




The Study on Integrated Development Strategy for Danang City and Its Neighboring Area in the Socialist Republic of Vietnam (DaCRISS)

FINAL REPORT / Part IV

Danang City Development Master Plan



December 2010

ALMEC Corporation
International Development Center of Japan

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**JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
DANANG PEOPLE'S COMMITTEE**

**THE STUDY ON INTEGRATED DEVELOPMENT STRATEGY FOR
DANANG CITY AND ITS NEIGHBORING AREA IN
THE SOCIALIST REPUBLIC OF VIETNAM
(DACRISS)**

**FINAL REPORT
PART IV DANANG CITY DEVELOPMENT MASTER PLAN**

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**ALMEC CORPORATION
INTERNATIONAL DEVELOPMENT CENTER OF JAPAN**

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(average in 2008)

PREFACE

In response to the request from the Government of the Socialist Republic of Vietnam, the Government of Japan decided to conduct The Study on the Integrated Development Strategy for Danang City and Its Neighboring Area (DaCRISS) and entrusted the program to the Japan International cooperation Agency (JICA)

JICA dispatched a team to Vietnam between June 2008 and December 2010, which was headed by Mr. IWATA Shizuo of ALMEC Corporation and consisted of ALMEC Corporation and International Development Center of Japan.

In the cooperation with the Vietnamese Counterpart Team, the JICA Study Team conducted the study. It also held a series of discussions with the relevant officials of the Government of Vietnam. Upon returning to Japan, the Team duly finalized the study and delivered this report.

I hope that this report will contribute to the sustainable development of Danang City and its neighboring areas as well as Vietnam and to the enhancement of friendly relations between the two countries.

Finally, I wish to express my sincere appreciation to the officials of the Government of Vietnam for their close cooperation.

December 2010

KIYOFUMI KONISHI
Director General, Economic Infrastructure Department
Japan International Cooperation Agency

December 2010

KIYOFUMI KONISHI

Director General, Economic Infrastructure Department
Japan International Cooperation Agency
Tokyo

Subject: Letter of Transmittal

Dear Sir,

We are pleased to formally submit herewith the final report of The Study on the Integrated Development Strategy for Danang City and Its Neighboring Area (DaCRISS).

This report compiles the results of the study which was undertaken both in Vietnam and Japan from June 2008 to December 2010 by the Team comprising ALMEC Corporation and International Development Center of Japan.

In the course of the study we have conducted various surveys including the Household Interview Survey which targeted at 5,000 households in Danang City, to grasp the situation of the city from various aspects. By considering these results as well as existing policies, and through thorough discussions with the counterpart team, we have proposed “Danang to be an Internationally Competitive Environmental City Beyond being Pollution-free” as the vision statement for Danang City.

We owe a lot to many people for the accomplishment of this report. First, we would like to express our sincere appreciation and deep gratitude to all those who extended their extensive assistance and cooperation to the Team, in particular the People’s Committee of Danang City.

We also acknowledge the officials of your agency and the Embassy of Japan in Vietnam for their support and valuable advice in the course of the Study.

We hope the report would contribute to the sustainable development of Danang City and its neighboring areas as well as Vietnam.

Very truly yours,

IWATA Shizuo

Team Leader

The Study on the Integrated Development Strategy
for Danang City and Its Neighboring Area (DaCRISS)

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ABBREVIATIONS

3R	Reuse, Reduce, Recycle
AASHTO	American Association of State Highway and Transportation Officials
ADB	Asian Development Bank
AFD	Agence Française de Développement
AIDS	Acquired Immune Deficiency Syndrome
ALTID	Asian Land Transport Infrastructure Development
APEC	Asia-Pacific Economic Cooperation
API	Air Pollution Indices
ARD	Agriculture and Rural Development Department (

AS	Activated sludge
ASEAN	Association of Southeast Asian Nations
AUICK	Asian Urban Information Center of Kobe
AusAID	Australian Agency for International Development
BOD	Biological Oxygen Demand
BOO	Build-Own-Operate
BRT	Bus Rapid Transit
BSE	Bus Service Enterprise
CAD	Computer Aided Design or Computer Aided Drafting
CBD	Central Business District
CBO	Community Based Organization
CDM	Clean Development Mechanism
CDS	City Development Strategy
CEMDI	Center for Environmental Monitoring Data and Information
CEPT	Chemically Enhanced Primary Treatment
CER	Certified Emission Reductions
CFEZ	Central Focal Economic Zone
CG	Central Government
CIE	Capital Investment Expenditure
CMTT	Cach Mang Thang Tam.
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
COD	Chemical Oxygen Demand
COWASU	Thua Thien Hue Construction Company
CPCM	Certified Pollution Control Manager
CPU	Central Processing Unit
CS	Commune Survey
CSR	Corporate Social Responsibility
CZIM	coastal zone integrated management
DaCRISS	The Study on Integrated Development Strategy for Da Nang City and Its Neighboring Area in the Socialist Republic of Vietnam
DAIZICO	Danang Industrial Zones Infrastructure Development and Exploitation Company
DARD	Department of Agriculture and Rural Development
DOCST	Department of Culture, Sport, and Tourism
DEIAA	Department of Environmental Impact Assessment and Appraisal
DGN	Design
DHMC	Danang Housing Management Company
DIEPZA	Danang Industrial and Export Processing Zones Authority
DNICT	Danang Information–Communication Technology
DOC	Department of Construction
DOET	Department of Education and Training
DOF	Department of Finance
DOFA	Department of Foreign Affairs
DOH	Department of Health
DOIA	Department of Internal Affairs
DOIC	Department of Information and Communications
DOIT	Department of Industry and Trading
DOJ	Department of Justice

DOLISA	Department of Labor, Invalids and Social Welfare
DONRE	Department of Natural Resources and Environment
DOST	Department of Science and Technology
DOT	Department of Transport
DPC	Danang People's Committee
DPI	Department of Planning and Investment
DPTA	Danang Public Transport Authority
DSS	Decision Support System
DTCC	Danang Traffic Control Centre
DUT	Danang University of Technology
DVD-RW	Digital Versatile Disc - Rewriteable
DWRM	Department of Water Resources Management
DWSC	Da Nang Water Service Company
DWT	Dead Weight Tons
ECAFE	Economic Commission for Asia and the Far East
EFA	Environmental Flows Assessment
EIA	Environment Impact Assessment
ENTEC	Environment Technology Centre
ENVISAT	Environmental Satellite
EPA	Environmental Pollution Agency
EPC	Environment Protection Center
EPRC	Environmental Protection Research Centre
EPZ	Export Processing Zone
ESCO	Environmental Service Company
EU	European Union
EVN	Electricity of Vietnam
EWEC	East–West Economic Corridor
EZ	economic zone
FAO	Food Agriculture Organisation
FDI	Foreign Direct Investment
FEZ	Focal Economic Zone
FIA	Foreign Investment Agency
FS	Feasibility Study
FSCC	Flood and Storm Control Committee
GB	Gigabyte
GCS	Geographic Coordinate System
GDP	Gross Domestic Product
GEF	Global Environment Facility
GMS	Greater Mekong Sub-regional
GOJ	Government of Japan
GOV	Government of Vietnam
GPS	Global Positioning System
GRDP	Gross Regional Domestic Product
GRT	gross register tons
GSO	General Statistics Office
GSTC	Global Sustainability Tourism Criteria
GTZ	Gesellschaft für Technische Zusammenarbeit
GWh	Giga Watt hour
GWP	Global Water Partnership
GIS	Geographic Information System
GIS-IDEAS	Geo Informatics for Spatial-Infrastructure Development in Earth & Allied Sciences
HACCAP	Hazard Analysis and Critical Control Points

HAIDEP	The Comprehensive Urban Development Programme in Hanoi Capital City
HCMC	Ho Chi Minh City
HDD	Hard Disk Drive
HDQ	headquarter
HEPCO	Hokkaido Electric Power Company
HH	household
HIS	household interview survey
HIV	Human Immunodeficiency Virus
HMC	Housing Management Company
HOUTRANS	The Study on the Urban Transport Master Plan and Feasibility Study in HCM Metropolitan Area
HP	Hewlett-Packard
HPC	Hanoi People's Committee
HRD	Human Resource Development
HSBC	Hong Kong and Shanghai Banking Corporation.
HSR	High Speed Railway
ICAO	International Civil Aviation Organization
ICEM	International Centre for Environmental Management
ICM	Integrated Coastal Management
ICT	Information–Communication Technology
ICZM	Integrated Coastal Zone Management
ID	Identification
IDA	International Development Association
IEE	Initial Environmental Examination
IEMS	Integrated Environmental Monitoring System
IERR	Internal Economic Rate of Return
ILO	International Labour Organization
IMF	International Monetary Fund
IMO	International Maritime Organization
IMOLA	Integrated Management of Lagoon Activities
INBO	International Network of Basin Organizations
IT	information technology
IUCN	International Union for Conservation of Nature.
IWRA	International Water Resources Association
IWRM	Integrated Water Resources Management
IYB	Improve Your Business
IZ	industrial zone
JBIC	Japan Bank for International Cooperation
JETRO	Japan External Trade Organization
JICA	Japan International Cooperation Agency
JPY	Japanese Yen
KCN	industrial estate
KfW	Kreditanstalt für Wiederaufbau
Lao PDR	Lao People's Democratic Republic
LICCPP	Livelihood Improvement in Central Coastal Provinces Project
LIH	low-income housing
LIHAS	Low Income Housing Assessment Study
LoS	length of stay
LRT	Light Rail Transit
LUR	land-use rights
LURC	Land Use Right Certificates

