovative improvements in each of aspect are to be implemented. As a result, use of public transport will be promoted by improvement of bus services and city center will be vitalized. Green transit network do not only serve bus passengers but also encourage the people to walk in the city centre and connect amenity facilities and destinations with each other.

6.55 Based on the above-mentioned discussion, provisional Green Transit Network for the city center of Danang is prepared. The proposed network connects major business, commercial, tourism and cultural hubs and parks. Since the network is formed as grid pattern with 500m interval, people will reach to the network at least by 200–300 m walking (see Figure 6.5.3).

Figure 6.5.3 Provisional Green Transit Network



Nguyen Van Troi Bridge



29 - 3 Park



Source: DaCRISS Study Team

8) Other Possible Measures

6.56 When basic public transportation network is provided, there are extensive opportunities to farther improve urban transport situation in the city. They are as follows;

- (a) **Restraint of Car Entry to CBD:** When proposed UMRT Lines are provided, main urban areas can mostly be covered by them within walking distance. This means a passenger in the city can access to a station within average of 5 to 7 minutes walk or maximum 10 minutes. When this situation is there, City authority can enforce more strict control against entry of car and motorcycle to the city centre. There are a number of technical methods to control the entry/exit of vehicles to/from designated areas.
- (b) **Transit Mall:** Transit mall is a concept to revive commercial areas where activities suffer from traffic congestions and degraded amenity due to lax traffic management. For these areas, road space is redesigned in a way that attractive public transport system is provided, walking amenity and safety for pedestrians are ensured that they can enjoy shopping and access to the shops and activities. This concept can also be applied in the city centre in Danang. (see Figure 6.5.4)

Figure 6.5.4 Example of Transit Mall



Clermont



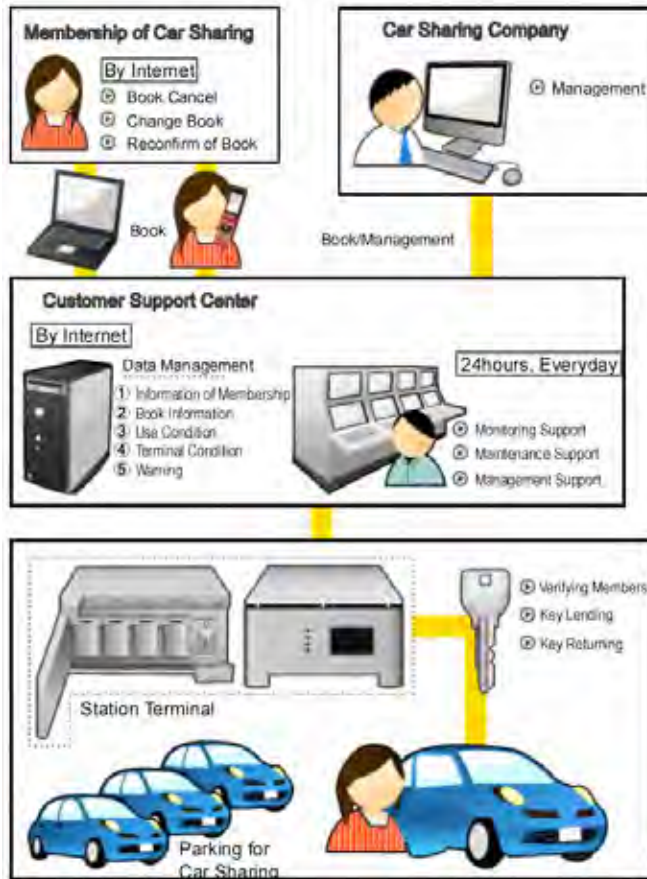
Amsterdam



Orlean

- (c) **Car Sharing:** Car sharing is a concept that a car is used by a group of people for more efficient use of car which leads to reduction in car traffic. When a person would like to use a car, he/she goes to a station where a number of cars are parked in various locations in a city. Fee is paid and the car is returned to station after use. The same system can be applied to bicycle and motorcycle as well. (see Figure 6.5.5)

Figure 6.5.5 Concept of Car Sharing



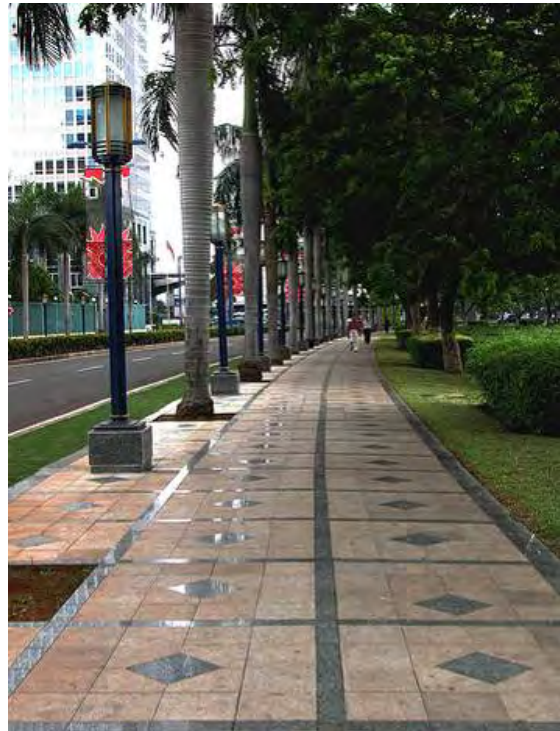
Spaces in the Bucktown neighborhood for Chicago's I-GO car sharing program.