LWR	Law on Water Resources
M/C	Motorcycle
MARD	Ministry of Agriculture and Rural Development
MASSCORP	Malaysian South-South Corporation
MB	megabyte
MICE	Meeting, Incentives, Conference and Exhibition
MIS	Management Information Systems
MLIT	Ministry of Land, Infrastructure, and Transport
MOA	Memorandum of Agreement
MOC	Ministry of Construction
MoCST	Ministry of Culture, Sports and Tourism
MOF	Ministry of Finance
MOI	Ministry of Industry
MONRE	Ministry of Natural Resources and Environment
MOST	Ministry of Science and Technology
MOT	Ministry of Transport
MP	Master Plan
MPA	Marine Protected Areas
MPI	Ministry of Planning and Investment
MRC	Mekong River Commission
MT	metric ton
NARBO	Network of River Basin Organization
NCEST	National Center for Environmental Science and Technology
NEDECO	Netherlands Engineering Consultants
NFEZ	North Focal Economic Zone
NIURP	National Institute for Urban and Rural Planning
NKEZ	Northern Key Economic Zone
NMT	non-motorized transportation
NO ₂	Nitrogen Oxide
NPV	Net Present value
N-S	North-South
NSHSR	North-South High-Speed Railway
NTSC	National Traffic Safety Committee
NWRS	National water resources strategies
NGO	Non Government Organizations
NH	National Highway
O&M	Operations and Maintenance
OD	Origin-Destination
ODA	Official Development Assistance
OECD	Organisation for Economic Cooperation and Development
PAD	Project Appraisal Document
PAR	Public Administration Reform
PC	People's Committee
PCC	Project Coordination Committee
PCD	Pollution Control Department
PCU	passenger car unit
PDF	Portable Document Format
PEMSEA	Partnerships in Environmental Management for the Seas of East Asia
PIIP	Priority Infrastructure Investment Program
PIT	Personal Income Tax

PMO	Project Management Office
PMU	Project Management Unit
PPA	Participatory Poverty Assessment
PPC	Provincial People's Committees
PPP	Public Private Partnership
PSPO	Pilot Study Project Office
PTA	Public Transport Authority
R&D	Research and Development
RBO	river basin organization
RDF	Refuse Derived Fuel
ROW	Right-of-way
SAGE	Schéma d'Aménagement et de Gestion des Eaux (Water Management Plan)
SAWACO	Saigon Water Corporation
SBR	Sequencing Batch Reactor
SCOTIA	Sustainable Coastal Tourism in Asia
SDS-SEA	Sustainable Development Strategy of the Seas of East Asia
SEA	Strategic Environmental Assessment
SEDP	Socio-Economic Development Plan
SFEZ	South Focal Economic Zone
SIDA	Swedish International Development Cooperation Agency
SKEZ	Southern Key Economic Zone
SME	small and medium-sized enterprise
SOC	State of the Coast
SOE	state-owned enterprise
SOHO	small office/home office
STRADA	System for Traffic Demand Analysis
SWOT	Strengths, Weaknesses, Opportunities, and Threats
SYB	Start Your Business
TCVN	Tieu Chuan Viet Nam
TCXDVN	Tiêu chuẩn xây dựng Việt Nam
TDM	Traffic Demand Management
TEDI	Transport Engineering Design Institute.
TEU	twenty-foot equivalent units
TF	Trickling Filter
TGCH	Tam Giang Cau Hai
TIN	Triangular Irregular Network
TLP	Tropical Low Pressure
UMRT	Urban Mass Rapid Transit
UN	United Nations
UNDP	United Nations Development Programme
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNFPA	United Nations Population Fund (formerly United Nations Fund for Population Activities).
UPI	Urban Planning Institute
URENCO	Urban Environmental Company
USA	United States of America
USB	Universal Serial Bus
USD	US Dollar
USP	Utility Service Programme

UTM	Universal Transverse Mercator
VAT	value added tax
VBSP	Vietnam Bank for Social Policy
VCCI	Vietnam Chamber of Commerce and Industry
VCEP	Vietnam-Canada Environment Program
VDR	Vietnam Development Report
VEA	Vietnam Environmental Agency
VEPA	Vietnam Environmental Protection Agency
VHLSS	Vietnam Household Living Standards Survey
VITRANET	Viet Nam Trade Network
VITRANSS 1	The Study on the National Transport Development Strategy in the Socialist Republic of Vietnam
VITRANSS2	The Comprehensive Study on the Sustainable Development of Transport System in Vietnam
VNAT	Vietnam National Administration of Tourism
VND	Vietnamese Dong
VNICZM	Viet Nam Netherlands Integrated Coastal Zone Management
VNRSC	Vietnam Remote Sensing Center
VPSSP	Vietnam Private Sector Support Programme
VRA	Vietnam Road Administration
WANI	Water and Nature Initiative
WB	World Bank
WDESP	Water Drainage and Environmental Sanitation Project
WGS	World Geodetic System
WHO	World Health Organization
WSP	Waste Stabilization Ponds
WTO	World Trade Organization
WWF	World Wildlife Fund
WWTP	Waste Water Treatment Plan

1 INTRODUCTION

1.1 Introduction

1.1 Based on the situation analysis performed in Part III, the Danang City Development Master Plan is formulated and presented in this part. The Master Plan targets year 2025, and the Implementation Plan targets 2015.

1.2 Grounding from findings in the situation analysis and current plans formulated by the city as well (namely the Socio Economic Development Plan, Construction Plan, Land Use Plan, and Environmental Plan), visions and strategies for the city are proposed for each subsector. In this course the Study Team puts emphasis on “sustainability” – “economic sustainability”, “social sustainability”, and “environmental sustainability”, as the core values. The key subsectors which are especially given attention are spatial development, transportation, urban utilities, and environment, and these subsectors are explained in detail through independent chapters in this part.

1.3 Consecutively, a consolidated plan is proposed, centering the target to promote Danang City as an “environmental city”. Candidate projects are evaluated comprehensively for prioritization and compliance with overall city development strategies, and short listed projects are put together along with its investment plans to formulate 20 comprehensive programs to realize the environmental city concept.

2 REVIEW OF EXISTING PLANS FOR DANANG CITY

2.1 Danang Socio-economic Development Plans

1) Socio-Economic Development Plan 2006–2010

2.1 The draft Socio-Economic Development Plan 2006–2010 or SEDP 2006–2010¹ for Danang City was prepared by the DPC and DPI with inputs from other departments. It includes an overview of Danang's economic situation, including opportunities and challenges, as well as objectives and targets for the plan period of 2006–2010. The city's "special attributes" identified in the SEDP which are expected to contribute to improved levels of economic growth include the city's premier administrative status, the region's major tourism attractions and facilities, and the emphasis being given to opening up the economy and markets.

2.2 However, the Plan recognizes that there are serious challenges that must be met. These include: (i) the present relatively low levels of economic development; (ii) an investment situation where demand is high but available funds are low; (iii) need to upgrade the city's urban management capacity; (iv) rapid urbanization wherein infrastructure provision cannot match demand; and (v) mounting environmental problems associated with rapid city expansion.

2.3 The general objectives for the period include the need to make Danang a: (i) center for industry, commerce, and tourism; (ii) transportation hub for the distribution of goods and services to national and international markets; (iii) center for telecommunications, banking, and finance; (iv) center for culture, sport, education, and training in the central region; and (vi) strategic location for defense and security for the region and nation.

2.4 Key targets highlighted in the Plan include: (i) promoting fast and achievable GDP growth; (ii) achieving GDP per capita of US\$2,000; (iii) achieving comprehensive urban development; (iv) promoting tourism as a leading sector in the economy by 2010; (v) achieving integration with the international economy; (vi) continuing financial reforms; (vii) developing new and expanded markets, including financial services and property; (viii) developing education and training, health, culture and communications; (ix) improving the City's "5 NO" program; (x) developing the city's "3 YES" program; and (xi) strengthening defense and security.

2.5 Key SEDP targets associated with achieving growth over the plan period of 2006-2010 are identified as follows: GDP of 14–15%; industrial output of 22–24%; services output of 12–13%; agriculture-fishery-forestry output of 5–6%; and export revenue of 23–25%. Total investment in the city is planned to double over the plan period to around VND 17,000 billion p.a. by 2010. The SEDP envisages the creation of an average 32,800 new jobs each year over the five-year period; however, as pointed out in the WB assessment, this projection is difficult to reconcile with the total SEDP estimated population growth over the period of around 62,600.

2.6 The draft Plan indicates that the trend towards modernization will see a slight increase by 2010 in the contribution to the GDP by the service sector (from 46.2% in 2005 to 47.7% by 2010), a generally stable share of the industry/construction sector (48.3% in

¹ The WB assessment is based on the draft SEDP published in May 2005. The SEDP was eventually approved on 28 December 2005.

2005 and 48.7% by 2010), and a reduction in the share of the agriculture/fisheries sector (from 5.5% in 2005 to 3.7% by 2010). Areas for development and improvement in each of these three key sectors are identified. In addition, the draft Plan identifies targets for specific activities, including targets for improved access to potable water, education and health facilities, among others.

2.7 The Plan also highlights factors that are expected to contribute to achieving the Plan's targets. These include: (i) applying advanced technology; (ii) achieving productivity increases; (iii) monitoring enterprise growth; (iv) providing encouragement to export growth and opening new markets; (v) developing telecommunications; (vi) expanding tourism; and (vii) developing major road links.

2.8 The SEDP identifies the need to continue pursuing administrative reform, including: (i) comprehensively reforming state management from city to ward level; (ii) strengthening urban management capability; and (iii) achieving improved procedures associated with attracting and implementing domestic and foreign investment. In particular, the attraction of additional foreign investment is sought through: (i) reform of investment procedures; (ii) expansion in investment counterparts; (iii) consistent identification of priority areas for investment; and (iv) improvement of foreign investment approval procedures.

2.9 The SEDP 2006–2010 places more emphasis on the development of the service sector, especially tourism, than the previous Plan. There is also more emphasis on the integration of infrastructure with urban spatial planning. And while the previous Plan focused on developing the industrial base to meet domestic and export markets, the new Plan also emphasizes the development of supporting industries and the promotion of modern technology to new industrial developments.

2.10 The DPI's approach to preparing the SEDP appears rigid and does not consider alternative future development scenarios and options. Furthermore, there seems to be little cross-referencing or integration between the SEDP and the existing urban master plan. In view of the fact that the prevailing general plan was prepared in 1999 by the National Institute of Urban and Regional Planning (NIURP) in Hanoi, this is perhaps not surprising but nevertheless points to a fundamental disconnect in the planning system. A previous WB mission² suggested that one approach for addressing these issues would be for the DPI to move towards a more flexible and realistic strategic planning approach, involving collaboration with other concerned departments and agencies such as the DOC and DONRE. This approach would assist in addressing problems of internal consistency as well as the lack of accurate data with good coverage. In addition to giving the SEDP more flexibility and potential application, this form of collaborative approach will assist in making detailed planning more responsive and realistic to demand. This approach would be based on and build upon the City Development Strategy (CDS) approach first introduced to the city through an ADB technical assistance project in 2002-2003.³

2) Socio-Economic Development Master Plan up to 2020

2.11 The DPI of Danang City drafted the "Report on Danang City Socio-Economic Development Master Plan up to 2020" (hereinafter referred to as SEDP 2020) in 2008. The City Assembly approved the Plan on 3 July 2008 and is now awaiting the final approval by the Prime Minister. After the appropriate procedure, it will be finally authorized for imple-

² Richard Dowall, April 2006.

³ ADB TA 6026-REG: Promoting Urban Poverty Reduction through Participation in the Cities Alliance.

mentation. The outline of the SEDP is shown in Table 2.1.1.

Table 2.1.1 Summary of the Danang Socio-economic Development Plans

Target	SEDP 2006–2010	SEDP 2010–2020
General Development Objective	<ul style="list-style-type: none"> • Become a satellite urban center playing an important role in CFEZ development in particular and national development in general. 	<ul style="list-style-type: none"> • Become one of the largest urban centers in Vietnam and the economic and social center of the central coastal regions.
Economic Development	<ul style="list-style-type: none"> • Achieve a GDP of 14–15% per year, wherein agriculture grows 5-6%, industry 22–23%, and services 14–15% with a corresponding production share of 3.2%, 48.8%, and 48%, respectively. • Increase export turnover at 23–24% per year. • Achieve a GDP per capita of USD 2,000 by 2010. 	<ul style="list-style-type: none"> • Achieve a GDP of 12–13% per year, wherein agriculture has a production share of 1.6%, industry 55.6%, and service 42.8%. • Increase export turnover at 19–20% per year; and • Achieve a GDP per capita of USD 4,050–5,000 by 2020.
Social Development	<ul style="list-style-type: none"> • Improve overall education and training capacity. • Establish vocational schools, software center, humanity and social science center. • Establish biology research center, and upgrade existing hospitals and construct new general hospitals. • Reduce poverty rate to 0.58% by 2010. • Create 10,500 new dwellings. 	<ul style="list-style-type: none"> • Further improve overall education and training capacity. • For 100% of communes and districts to meet the national standard for public healthcare. • Reduce malnutrition rate to 10–12% and reduce annual birth rate to 0.3%. • Reduce poverty rate to 0.5% and reach 60% of better-off households (no clear criteria).
Environment	<ul style="list-style-type: none"> • Improve water environment. • Treat wastewater from industrial parks to meet environment standards, etc. 	<ul style="list-style-type: none"> • Develop Danang City into an “Environment City” by 2020. • Provide 100% of urban population and 90% of rural population with access to clean water by 2015. • Collect and treat 100% of solid waste by 2015 and recycle over 95% of solid waste by 2020. • Collect and treat 100% of industrial and domestic wastewater by 2020.
Infrastructure Development	<ul style="list-style-type: none"> • Provide roads, airports, water supply and drainage systems, urban greenery. 	<ul style="list-style-type: none"> • Further provide roads, airports, water supply and drainage systems, urban greenery. • Connect 100% of suburban households to the power grid, etc.
Population	<ul style="list-style-type: none"> • Achieve an average population growth rate of 1.9%. • Achieve a total population of 859 million by 2010. • Generate employment: 32,800 pa (2006-2010) 	<ul style="list-style-type: none"> • Maintain a natural population growth rate of 1%. • Achieve a social growth rate (net migration) of 5%. • Achieve a total population of 1,078 million by 2015 and 1,369 million by 2020. • Keep the urban population rate at 92% by 2020. • Generate employment: 32,000-35,000 pa (2006–2010) 35,000-45,000 pa (2011–2020).

Source: Danang SEDPs

2.12 John Henshall and Nguyen Thi Thanh Hang⁴, both economists and town planners, reviewed this SEDP⁵ for the World Bank and commented as follows: “The Plan does not appear to provide sufficient coverage of how certain important issues in the Plan will be dealt with. There is reference to forecast growth in industry/ construction and in services, but there is no assessment of the important subsectors within these sectors where growth will be encouraged (P.21).”

2.13 In addition, they believe that some target indicators are set too high, especially economic indicators such as GDP growth rate for industry and the number of employment.

2.14 David Dowall⁶, an expert on urban economics and infrastructure policy, com-

⁴ Henshall, John and Nguyen Thi Thanh Hang. June 2005. Advisory Support in Review of Danang 5-Year Socio-economic Development Plan 2006-2010. Danang Priority Infrastructure Investment Project. World Bank.

⁵ The review was based on the draft SEDP prepared in 2006. Thus, the numbers may be different with 2008 SEDP.

⁶ Dowall, David E. 2006. A Note on Planning Issue in Danang. Photocopy. (Mr. Dowall, director of the Institute of Urban and Regional Development at the University of California, Berkeley, frequently consults for the World Bank, ADB, etc.)

mented that the SEDP provided too low a density for the peri-urban areas and emphasized the necessity of a proper development of these areas.

2.15 In addition to the above comments, this section also points out the following factors in the SEDP 2020.

- (a) **Economy:** It is rational to emphasize the importance of service sector development in the latter period of urban development. Clearly, its growth will exceed that of the industrial sector; but the forecast timing should be revised because as early as 2007 its GDP share (49%) was already higher than the industrial sector's (47%). The reason is not because of the high growth of the service sector but rather because of a slow-down in the industrial sector. Consequently, the targets for GDP growth for the industrial sector for 2010 and 2020 would seem highly difficult to achieve. On the other hand, the target for the service sector in terms of growth rate and the share seems relatively possible to achieve.
- (b) **Population:** Tables 2.1.4–5 in Chapter 2 illustrate the demographic status of Danang City. The natural growth rate can be kept to 1.0–1.2% for the long term, although it may increase during the five-year plan period due to an increase in fertile populations. Thus, the target natural growth rates set by the SEDP is relevant. On the other hand, the impact of migration should be reconsidered. Table 2.1.5 implies that Danang experiences a 0.7% increase every year due to immigration, which is significantly lower than that of the SEDP target. Attracting people from outside by providing employment opportunities will be the most important task for Danang.

2.2 Danang Master Plan (Construction Plan)

1) Background

2.16 In line with the prevailing national planning system in Vietnam and as provided by the Construction Law and supporting legislation, urban construction plans or master plans comprise a general plan for an urban area and detailed district as well as local plans. The “General Plan for Danang City 2000–2020” was prepared mainly by NIURP in Hanoi in 1999, and subsequently readjusted in 2003. A further readjustment of the Master Plan was proposed for 2007. In preparing the Master Plan, NIURP reportedly collaborated with concerned local agencies such as the DPI, DOC PMO, UPI, DONRE, and DOLISA.

2.17 The Master Plan incorporates the classical characteristics of a static “grand vision” for the city. It is based entirely on physical planning considerations with only limited reference to the social and economic provisions of the SEDP. The Master Plan demonstrates little awareness of the need for a more strategic and integrated planning approach which sets goals and objectives to achieve a vision for the city over time and which allows for modification of the plan as new issues and opportunities emerge.

2.18 The Construction Law makes only limited reference to land use. The main legal basis for land-use planning is in fact the Land Law. As a result, the Danang Master Plan incorporates only limited reference to existing or proposed land-use classifications, and gives no consistent or comprehensive detail of the type and density of land uses permitted. It is therefore an inadequate land management tool providing only minimal guidance to local agencies, such as the DOC/PMO and UPI, responsible for preparing detailed district plans and land-use zoning plans, and for exercising effective development control. There is clearly a need to update the existing and incomplete range of land-use categories applied to the preparation of master plans.

2) Proposed Population Distribution and Density

2.19 Data derived from the Danang Statistical Yearbook and Priority Infrastructure Investment Project (PIIP) documents indicate that the Master Plan incorporates a spatial distribution strategy that involves increasing gross population densities throughout the city from 6.1 persons/ha in 2005 to 9.6 persons/ha by 2020, representing a 57% increase. The strategy seeks to limit the buildup of population density in inner urban districts (Hai Chau and Thanh Khe) and to direct more than 80% of all future population growth to outlying districts and suburban areas (refer to Table 2.2.1). As a result, densities are projected to double in Lien Chien District, triple in Cam Le, and increase four times in Ngu Hanh Son. It is projected that even in outlying areas densities will increase by more than 50%.