Source: NISHIMU ELECTRONICS INDUSTRIES CO., LTD, Planners Web

- (d) **Pedestrian Walkways:** Danang City provides already a number of attractive pedestrian walkways along the river. However, this can farther be expanded to cover the entire city to develop a network. This is especially important for public transport system development because people always have to access to public transportation routes mainly by walking. A weakness of Danang City is that many sidewalks of urban roads are not pavements with consistent standards. Some are narrow, pavements are inadequate, and often the space is occupied by parking vehicles, shops and others. In order to establish an effective network of pedestrian walkways, it is also important to provide adequate street trees, street lights, safety facilities, street furniture, and traffic signs, among others. (see Figure 6.5.6)

Figure 6.5.6 Examples of Road Use for Pedestrians

<Pedestrian Way>



< Street

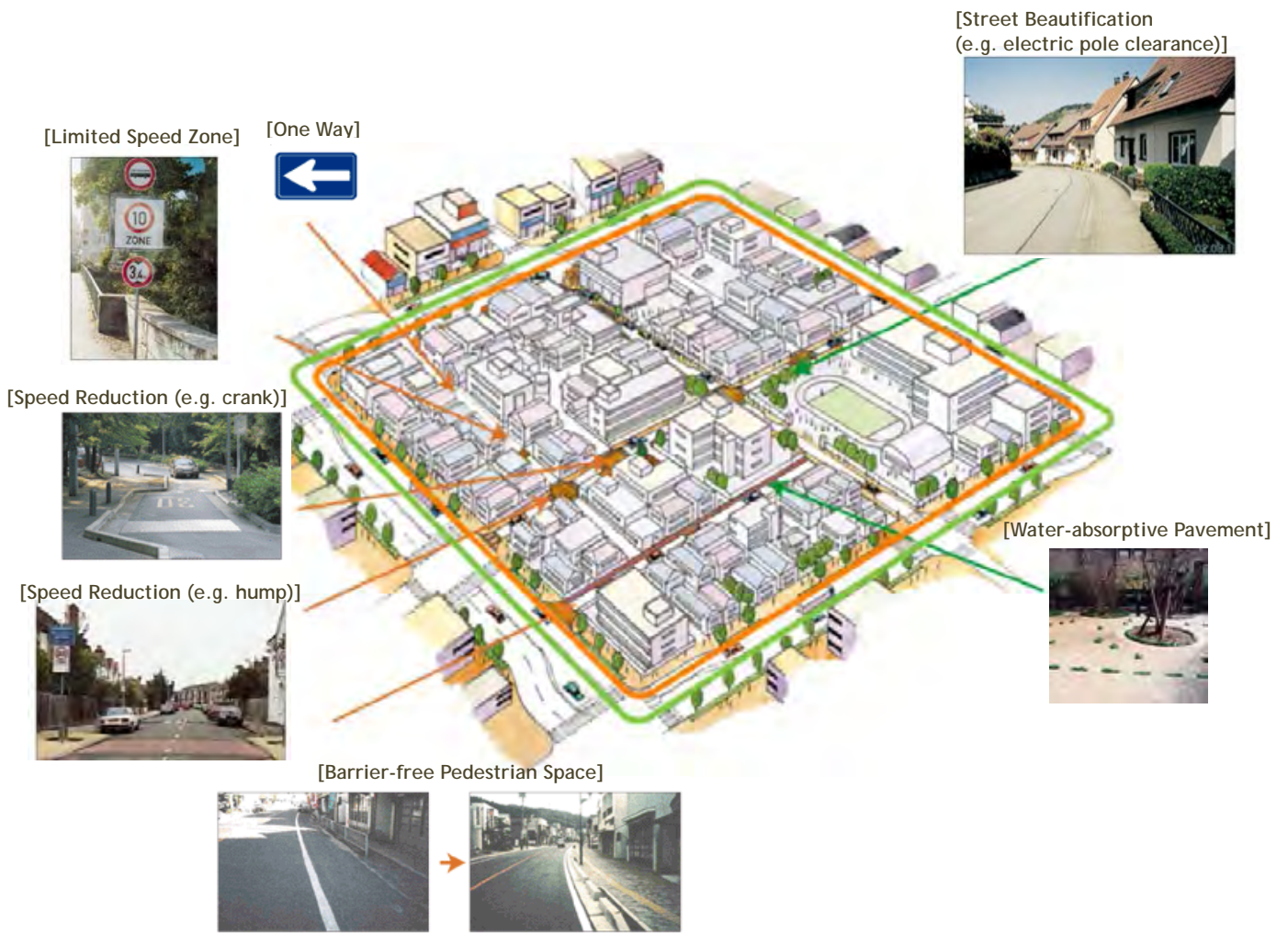
Furniture



Source: <http://wvs.toleftpixel.com> and other internet sources

(e) **Traffic Management at Connectivity Level:** Traffic management at community level needs to be attended to ensure safety and amenity of the people in daily life. It is especially important to protect pedestrians against motor vehicles (see Figure 6.5.7).