2.20 The population densities proposed in the Master Plan for these outlying districts are extremely low by Asian standards: less than 60 persons/ha in all cases and as low as 3 persons/ha in suburban areas. Therefore, if implemented, this proposed spatial development strategy will have considerable implications in terms of the additional land area required (estimated at 20–30km²) for residential development, and the investment needed for site preparation and for extending infrastructure, roads, and public services to more remote low-density housing areas. It will also have a potentially adverse impact on traditional settlements and agricultural lands in peripheral areas of the city. In line with WB findings⁷, it is recommended that this strategy be reconsidered so as to exploit more fully

⁷ Danang Urban Planning Issues Report. World Bank. David E. Dowall. June 2006.

land as well as infrastructure and public service facilities already existing in inner urban areas.

Table 2.2.1 Danang City Population Distribution by District, 2005 and 2020¹

District	Area (km ²)	2005 Population		2020 Population		Population Increase (2005–2020)
		Total	Density (persons/ha)	Total	Density (persons/ha)	
1. Hai Chau and Thanh Khe	30.36	356,563	117.4	356,563	117.4	0
2. Son Tra	60.88	116,679	18.5	138,000	22.7	21,321
3. Ngu Hanh Son	36.52	51,915	13.8	201,469	55.2	149,554
4. Lien Chien	82.37	82,363	8.8	159,220	19.3	76,857
5. Cam Le	33.25	65,506	19.7	200,000	60.0	134,494
6. Other Suburban Areas	1008.75	107,997	1.5	244,748	2.3	136,751
Total/ Average	1,255.53	781,023	6.1	1,300,000	9.6	518,977

Sources: Danang Statistical Yearbook, 2004; PIIIP documents

¹ Assuming a population of 1.3 million by 2020.

3) Master Plan Resettlement Requirements

2.21 In the interim 6–7 years since the preparation of the Master Plan, Danang has continued to grow and expand at a rapid pace. Much of this urbanization has occurred outside the provisions of the Master Plan. The reasons for this include the following: (i) in the first instance, the Master Plan was prepared without any direct and continuous reference to local conditions and opinion and (ii) the Master Plan's land-use and zoning requirements coupled with lack of local enforcement capacity were inadequate to ensure conformity with the Plan's provisions. As a result, the current Master Plan (General Plan) bears little relevance to the present-day pattern of urban land-use development apparent in Danang.

2.22 However, one aspect of the Master Plan that has been fairly and rigorously followed and reinterpreted at the district plan level has been the main road and highway network. In most instances, it appears that this network, which provides the developmental framework for the city, is being rigidly implemented on the basis of national road and highway design standards, with only minimal consideration of cost, projected traffic volumes, and impact on existing development, much of which comprises low-income settlements. This approach has a number of serious long-term applications:

- (a) **Loss of Livelihood:** In addition to the social disruption caused by the implementation of the main road and highway construction program on the basis of excessive design standards, the program has resulted in the relocation and loss of livelihood for many households reliant on farming and fishing. Many of these households have been/or are scheduled to be resettled either in inappropriate urban areas (far from agricultural land or the sea), or in medium-rise apartment buildings.
- (b) **Inadequate Compensation:** Although compensation payments are made by Government to resettled households, these payments are generally inadequate in terms of the price these households have to pay for resettlement sites or apartments and/or the cost of new house construction. This situation is made worse by the loss of livelihood and the difficulty many households face in terms of accessing housing finance. As a result, there is deterioration in the quality of life of many resettled households. Many are forced into rental accommodation, thereby putting an additional administrative burden on the city.

(c) **Drain on Limited Resources:** Although some measure of resettlement is inevitable in any ongoing urban development program, the disproportionate amount of resettlement in Danang forms a major component of the ongoing housing program and a considerable drain on the city's limited capital resources. Danang's ongoing housing program should be focused on real—as opposed to artificially created—housing demand such as that generated through the replacement of obsolete public housing, the formation of new households, and the accommodation of urban migrants. The level of resettlement called for as a result of implementing the Master Plan's main highway/road construction program also appears in contravention of the provisions of the Central Government Poverty Reduction Strategy.

2.23 Although the cost of compensation payments compared to the price of resettlement sites clearly brings a net revenue benefit to Government, there is a need to explore alternative approaches which will minimize the adverse social and economic impact of resettlement, the front-end capital costs of resettlement site development, and the longer-term maintenance and repair costs of an excessive, and in many instances, underutilized main road network. The application of appropriate highway/road design standards commensurate with projected traffic volumes—possibly on an incrementally phased basis—coupled with more sensitive network alignments, would help reduce the need for resettlement and related land acquisition and development costs. Anticipating the low level of car ownership and application of appropriate road design standards in new development areas will also increase the proportion of available revenue-generating, marketable land, increase residential densities, and limit the need for extensive and costly urban sprawl.

2.24 Due to the fact that the main highway/road network incorporated in the Master Plan was designed largely without any consideration of present local conditions, the exact nature of disruption and relocation to be generated is hard to predict. Detailed resettlement requirements only begin to emerge when sections of the main highway/road network are set out on the ground as part of a defined project package. Each Project PMU responsible for civil works can then make a first hand assessment of the likely resettlement fallout on a case-by-case basis, and calculate the number and socio-economic structure of affected households. This information is then transmitted to the DOC which in turn makes the appropriate resettlement provisions. Given this ad-hoc approach, it is difficult to make any accurate forecast of resettlement requirements and incorporate these in any medium- to long-term housing program. This accounts for the scattered and fragmented location of resettlement sites throughout the city, and to some extent, the sometimes inappropriate resettlement accommodation in relation to the real needs of resettled households. It also accounts for the fact that the DOC PMO and UPI are continuously revising detailed plans to incorporate new resettlement sites.

4) Danang Land Redevelopment Strategy

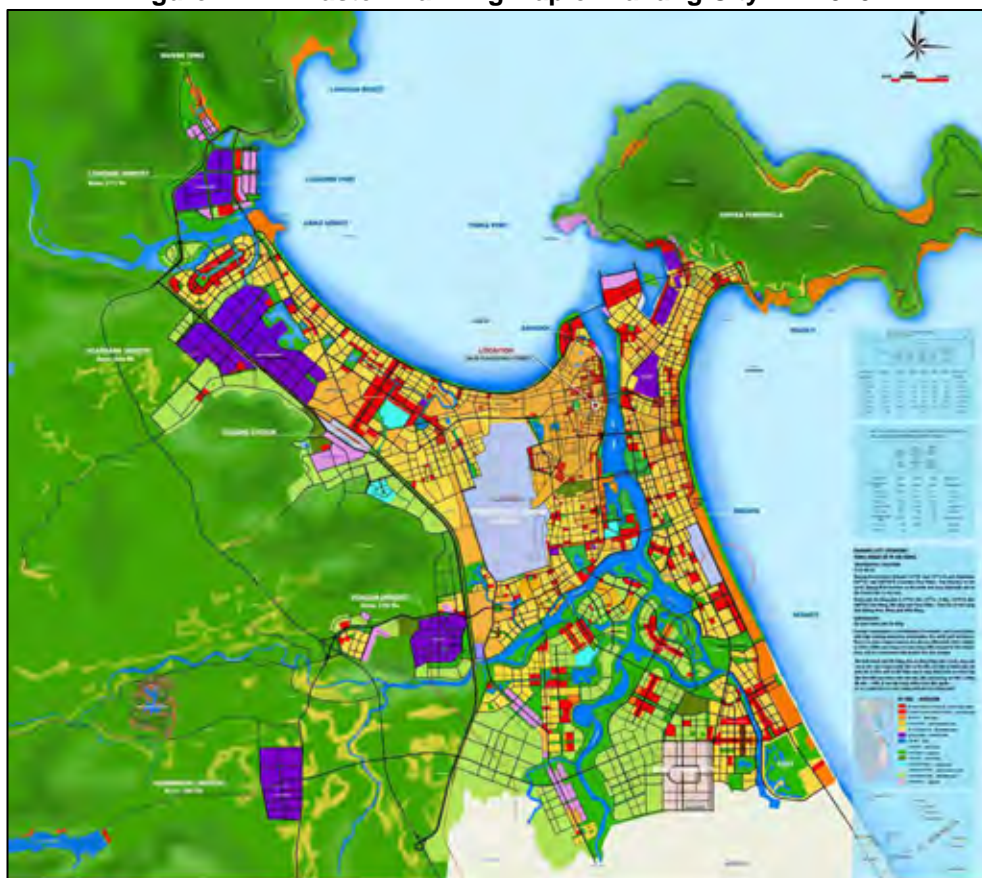
2.25 Danang City has reclaimed land from four major sources for urban use: the military, underused SOE land, agricultural land, and areas of poor, relatively low-density traditional housing. Once the land has been cleared and redeveloped through the provision of roads and public services, prime plots are sold for commercial development, while others are utilized for the resettlement of displaced households. According to the Vietnam Development Report (VDR, 2004), funds from the sale of commercial real estate are used to reinvest in infrastructure and urban upgrading.

2.26 The ability, in the first instance, to acquire underutilized land held by SOEs and the military is central to the Land Redevelopment Strategy. Although the Land Law provides for the return of unused SOE land to the State, the mechanisms for returning such land or the criteria for assessing which areas are not required are not defined. As a result, it is often difficult in practice to secure the return of such land.

2.27 In Danang, two factors have led to the successful return and utilization of land for urban development. First, as there is a lower demand for urban land than cities like Hanoi or HCMC, unsanctioned land is less entrenched and easier to secure. Second, the political power of the DPC has allowed them to secure the return of SOE (and unused military) land to government. Further analysis has also suggested that the administration's ability to mobilize public opinion combined with relatively transparent land redevelopment procedures⁸ have also been factors in the relative success of land recovery in Danang.

2.28 Given the fact that payment of compensation and the cost of developing resettlement sites inevitably diminish the amount of revenue gained from land redevelopment, there is a strong institutional incentive to control the use of land in existing residential areas. The relatively low demand for housing in Danang compared to that in other major cities, to some extent, also facilitates this process, notwithstanding the fact that development control guidelines, mechanisms, and capacity are generally lacking. Another key difference between the urban development strategy in Danang and that in other cities is that the DPC has not generally involved the private sector in land development.

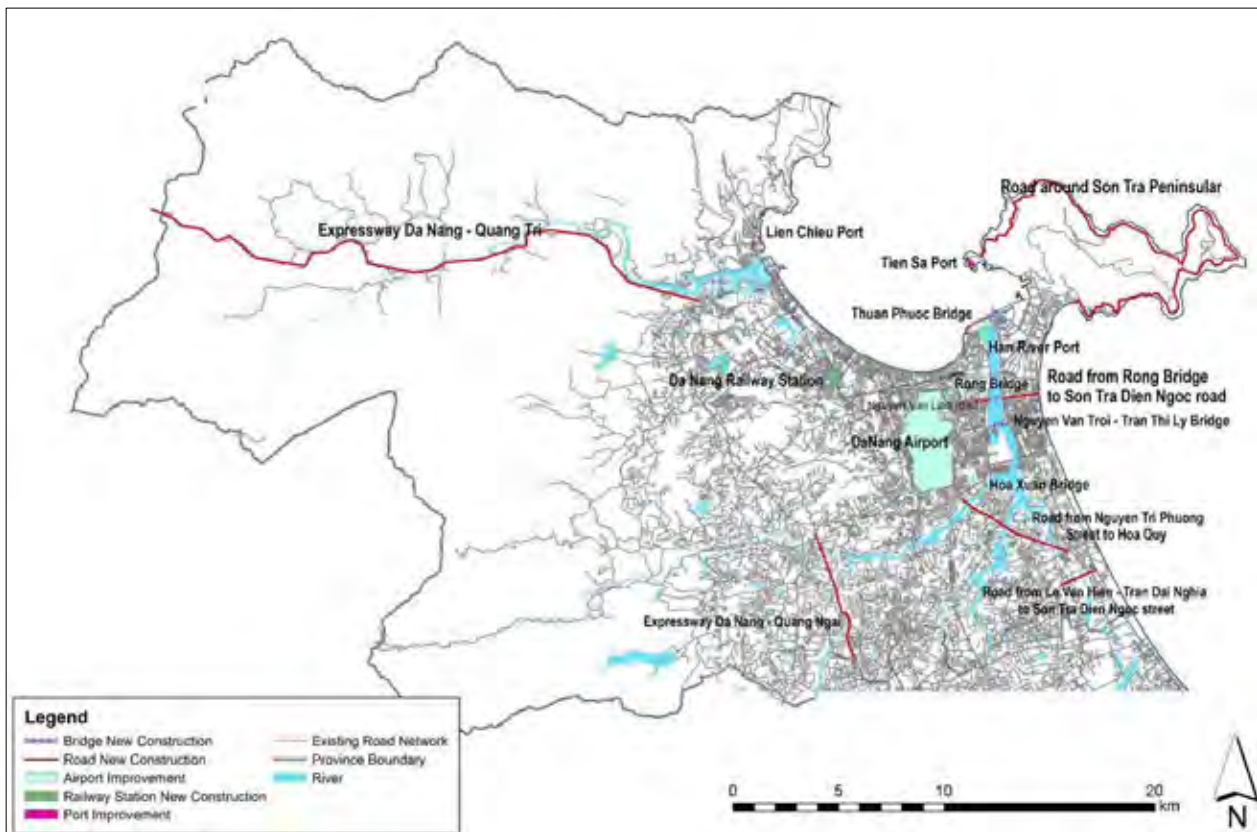
Figure 2.2.1 Master Planning Map of Danang City Till 2020



Source: Department of Construction, Danang.

⁸ For example, well-staffed resettlement boards and Provincial People's Committees (PPCs) have open-door days every week (World Bank 2004).

Figure 2.2.2 Transportation Projects Included in the Construction Plan



Source: Danang Construction Plan.

2.3 Danang Land Use Plan 2006–2010

2.29 DONRE has prepared a draft of the “Da Nang Land Use Plan 2006–2010.” This Plan revises the preceding Danang land-use plans for the 1997–2010 and 2004–2010 periods. It focuses on the supply of urban land to meet the city’s development needs. Specifically, it provides for the conversion of some agricultural and unused land.

2.30 The Plan sets the development orientation of the city toward the south, west, northwest, and southeast. In addition, satellite urban centers are to be developed in sub-urban areas.

2.31 The Plan also prioritizes land development by category. During the course of industrialization and urbanization, the conversion of agricultural land, especially paddy fields, is to be restricted to ensure food security and create rural jobs. Industrial land use should be based on the development of industrial parks to use land effectively and efficiently. Existing forests are to be protected, while barren hills and land should be reforested so as to raise forest coverage to 64.77% by 2010. Based on the projection made by the SEDP 2006–2010, the land-use plan estimates urban residential land to increase by 833.65ha to cover a total of 4,023 ha.

2.32 The Plan prepares two development options. Option 1 prioritizes land for industry, construction, and service. It establishes trade, tourism, and relaxation centers in appropriate places. Option 2 adds land fund for industry, trade, tourism, and infrastructure and promotes the development of high-density residential areas. Option 1 requires more non-agricultural land and less agricultural land than Option 2. Finally, the Plan recommends Option 1 from the viewpoints of economic efficiency, urban land availability, and industrial location.

2.33 The volume of land-use changes is planned as shown in Table 2.3.1. In addition, the Plan calculates the future area requirement of each project.

2.34 Considering the land-use classification in use, the Plan seems to have little interest or concern for the urban residential area. In addition, the plan has no map presentation or land-use summary by administrative boundary, making it difficult to imagine future land uses.

Table 2.3.1 Outline of the Land-use Plan 2006–2010

Land Use ¹	2005		By 2010	
	Ha	%	ha	%
1. Agricultural Land (nnp)	70,492	56.1	69,952	55.7
a. Cultivation ((sxn)	9,236	7.4	7,934	6.3
• Annual Trees (chn)	7,605	6.05	6,652	5.29
– Rice (lua)	5,277	4.2	4,548	3.6
– Others (hnc)	2,329	1.9	2,104	1.7
• Perennial trees (cln)	1,630	1.3	1,282	1.0
b. Forestry (lnp)	60,990	48.5	61,637	49.1
• Production (rsx)	31,150	24.8	31,617	25.2
• Prevention (rph)	12,849	10.2	13,029	10.4
• Special (rdd)	16,991	13.5	16,991	13.5
c. Aquaculture (nts)	196	0.2	311	0.3
d. Others (nkh)	71	0.1	71	0.1
2. Non-Agricultural Land (pnn)	48,204	38.4	53,749	42.8
a. Residential (otc)	5,561	4.4	7,261	5.8
• Rural (ont)	2,372	1.9	3,238	2.6
• Urban (odt)	3,189	2.5	4,023	3.2
b. Specialized (cdg)	7,960	6.3	12,110	9.6
• Administrative Offices/Agencies (cts)	172	0.1	176	0.1
• Security / National Defense (cqa)	2,540	2.0	2,518	2.0
– National Defense (QPH)	2,500	2.0	2,479	2.0
– Security (ANI)	39	0.0	39	0.0
• Production (csk)	1,802	1.4	4,435	3.5
– Industrial Parks (skk)	939	0.8	2,481	2.0
– Business Units (skc)	620	0.5	1,646	1.3
– Mining (sks)	188	0.2	204	0.2
– Construction Materials, Ceramics (skx)	55	0.0	105	0.1
• Public Land (ccc)	3,446	2.7	4,980	4.0
– Transportation (dgt)	2,163	1.7	3,361	2.7
– Irrigation (dtl)	406	0.3	406	0.3
– Utility (DNT)	21	0.0	24	0.0
– Cultural Facilities (DVH)	247	0.2	291	0.2
– Health Care Facilities (DYT)	41	0.0	64	0.1
– Education/Training Facilities (DGD)	287	0.2	409	0.3
– Sport Complexes/Facilities (DTT)	85	0.1	212	0.2
– Marketplaces (DCH)	38	0.0	42	0.0
– Heritage (LDT)	36	0.0	36	0.0
– Dump Sites, Disposal Zones (RAC)	123	0.1	134	0.1
c. Religious Facilities (ttn)	108	0.1	108	0.1
d. Cemeteries (ntd)	785	0.6	600	0.5
e. Water Bodies (smn)	3,289	2.6	3,170	2.5
f. Others (pnk)	30,500	24.3	30,500	24.3
3. Unused Land (csd)	6,958	5.5	1,953	1.6
a. Plain Land (bcs)	2,107	1.7	126	0.1
b. Hilly Land (dcs)	4,572	3.6	1,548	1.2
c. Bare Rocky Land (ncs)	279	0.2	279	0.2
Total	125,654	100.0	125,654	100.0

Source: Land Use Plan 2006–2010, DONRE

¹ Letters in parentheses are codes.

2.4 Environmental Plan

1) Implications of the Environmental Plan in the Formal Planning System

2.35 “Environmental City – Danang” was formulated to be an environmental city, urban environment, similar to Vienna, while also pursuing sustainable development and improving people’s living standard. Basic concepts behind the Plan are: (i) sustainable development; (ii) ecological city; and (iii) environment city, targeting a city with no pollution and environmental degradation and where the people harmonize with the nature. Generally, the environmental quality of Danang City in the last 10 years has seen positive change and improvement. However, rapid urbanization and expansion of industrial estates are seen to become the sources of environmental degradation and their adverse impacts are predicted to worsen.