Figure 6.5.7 Possible Measures to Improve Traffic at Community Level



Source: MLIT of Japan, TAIYO CEMENT INDUSTRIAL

6.6 Pre-Feasibility Study for Priority Measures

8.2.1 Comprehensive Urban Transportation Management

1) Current Conditions and Issues

6.57 Current conditions and issues regarding urban transportation management are as follows:

- (i) Urban traffic congestion in the city centre and along the main urban radial roads;
- (ii) Traffic accidents which are reducing but still at a very serious situation in both terms frequency and severity;
- (iii) Environmental pollutions and green-house gases from motorized traffic; and
- (iv) High cost of transport causes by infrastructure expansion and operation.

2) Objectives

6.58 Long term goals are as follows:

- (i) To ensure the accessibility of all urban activities in Danang City;
- (ii) To ensure the safety for all traffic movements in the city;
- (iii) To reduce traffic emissions and to save urban land area using for transportation; and
- (iv) To minimize transport cost and to enhance economic development of the city and its region.

6.59 Short term objectives are as follows:

- (i) To develop an intelligent traffic management system in the central area of Danang City;
- (ii) To improve traffic safety in the city centre and along the main urban radial roads;
- (iii) To facilitate walking and biking in the city centre and along the main urban radial roads; and
- (iv) To ensure the smooth and effective operation of the public transport service in the city centre and along the urban radial roads.

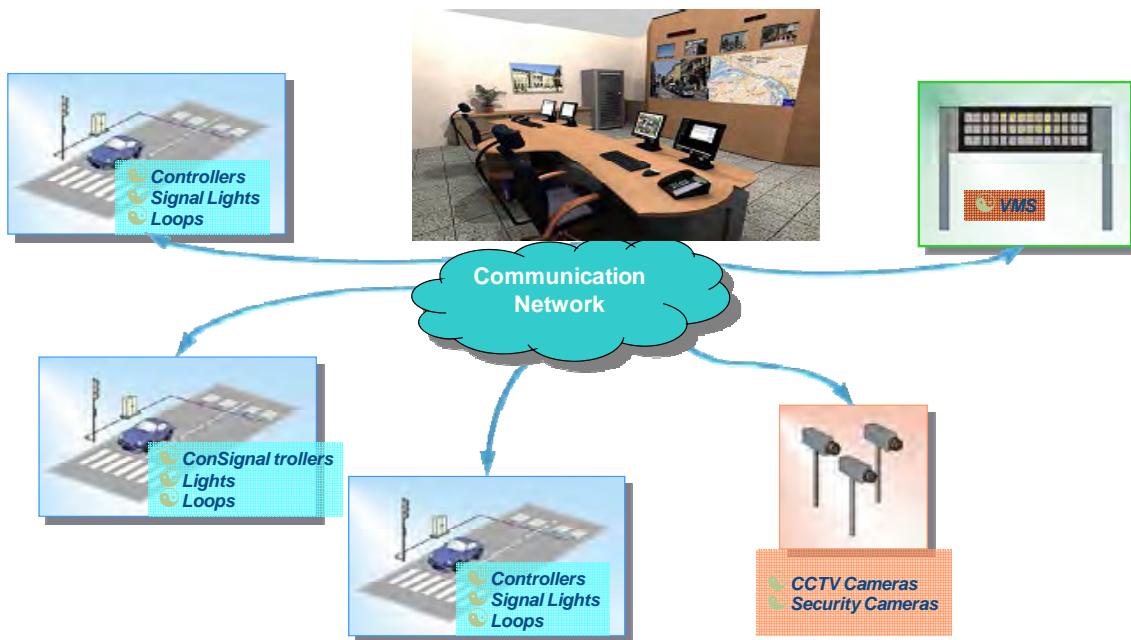
3) Proposed Measures

(1) Urban Traffic Signal Control System

6.60 This includes the following measures:

- (i) Advanced traffic management system(including software and hardware)
- (ii) Local controllers, loops and traffic lights at 90 intersections
- (iii) Closed-Circuit TV system (including digital video camera at 40 key intersections)
- (iv) Communications network (65 km)
- (v) Environmental monitoring system

Figure 6.6.1 Proposed Concept of Advance Traffic Control System



Source: Worked out by DaCRISS Study Team.

(2) Traffic Calming Zone

6.61 Traffic calming zone of the entire urban core of Danang includes the following items:

- (i) Traffic marking and sign boards to inform people about the application of traffic calming zone in the inner core;
- (ii) Urban landscape and traffic calming re-design of roads to encourage people to travel with slow speed by enjoying nice urban landscape and road facilities (about 16 road sections or 25 km will be redesigned);
- (iii) TCZ speed monitors will be installed at suitable points along the 16 roads in order to ensure the monitoring capacity supporting to quality management and enforcement; and
- (iv) Street sections of the pedestrian street on Hung Vuong and Nguyen Thai Hoc Street, which has been proposed in the Danang Urban General Construction Master Plan, will be re-designed in order to ensure a safe pedestrian environment and also accommodate logistics and emergency vehicles at demand.

6.62 Urban area traffic management will be applied by two levels (see Figure 6.6.2).

- (i) Level 1: Danang urban traffic calming area (inner core of Danang city)
- (ii) Level 2: Danang urban traffic smoothing area (outer core of Danang City)

(3) Corridor Traffic Management

6.63 This components will focus to improvement traffic management condition along the five main five corridors, including NH1-Truong Chinh, NH14-Cach Mang Thang Tam, Ngo Quyen – Le Van Hien, Nguyen Tat Thanh, Au Co, by the following measures;

- (i) Traffic separation re-arrangement in order to separate traffic flow of automobile, motorcycle and bicycle. The arrangement of bus priority lane is also included;

- (ii) Side-walk improvement in order to ensure the walk-ability of pedestrians and to arrange proper area of motorcycle and bicycle parking;
- (iii) Intersection improvements (including the junctions with alleys) in order to ensure all intersections between the corridors and other roads are managed. The traffic signal control along the corridors is also included in the component traffic signal control system;
- (iv) Pedestrian crossing facilities are important measure in order to ensure the continuity of walking trip by dedicated facilities, including 20 pedestrian bridges, sufficient number of zebras at the demanding points and pedestrian traffic lights at the signalized intersections along the corridors; and
- (v) Alley improvement in order to ensure the walk-ability of pedestrians along the corridors and to ensure the accessibility of them to the bus-stops and UMRT stations (in the future) within the at least 500 meter radius to the stops.

(4) Urban Parking Management

6.64 The parking management scheme is proposed to apply for entire the outer core of Danang urban area, including three main items;

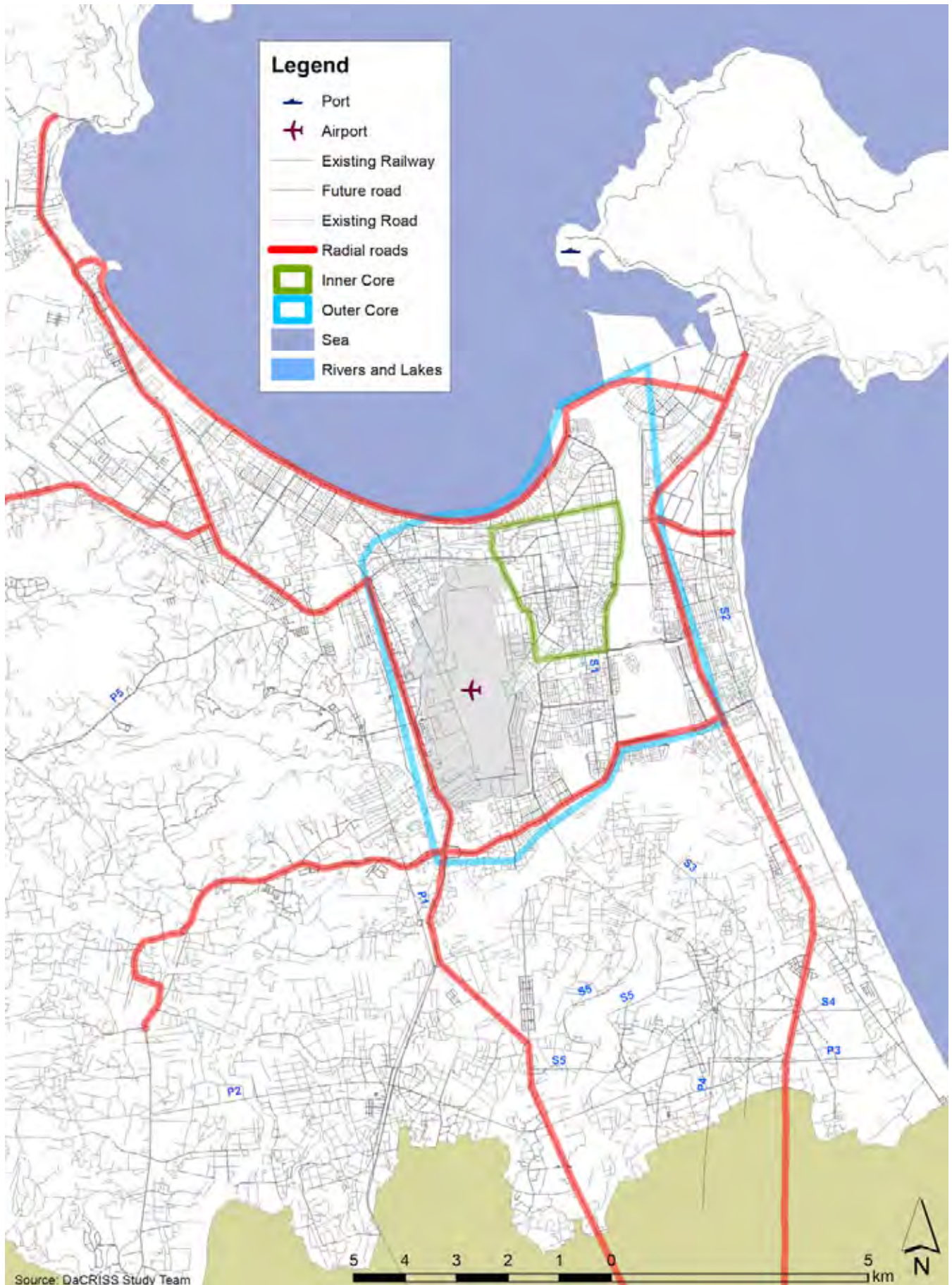
- (i) On-street parking re-arrangement on all roads within the outer core of Danang City in order to allocate the specific area of roads and sidewalks for public parking demand;
- (ii) Public parking-meters installation will be necessary in order to support the drivers to pay parking fee automatically without the conductors; and
- (iii) Intelligent parking management system should be considered to be applied in all off-street parking facilities in the inner core of Danang city which have more than 100 parking lots available for public parking demand (including dynamic parking information system for the facilities).