2.36 The three elements of water, air, and soil are the main planning issues. The water quality of rivers and lakes has shown a high rate of pollution in some areas and above standard level in many other locations. Rivers, especially in the southern area of the city, are vulnerable to salt contamination in the dry season. The discharge of untreated domestic and industrial wastewater and careless disposal of garbage by residents along the rivers are two other reasons for river and lake water contamination. As a result, the coastal waters of Danang Bay, especially in some areas close to domestic water discharge sites in Thanh Binh ward, are polluted. Groundwater in many areas, such as Hoa Khanh, Ngu Hanh Son, and Cam Le, is vulnerable to local pollution. In addition, groundwater in Danang City is highly contaminated by bio-organisms. The same is true for areas along rivers, which are prone to flooding.

2.37 Dust pollution levels are high in densely trafficked locations, and CO pollution is also observed occasionally. In addition, air pollution has been a serious problem in areas surrounding industrial estates because emissions from factories are not properly treated. Noise and vibration, on the other hand, are the most significant concerns in residential areas.

2.38 Soil pollution is mostly associated with water pollution, e.g. agricultural land in Hoa Hiep is affected because of untreated wastewater from nearby industrial estates, and the land near Khanh Son dumpsite is contaminated by leaking wastewater.

2.39 As Figure 2.4.1 shows, most targets indicated in the Environmental City Plan are in sync with SEDP targets, but less with those in the Construction Plan. One of the reasons for this is that the SEDP and the Environmental Plan were formulated in 2008, but the Construction Plan was formulated much earlier in 2002. Except for solid waste and forest biodiversity protection, almost all measures in the Environmental City Plan aim to control or mitigate current environment pollutants. However, it does not offer concrete measures to manage future development activities such as the development of new industrial and residential estates, fishery service zones, and tourism. For example, while the SEDP addresses the development of eco-village tourism sites and traditional craft villages, the latter currently a source of water and air pollution, the SEDP is not clear on how the construction of more resort facilities along My Khe beach and adjoining areas should be managed. These projects are expected to generate more untreated wastewater discharge unless a proper sewage treatment system is designed before these investments are carried out.

Figure 2.4.1 Comparison among SEDPs, Construction Plan, and Environmental City Plan

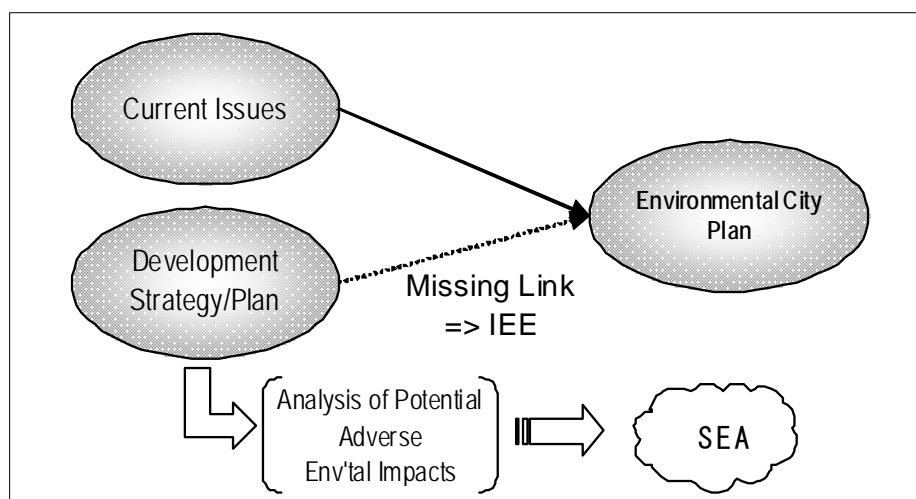
SEDP	Construction Plan	Environmental City Plan
w1 Improve overall water quality.		w2 Alleviate water pollution in residential compounds by 2010.
w2 Alleviate water pollution in residential compounds.		w3 Alleviate pollution of coastal waters and estuaries by 2010.
w3 Alleviate pollution of coastal waters.		w5 Complete water supply system for urban districts by 2010.
w4 Alleviate water pollution from manufacturing factories, especially from steel, cement and fish processing plants.		
w5 Complete water supply system for urban core areas.		
w6 Provide 100% of urban and 90% of rural population with access to clean water by 2015.		
ww1 Install wastewater treatment plants to meet environment standards.	ww1 Gradually separate drainage and sewerage systems which are combined at present.	ww1 Treat wastewater in industrial parks to meet Vietnam's environment standards by 2010.
ww2 Collect and treat 100% of industrial and domestic wastewater by 2020.	ww1 Collect domestic wastewater through a separate sewerage system and into treatment plants before discharging into rivers.	ww2 Treat 90% of wastewater from industrial estates to meet environment standards by 2015.
	ww1 Treat industrial & hospital wastewater at discharge sources to meet environment standards before discharging into the sewerage system.	ww2 Collect and hygienically treat 90% of domestic wastewater from urban districts by 2015.
		ww2 Collect and treat 100% of industrial and domestic wastewater by 2020.
		New Recycle 25% of water by 2020.
sw1 Collect and treat domestic and hazardous wastes.	New Develop a solid waste plant and develop Hoa Quy landfill to serve the areas east of the Han River.	sw1 Collect and treat domestic and hazardous wastes and make waste collection and treatment services affordable by 2010.
sw2 Segregate solid waste at sources.		sw2 Segregate solid waste at sources for the whole city level by 2010.
sw3 Collect and treat hygienically 100% of solid waste by 2015.		sw3 Finalize the development of hazardous-waste collection and treatment system, including hospital solid waste treatment plants.
sw4 Recycle over 95% of solid waste by 2020.		sw4 Recycle 70% of solid waste by 2020.
so1 Reduce soil pollution.		so1 Reduce soil pollution by 2010.
gr1 Develop urban green space at 9?10m ² per capita by 2020.	gr1 Develop urban greenery at 12?15m ² per capita.	gr1 Expand urban greenery at 3?4m ² per capita by 2015.
	New Develop a green belt and community park along the Han River and along the beaches.	New Protect biodiversity of city's forests and forest plantations to aim for a 50.6% forest coverage by 2015.
Oth Develop Danang City as an "Environmental City" by 2020.		Oth Reduce air pollution index to less than 100 by 2015.
Oth Encourage residents to use fuel-efficient and environment-friendly vehicles.		

Source: SEDP: Report on Da Nang City Socio-Economic Development Master Plan up to 2020, Da Nang People Committee, July 2008.
 Construction Plan: Summary of General Planning Orientations for Technical Infrastructure Development in Da Nang City up to 2020, 2002.
 Environmental City Plan: The Project for Da Nang Environment City Development, Da Nang People Committee, August 2008.

Note: w = water supply and surface water, ww – wastewater, sw = solid waste, so = soil, gr = greenery and oth = others

2.40 The Environmental Protection Law clearly requires all regional, city, and district master plans should prepare strategic environmental assessments (SEAs). Through the process of preparing SEAs, the initial environmental examination (IEE) could give some inputs to revise or continuously update the Environmental City Plan to incorporate probable environmentally adverse impacts and those mitigation or prevention measures, as conceptually illustrated in Figure 2.4.2. Thus, the SEA process needs to be officially incorporated into the preparation and implementation of the Plan.

Figure 2.4.2 Current Planning Process



Source: DaCRISS Study Team

2) Goals of the Plan

2.41 The goals for Danang City addressed by the existing plan are clear and pertinent, and are shared by DaCRISS. The plan's goals are fourfold, as follows, with the fifth goal proposed by DaCRISS:

- 1) To create a trademark—an environmental city for Danang—and to provide a safe and healthy environment for citizens, investors, as well as domestic and foreign tourists;
- 2) To prevent and reduce pollution or degradation of the environment in residential areas, industrial zones and the coast; to ensure good quality of water, soil and air; to treat industrial wastewater and toxic waste;
- 3) To strengthen capacity for environmental protection and management;
- 4) To raise public awareness of environmental protection and to translate this awareness into actions in the people's daily life; and,
- 5) To formulate a pioneering model of environmental management in Vietnam.

2.42 However, the goals presented above cannot be achieved merely by satisfying minimum environmental standards stated in existing regulations; rather, there is a need to introduce innovative environmental concepts and models, particularly on curbing pollution, and applying them successfully.

3) Environmental Targets

2.43 The Plan envisages quantitative targets in several parameters/indicators in the three (3) categories of air, water, and soil which should be achieved by the target year of 2020, as shown in Table 2.4.1. Unfortunately, the current levels are not definitely indicated due to the lack of reliable measurement systems and technical guidelines; therefore, it is impossible to compare the reality with the target. Identification of gaps between both is important, because it will indicate the magnitude of effort needed to be made by the city government, the public, and the business sector. Therefore, there is an urgent need to first install monitoring equipment and facilities, before applying internationally accepted measurement guidelines to determine quantitative indicators for the city. Thereafter, there is a need to train environmental measurers at the relevant government agencies, universities, and research institutes/laboratories. As a professional consulting field, an official qualification system for Certified Environmental Measurers is recommended for introduction in

the city. Although this qualification system should be undertaken at the national level based on international standards, the model test may be undertaken first in Danang.

2.44 There is another crucial argument related to setting quantitative targets. While the national government has adopted environmental standards and the World Health Organization (WHO) provides referable targets for these standards, the WHO levels are not quite applicable to all counties, nor are the Vietnam national standards necessarily appropriate for all cities. With its policy of becoming an “environmental city,” Danang City may indicate unique environmental targets, which are distinct from those of Ho Chi Minh or Hanoi, in the city’s ordinances. In this sense, it is recommended that such targets be reviewed and refined further in light of such a special policy.