(5) Institutional Capacity Building

6.65 In order to ensure high quality transportation management system, it should be proposed to strengthen the institutional structure, regulations and human resource capacity, including;

- (i) Establishment of Danang Traffic Control Centre (DTCC) as the central command authority to manage traffic condition in Da Nang city by having the organization, personnel and building;
- (ii) Development of Danang Transport database as part of DTCC in order to collect, manage all information of transportation system in Danang City supporting for daily traffic operation and development planning process;
- (iii) Preparation of urban transportation management regulations including the instruction about traffic management measures, parking pricing scheme, enforcement and organizational responsibilities; and
- (iv) Training courses for related personnel in DTCC and also in other departments and authorities of Danang.

Figure 6.6.2 Proposed Urban Transportation Management Area in Danang City



8.2.2 Feasibility Study on Development of UMRT Line 1

1) Current Conditions and Issues

6.66 Current conditions and issues regarding public transportation are as follows:

- (i) Future traffic congestion along the most important urban traffic corridor causes by explosion if individual motorized traffic;
- (ii) Traffic accidents are reducing but still at a very serious situation in both terms frequency and severity;
- (iii) Environmental pollutions and green-house gases from motorized traffic; and
- (iv) High cost of transport causes by infrastructure expansion and vehicle operation.

6.67 UMRT (Urban Mass Rapid Transit) is defined as a modern mass – transit serving urban transport passenger demand, including BRT (Bus Rapid Transit), LRT (at – grade, elevated, underground) and MRT. Specific system can be chosen depending on the physical conditions of the routes and demand.

6.68 The UMRT Project is meant to provide a high-capacity mass transit service on heavily congested transport corridors connecting between CBDs and urban centers and major suburban areas. It would be designed using the best of both rail and busway technologies to reduce the initial capital cost and dovetail with growing passenger demand. The passenger loading profile along a line is usually uneven and begins to taper off at the suburban fringe. Thus, rail at those sections would not be economical. On the other hand, demand on the inner sections of the line closer to the city center could be so high as to exceed bus capacities. Hence, demand forecast will be crucial in determining the transition from bus to rail and the corresponding line lengths.

6.69 Aside from economics, the bus-rail combination also reserves in advance the ROW for future rail extension. Thus, the radius of curvature for the busway should take into account the more stringent standards required by rail (vertical and horizontal) curves. Furthermore, as the first system to be introduced in Danang City, the UMRT would influence subsequent standards for other urban railway lines in terms of track gauge, electrical system, signaling system, station plaza, and the like. Otherwise, maintenance and integration would become major headaches.

2) Objectives

6.70 Long term goals are as follows:

- (i) To ensure the accessibility of all urban activities in Danang City;
- (ii) To ensure the safety for all traffic movements in the city;
- (iii) To provide a emission-free transport service and to preserve city's natural resources; and
- (iv) To minimize transport cost and to enhance economic development of the city and its region.

6.71 Short term objectives are as follows:

- (i) To develop successfully infrastructure for UMRT service with the LRT service in the first phase;

- (ii) To integrate successfully the bus services and the LRT service;
- (iii) To ensure accessibility for pedestrians and bicyclists to the UMRT stations; and
- (iv) To integrate successfully the UMRT stations and urban land use in the surrounding areas.

3) Proposed Measures

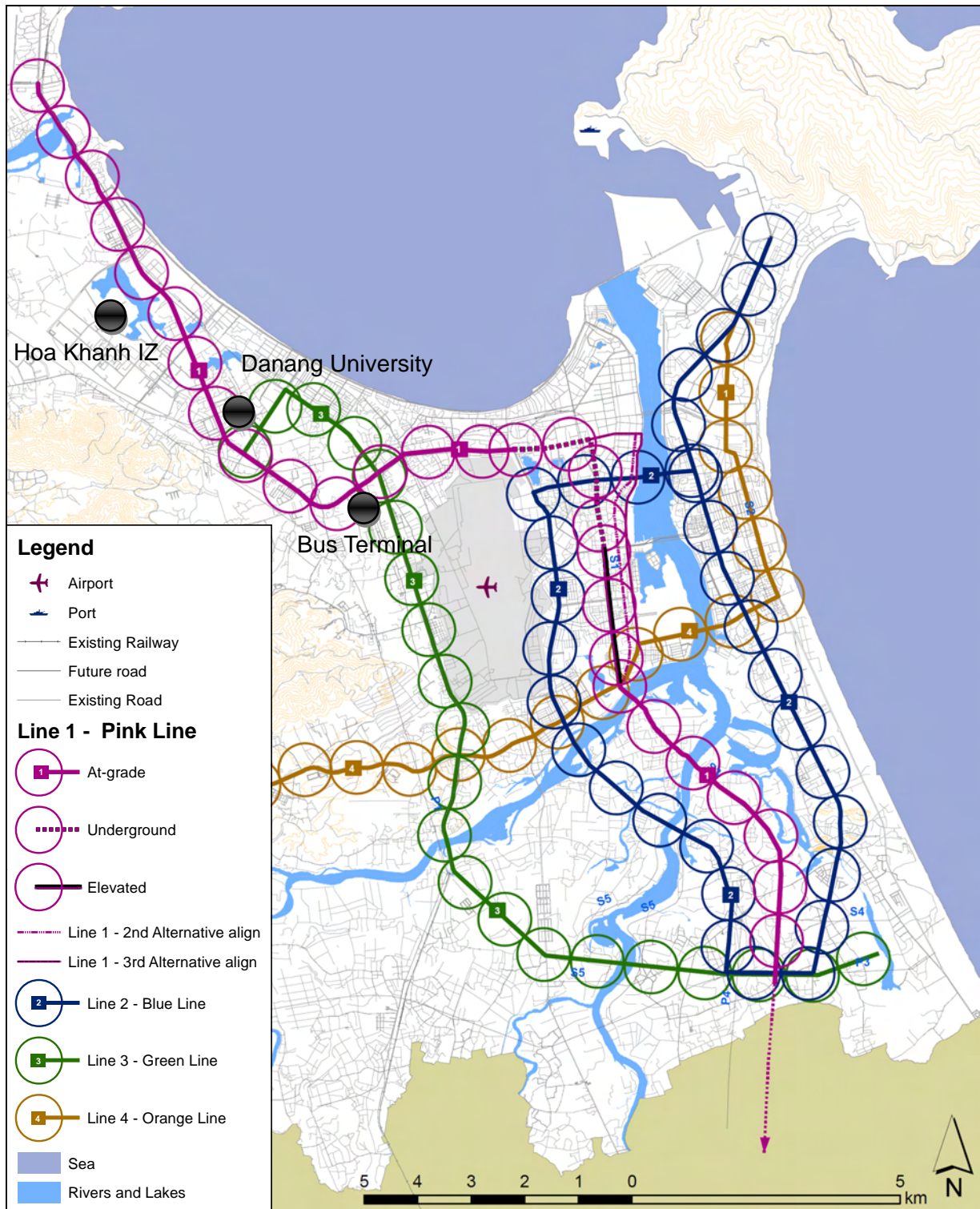
6.72 The UMRT line 1, Pink line, is defined along the current busiest traffic corridor connecting the northern and southern developing zones to the CBD of Danang (see Figure 6.6.3). Three other potential lines are identified as well (see Figure 6.6.3 and Table 6.6.1).

6.73 The development of UMRT services normally takes a long period (7 to 10 years), while the urbanization is rapidly growing and the density in the city centre will become quickly saturated, at which any interruption for development of transport infrastructure or mass transit line will be admitted by huge cost financially and economically. Therefore, an early start of having land acquisition and infrastructure availability for UMRT with light rail transit service is considered as the best solution to help the city avoid the heavy scarification or failure to achieve UMRT in the future. In addition, UMRT provides opportunities for effective urban expansion and redevelopment (see Figure 6.6.4).

6.74 The required clearances for the railway section are shown on Table 6.6.2. Accordingly, an underground railway would still require road widening or improvement if the supervening road has less than four lanes. Underground stations would also call for a widening of a 4-lane road, if the sidewalk is narrow. The elevated section would need space of about 3m for the pier of the viaducts. Thus, the underlying road may need to be widened to accommodate the pier on the center median and maintain its lane capacity. On the at-grade sections, the station can be located over the track or on both sides of the track, and connected by pedestrian decks.

6.75 Table 6.6.3 shows the proposed schedule for UMRT development, which has been discussed with city authorities. Feasibility study will be the first step for development.