Table 2.4.1 Target Environmental Indicators by 2020

	Indicator	Existing, 2005	Target, 2020
Air Quality	1. Air Pollution Index (API)	-	AP I: < 100 To be measured by automatic stations (from 2012)
	2. Noise		
	• Residential Area ¹⁾	76	< 60 dB(A)
	• Street ²⁾	74	< 75 dB (A)
	3. Factories with Air Pollution Control	-	> 90%
	4. Per-capita Urban Greenery	2 m ²	> 6–8 m ²
Water Quality	5. Households Accessible to Clean Water		
	• Urban District	57%	> 95%
	• Rural	41%	> 70%
	6. Qualified Water Quality Sources: rivers, coastal, lakes, and underground	-	100%
	7. Treated Urban Domestic Waste Water	-	> 50%
	8. Qualified Industrial Waste Water	-	100%
Soil Quality	9. Domestic Solid Waste Collection	86%	> 90%
	10. Re-use of Industrial Solid Waste	-	> 70% Not discharge toxic & hazardous wastes

Source: Danang Environment City Development, August 2008

¹⁾ Average of “Nguyen Trai Secondary School” and “Trung Vuong Theatre” monitoring points, original data from National Environmental Monitoring Program (2008)

²⁾ Average of “South Hai Van Mountain” and “Hue Cross-road” monitoring points, original data from National Environmental Monitoring Program (2008)

4) Time Frame and Major Activities

2.45 The three-phased time frame has been delineated for the implementation of the Plan, that is, Period 1: 2008–2010; Period 2: 2011–2015; and Period 3: 2016–2020. Focal measures and actions are summarized in Table 2.4.3. Some concrete projects are described in this Plan, and all these are incorporated into the environmental management plan for DaCRISS.

2.46 The time frame may need to be amended based on an assessment of the performance and achievement of the actions listed for Period 1: 2008–2010. And while these actions are urgent, actual implementation may be different. Taking into account the heavier environmental load associated with increasing populations and economic activities, the target levels, as shown in Table 8.3.2, are assessed to be quite high and would require that considerable resources, from both public and private investments, be concentrated on the environmental sector to implement such actions. In addition to funds, the implementability of actions is another vital issue to be discussed.

Table 2.4.2 Targets toward Becoming an Environmental City

No.	Criterion	Status, 2005	Target, 2020
Air Quality			
1	Air Pollution Indices (API)	Not available	API < 100 (measured by automatic and consecutive are monitoring system)
2	Noise levels in: - Residential areas - Roadsides of main roads	Not available	< 60 dB(A) < 75 dB(A)
3	Coverage of smoke and dust control area	Not available	> 90 %
4	Green coverage in inner city	2 m ² /resident	> 6-8 m ² /resident
Water Quality			
5	Percentage of people using clean water: - in the inner city - rural areas	57.4% 4.1%	> 95% > 70%
6	Compliance rate of water quality at the source for the central supplied drinking water	98.5%	> 96%
7	Treatment rate of urban domestic wastewater	Not available	> 50%
8	Compliance rate of industrial wastewater discharge	Not available	100%
Soil (Solid Waste Management)			
9	Rate of collecting domestic solid waste	86%	> 90%
10	Reuse rate of Industrial solid waste	Not available	> 70%, and not discharge of dangerous industrial waste

Source: The Plan for "developing Danang-the Environmental City, Oct., 2008

Notes: > more than; < less than

Table 2.4.3 Focal Measures and Actions in the Plan for Danang – an Environmental City

	Period 1: 2008–2010	Period 2: 2011–2015	Period 3: 2015–2020
Objectives	<ul style="list-style-type: none"> to solve urgent environmental problems 	<ul style="list-style-type: none"> To focus on resolving urgent environmental issues towards 2015 	<ul style="list-style-type: none"> To complete all projects during 2008-2015, and to ensure all criteria set for the Environmental City
Water	<ul style="list-style-type: none"> Complete treatment in problem areas such as Khanh Phuc, Thuan Phuc, Thanh Khe Ohu Wards; Prevent onshore water pollution at Thanh Binh and My Khe beaches; Build wastewater treatment systems in industrial zones such as Hao Khanh, Lieu Chieu and Tho Quang Sea-food. 	<ul style="list-style-type: none"> Ensure 90% of urban and 70% of rural residents to get access to clean water Ensure 90% of wastewater treatment form industrial parks and EPZs; Ensure 90% of residential grey water treatment; Control sources of toxic water (surveying toxic waste quantity and sources) 	<ul style="list-style-type: none"> Ensure 100% treatment of industrial and residential wastewater Recycle 25% of treated water
Air	<ul style="list-style-type: none"> Resolve air pollution in factories of metal industry, cement, seafood processing; Reduce transport dust; and Plant trees. 	<ul style="list-style-type: none"> Ensure the pollution index of less than 100 (PM10, PM2.2, O3, SO2; CO meets the standards) Accelerate reforestation to increase cover to 50.6% of the total forest area. Increase green areas in inner city with 3-4 m²/resident. 	-
Soil (SWM)	<ul style="list-style-type: none"> Collect all hazardous waste; Privatized the entire SWM, including collection, transfer & treatment; Promote source-segregation activities; Increase solid waste recycling rate to 30% 	<ul style="list-style-type: none"> Construct a system to collect and treat toxic and hospital waste Pursue a PPP funding for SWM Increase solid waste recycling rate to 50% 	<ul style="list-style-type: none"> Increase solid waste recycling rate to 70%

Source: The Plan for "Developing Danang-the Environmental City, Oct., 2008, arranged by DaCRISS Study Team

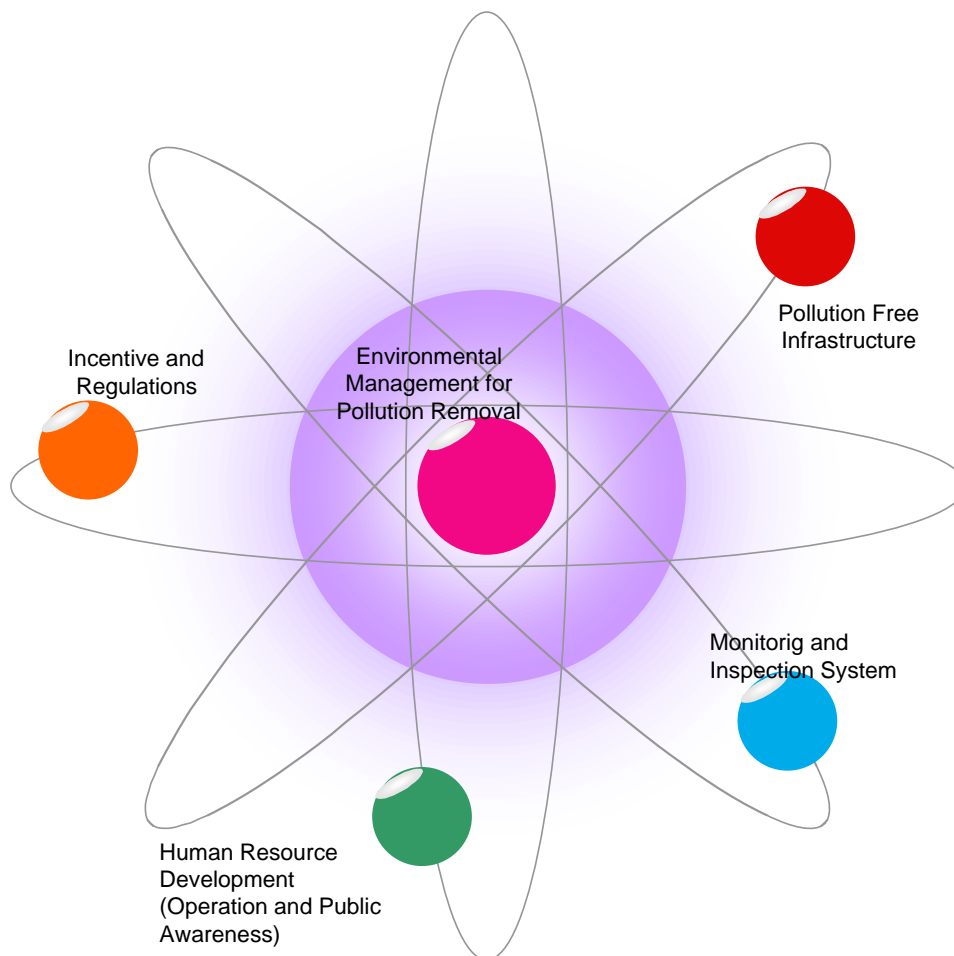
2.47 Meanwhile, as for time frame, the DaCRISS sets different milestones, i.e., the year 2015 as the short-term target and 2025 as the long-term target years. Therefore, the milestones of the environmental management plan has been changed: Period 1 (2008–2010) and Period 2 (2011–2015) have been merged into one planning term, i.e., short-term period (2009–2015). In 2010, almost at the end of Period 1, the prospects for im-

plementation are still not sure. There are projects waiting for either formulation or funds to improve water, air, and soil sectors. These are the development of wastewater treatment facilities in industrial zones, collection of hazardous waste, promotion of source segregation, resolution of air pollution in factories and others, the implementation of which will be accelerated.

5) Coverage of Issues on Environmental Management

2.48 A holistic approach should be employed to discuss the entire scheme of environmental management with an implication on identifying the stakeholders and their responsibilities. The existing plan covers the three elements of water, air and soil (solid waste management), but such an elements-based approach cannot cover all issues, because integration is likely to be needed. Therefore, this elements-based approach may be reinforced by an activities-based approach, or a behavioral planning approach, as shown in the following sections. For example, if the removal of a pollution hotspot becomes a major challenge, different approaches will be integrated in order to achieve the objective. These approaches might include human resource development, adoption of appropriate technology or infrastructure, provision of incentives and regulations, or the establishment of monitoring and inspection systems. This holistic approach is shown in Figure 2.4.3.