Figure 6.6.3 Location of Proposed UMRT Projects

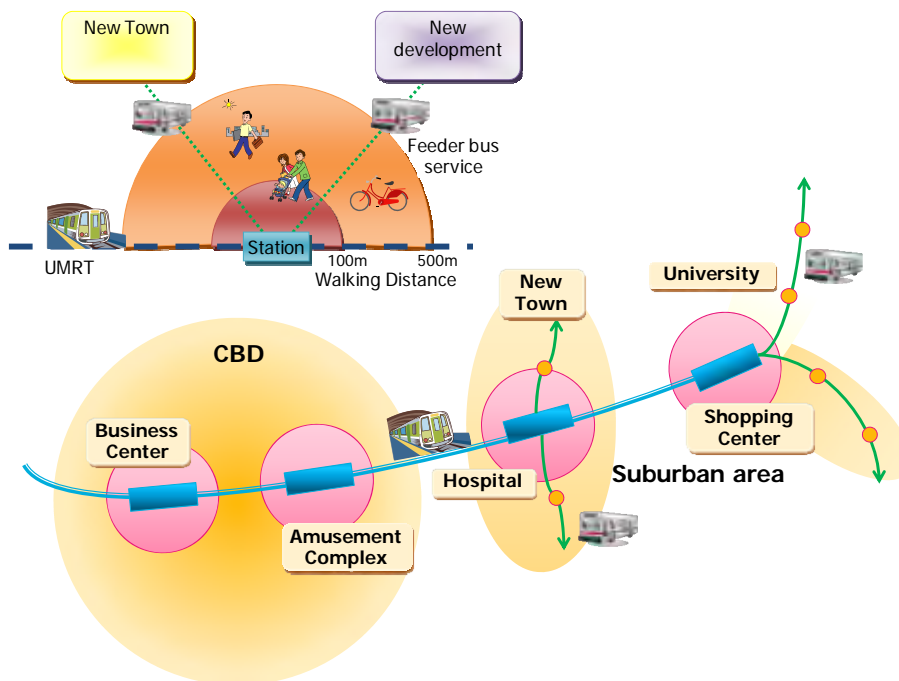


Source: DaCRISS Study Team.

Table 6.6.1 Details of Proposed UMRT Alignment

Line	System	Structure	Length	Alignment
Line 1	BRT LRT	At – grade	22-23 km	Nguyen Luong Bang – Dien Bien Phu – Hoang Dieu – Hoa Xuan
Line 2		Elevated	29 km	Ngo Quyen – Dragon Bridge – Nguyen Huu Tho – Ngu Hanh Son
Line 3		Underground	23 km	New Railway Station – Truong Chinh – Ngu Hanh Son
Line 4			16 km	Son Tra – Cach Mang Thang – Quoc Lo 14B

Figure 6.6.4 UMRT and Integrated Urban Development



Source: HAIMUD, 2010.

Picture 6.6.1 Urban Rails in Asian Cities



Bangkok



Singapore



Manila

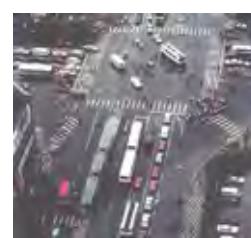
Picture 6.6.2 BRT in Other Cities



Curitiba



Jakarta



Kunming (exclusive lane)

Source: Taken by the Study Team









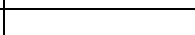



Table 6.6.2 Necessary Width of Land for Railway Structure

Structure	Necessary Width (m)	
	Track-way	Station
Elevated Section	9 m (Approach Section 11.0 m)	17 m (3.0 m platform width)
At-grade Section	9 m	15 m (3.0 m platform width)

Source: DaCRISS Study Team

Note: 1) Adding the space of construction to the width of structure.

Table 6.6.3 Proposed Roadmap for UMRT Development

		Short-Term (2010-13)	Med-Term (2014-20)	Long-Term (2020 <)
UMRT Corridor Traffic Management	F/S			
	Project Preparation			
	Implementation			
Public Transport Development	Bus			
	BRT			
	LRT			
Integrated Urban Development	Detailed planning			
	Investment guideline			
	Implementation			

F/S: Feasibility Study P/P: Project Preparation

6.7 Identified Projects / Actions

6.76 After the assessment of the projects proposed in the SEDP, the study team proposes the projects as shown in Table 6.7.1.

Table 6.7.1 Identified Projects / Actions

Project Group	Code	Projects / Action	Cost (mil. USD)	Fund Source ¹⁾	Type of Project ²⁾	Implementing Body ³⁾	Implementation Timing ⁴⁾	Proposed by ⁵⁾	Related Subsector
Establish interfaces with regional transport	Tr-1	Commuter Road (to expressway)	81.9	G	If	<u>6</u>	L	J	Sp
Upgrade the existing airport	Tr-2	Improve capacity of Danang Airport to 4 million passengers per year (upgrading of passenger terminal, freight terminal, runway 35R/17L (3500m*45m), construction of aircraft maintenance workshop, improvement of apron)	75.0	G	If	<u>6</u>	L	D	Sp, To
Upgrade the existing railway station	Tr-3	Develop new Danang Railway station by 2020 (45 ha)	100.7	G	If	<u>6</u>	L	D	Sp, To
	Tr-4	Improve Trans – Vietnam Railway and relocate the railway station to Minh Hoa – Hoa Phat near Phuoc Tuong Mountain foot	5.0	G	If	<u>6</u>	L	D	Sp, To
Upgrade bus services	Tr-5	Develop inter-provincial bus stations: Northern station in northern Bau Tram; southern station in Tu Cau Bridge (NH1A); south east station in Ngu Hanh Son district center; north east station in northern aquaculture service industrial park	3.0	G	If	<u>6</u>	L	D	Sp, En
	Tr-6	Urban Bus Expansion Project	52.0	PFI	If	<u>6</u>	M	D/J	So, Sp, En
Ensure better environment for non - motorized transport	Tr-7	Pedestrian Environment Improvement Project	5.0	G	Mg	<u>6</u>	L	J	Sp, En
	Tr-8	Bicycle Network Development Project	5.0	G	Mg	<u>6</u>	L	J	Sp, En
Attend global environmental issues	Tr-9	Promote traffic dust reduction projects	1.1	G	Mg	5, <u>6</u>	S	D	Lc, En
	Tr-10	Develop public transport (bus and rails) network development	19.3	G	If	5, <u>6</u>	S	D	So, Lc, En
	Tr-11	Promote the use of pure fuel and reduce polluted exhaust fumes	3.1	G	Mg	5, <u>6</u>	S	D	Lc, En, Ut
	Tr-12	Feasibility Study of UMRT Line 1	1.5	G	TA	<u>6</u>	L	B	Sp, En
Develop effective roads system in integration with landuse	Tr-13	A1 Main Roads in Lien Chieu New CBD	29.1	G	If	<u>6</u>	S	D	Sp
	Tr-14	A2 Main Roads in Lien Chieu New CBD	12.0	G	If	<u>6</u>	S	D	Sp
	Tr-15	P1 Danang Urban Bypass	119.4	G	If	<u>6</u>	L	D	Sp
	Tr-16	P2 University Avenue	40.8	G	If	<u>6</u>	L	D	Sp
	Tr-17	P3 University Avenue	9.2	G	If	<u>6</u>	M	D	Sp
	Tr-18	P4 North-South Highway	20.3	G	If	<u>6</u>	L	D	Sp
	Tr-19	P5 Access road of North-South Expressway – Bus terminal	22.8	G	If	<u>6</u>	L	D	Sp
	Tr-20	S1 North-South Highway 1	214.7	G	If	<u>6</u>	L	D	Sp
	Tr-21	S2 North-South Highway 1	38.9	G	If	<u>6</u>	S	D	Sp
	Tr-22	S3 North-South Highway Extension	36.6	G	If	<u>6</u>	M	D	Sp
	Tr-23	S4 Eastside Hoa Xuan – Ngu Hanh Son Road	7.6	G	If	<u>6</u>	M	D	Sp
	Tr-24	S5 Westside Hoa Chau – Hoa Xuan - Ngu Hanh Son Road	51.3	G	If	<u>6</u>	L	J	Sp
	Tr-25	Improvement of District Road No. 601	25.0	G	If	<u>6</u>	S	D	Sp
	Tr-26	Improvement of District Road No. 604	43.0	G	If	<u>6</u>	S	D	Sp

Project Group	Code	Projects / Action	Cost (mil. USD)	Fund Source ¹⁾	Type of Project ²⁾	Implementing Body ³⁾	Implementation Timing ⁴⁾	Proposed by ⁵⁾	Related Subsector
Strengthen traffic management system	Tr-27	Interchange Development Project	99.1	G	If	<u>6</u>	L	J	Ec, Sp
	Tr-28	Establish a driving license examination center in Hoa Cam	1.0	G	If	<u>6</u>	L	D	Ec, Sp, Hr
	Tr-29	Comprehensive Transportation Management in City Center and Main Corridors (Transportation Environment Improvement)	1.5	G	TA	<u>6</u>	S	B	Ec, Sp, Hr, Ca
Develop water transport services	Tr-30	Develop Lien Chieu Port to serve exportation – importation as well as transit cargos in the East – West Corridor	50.0	G	If	<u>6</u>	L	D	Sp
	Tr-31	Develop Tho Quang Port to accommodate vessels of less than 20,000 DWT as a replacement of Song Han Port	20.0	G	If	<u>6</u>	L	D	Sp
	Tr-32	Expand capacity of Tien Sa Port to 6 – 7 million tons and receipt of 60,000 DWT vessels	10.0	G	If	<u>6</u>	L	D	Sp
	Tr-33	Cruising Service Development Project	2.0	PFI	If	<u>6</u>	L	J	Sp, To
Transportation Development Subtotal	Government		1,153						
	Private		0						
	Private Finance Initiative		54						
	Total		1,207						

Source: DaCRISS Study Team

1) G=Government, PFI=Private Finance Initiative, P=Private

2) If=Infrastructure, Mg=Management, TA=Technical Assistance

3) 1=DPI, 2=DOF, 3=DOIT, 4=DOC, 5=DONRE, 6=DOT, 7=DOST, 8=DARD, 9=DOCST, 10=DOIA, 11=DOFA, 12=DOET, 13=DOH, 14=DOL, 15=DOJ, 16=DOIC, 17=DOI. The underlined number indicates the leading agency.

4) S=2010-2012, M=2013-2015, L=2015-2025

5) D=Danang City, J=JICA, O=Others

6) Ec=Economic Development, So= Social Development, En=Environmental Management, Sp=Spatial Development, Lc=Housing and Living Conditions, Tr=Transportation Development, Ut=Urban Infrastructure and Utilities, Hr=Human Resource Development, Mf=Municipal Finance Capacity Development and Management, Ca=Administrative Capacity Development and Management, To=Tourism Development