Figure 2.4.3 Holistic Approach in Eliminating Pollution



2.49 In DaCRISS, the environmental sector is dealt with using a cross-cutting approach, whereby environment is widely discussed in each subsector.

6) Characteristics of the Plan

2.50 “Environment” is a word which has a wide meaning and has changed in accordance with the times. In Japan, environmental problems initially referred to pollution problems caused by industries. Then the concepts of nature conservation, waste management, and energy efficiency were added. Currently, climate change and global warming are the hot issues. The plan for Danang to become an environmental city focuses on removing environmental hotspots, taking into account current levels of pollution and capacities for improvement. It is worth to start with hotspot removal as an entry point for environment management. As measures for this are implemented and the people’s awareness increases, other environmental aspects can be pursued

7) Projects/Programs and Demarcation of Financial Requirements

2.51 A total of 41 projects and programs have been identified in the Plan to improve air, water, and soil conditions up to 2020, and these are divided in a phased manner, i.e., Stage I (2008–2010) covers projects and programs with the highest priority; Stage II (2011–2015) consists of those needed to achieve the minimum targets; and Stage III (2006–2020) comprises those that will complete all targets. This phasing should be appropriate if Stage I projects (refer to Table 2.4.4) are implemented successfully. Hence, all projects and programs planned for Stage II should be reviewed based on Stage 1 results and redesigned, if needed.

2.52 The total cost for all planned projects and programs was estimated at about VND 6,057.7 billion, or US\$378 million. For this huge amount of needed investment, the following cost-sharing arrangement is proposed:

(a) Central Budget:	VND 316.5 bill.	(US\$ 19.8 mill.)	5.2%
(b) City Budget:	VND 952.0 bill.	(US\$ 59.5 mill.)	15.7%
(c) ODA Loans:	VND 2,316.6 bill.	(US\$ 144.8 mill.)	38.2%
(d) Others:	VND 2,472.6 bill.	(US\$ 154.5 mill.)	40.8%

2.53 The share of the government, both at the central and city level, is planned to be 21% of the total requirement. External money through ODA loans is expected to reach approximately US\$145 million. The most important is the 40% share of “Others”, referring to contributions from the private sector, communities, and/or charges paid by polluters or project beneficiaries. This share is key to making the Plan implementable and feasible. To this end, the Plan proposes the establishment of an “Environmental Protection Fund.” As this proposal is considered to have the right orientation, a more detailed and practical scheme on fund management should be explored.

Table 2.4.4 Phase I Priority Projects, 2008–2010

Task/Project		Chair Agency	Coordinating Agency	Cost (Mill. VND)	Duration
Air Environment	1. Plan and build an automated meteorological network for air quality monitoring	DONRE	Local administration and agencies	20,000	2008–2012
	2. Promote use of pure fuel (ie gas or alcohol) and reduce polluting exhaust emissions from mobile and fixed sources <ul style="list-style-type: none"> • Mobile sources: Develop new types of vehicles using pure fuel; build stations providing pure fuel. • Fixed source: Facilitate use of pure fuels (eg natural gas, gasified coal and solar energy) by enterprises; implement ISO 14001. 	DONRE	DOT, ROST, DPI	42,000	2008–2010
	3. Develop public greeneries	DOC	DONRE, ARD, DO, District PC	10,000	2008–2010
Water Environment	4. Operate and manage Rong Pond's environmental protection program	Hai Chau District PC	DOT, DOC, DONRE, ARD	10,000	2008–2010
	5. Operate and manage Bau Tram's environmental protection program	Lien Chieu District PC	DOT, DOC, DONRE, ARD	5,000	2008–2010
	6. Plan and build automatic water quality monitoring system	DONRE	DPC, District PC, DOC	15,000	2008–2010
	7. Build central wastewater treatment system in industrial zones (IZs): Lien Chieu, Hoa Khanh Expansion	Infrastructure development company- IZ-DN	DOF, DONRE, DOC, PMU of IZs & IPZs	40,000	2008–2009
	8. Carry out additional garbage leakage treatment project at the new Khanh Son dump site	SG-DN Investment JSC	DOF, DONRE, DOC, PMU of IZs & IPZs	20,000	2008–2010
	9. Build central wastewater treatment system at Danang IZ	DONRE	DOC, Lien Chieu District PC	7,000	2008–2009
	10. Improve Phu Loc River's environment (PIIP-Da Nang City)	Masda Venture Company	DOF, DONRE, DOC, PMU of IZs & IPZs	9,000	2008–2009
	11. Develop eco-tourism, establish ecological village models, and expand them	DOT	DONRE, Districts OC	132,931	2008–2010
Total				310,931	

Source: Danang Environment City Development, August 2008

2.54 In this regard, a public-private partnership (PPP) mechanism for environmental projects needs to be deliberately pursued. In order words, without the broad and positive involvement of the private sector in any form of PPP, any project would not be successfully carried out and the anticipated benefits would not be achieved, simply because environmental improvement inherently requires collective effort and involvement of all segments of stakeholders. Hence, guidelines to develop a PPP mechanism should be institutionalized within the environmental sector.

8) Program Implementation

2.55 The Plan provides eight measures which are all well-thought out, integrated, and appropriate, and therefore expected to be implemented as planned. These are the following:

- (i) Promote public awareness of and duties with regard to environmental protection
- (i) Strengthen the urban environment management system, establishing:
 - An environmental management team at district level (assigning 2–3 staff with this mandate);
 - Organization of a community groups in cooperation with women's and youth unions, etc.; and

- Establishment of an Environmental Police Department under the City Police.
- (ii) Establish a mechanism to realize the vision of an “Environment City,” in compliance with a legal document system and enforcement measures
- (iii) Encourage public involvement through:
 - Standardization of “green-clean-beautiful” communes, eco-families and movements, and
 - Establishment of an official system for awarding and recognizing good practices.
- (iv) Develop human resources by organizing a team of experts to provide scientific advice on environmental measures
- (v) Mobilize funds for the implementation of measures, through:
 - Strategic appropriation of central and local government budgets;
 - Introduction of PPP schemes;
 - Appeal for ODA funds on wastewater treatment, solid waste management, noise and air pollution mitigation; and
 - Establishment of an environmental protection fund.
- (vi) Balance environmental protection with socio-economic development through:
 - Conduct of SEAs;
 - Preparation of an environmental management plan (EMP); and
 - Establishment of long-term and annual financial arrangements.
- (vii) Strengthen periodic inspection and monitoring of the program’s/plan’s implementation and share responsibilities among related city departments.

2.56 Out of the eight measures above, several are further explained, as follows:

- (a) **Establishment of an Environmental Police Department:** Including this measure in the city policy is essential to strengthen the enforcement of environmental laws and regulations. The public should be made to aware that disobedience of laws and regulations is a public offense and is punishable. This measure, which should be concomitant with the legal system, will boost the implementation of the fifth measure below;
- (b) **Organization of a Team of Experts:** As one of the crucial HRD projects, this is expected to be undertaken as soon as practical and should be supported by universities and other academic institutes in Danang as well as by potential donors;
- (c) **Fund Mobilization:** In the budgeting process, strategic appropriation of government budget should be ensured. The government must provide the ‘startup capital’; otherwise, ODA and private funds will not be mobilized;
- (d) **Strategic Environmental Assessment:** This is to be carried out occasionally in the course of the JICA study to facilitate a participatory planning approach. It has been confirmed so far through public consultations on SEA that the concept of a and policy for an “Environmental City-Danang” is widely supported by the majority of citizens and the private sector;
- (e) **Environmental Inspection of Industries:** This should be officially conducted by environmental agencies with a legal mandate, preferably the Environmental Police, once it is established. At the same time, an official monitoring system should be urgently established together with the organization of an expert team.

9) Organization for Plan Implementation

2.57 As the policy for an environmental city was already publicly announced and this development orientation is widely supported by the public, the government of Danang City should put in place an organization which will implement the Plan. A Steering Committee is proposed to be established to assure interdepartmental coordination among relevant authorities. It will be chaired by the DPC Chairman with the Director of DONRE as deputy. The members will come from the DPI, DOF, DPC Office, and other relevant agencies. The tasks of the Steering Committee are to:

- (i) Coordinate budget and implementation with relevant agencies;
- (ii) Propose the promulgation of legal documents;
- (iii) Propose/approve functions, tasks, and organizational structure of projects; and
- (iv) Report timely to the DPC issues beyond the mandate of DONRE.

2.58 The tasks of the DPI and DOF are extremely important, because they will appraise projects, elevate financial issues to the DPC, and mobilize fund sources in coordination with DONRE. The DCST, Danang Radio and TV, Danang Newspaper will be responsible for enhancing public awareness. The Plan also proposes to launch an “Environment City Program” which will be broadcast daily at 17:00–19:00hrs and published in the weekly newspaper in Danang.

2.59 Besides, it should be noted that the mobilization of academic knowledge and human resources is essential to enable Danang City to become the most reputable environmental knowledge center in Vietnam. The Danang University of Technology (Danang University) should proactively collaborate with the city in terms of establishing expert teams and/or environmental inspection teams. Special financing arrangements for such research collaboration and human resource exchange need to be made by the city.

2.5 Plans Undertaken by Various Donors

1) Danang Priority Infrastructure Investment Project (World Bank)

- (a) **Study Scope:** The project is a multi – sectoral project including 4 key components as follows: (i) infrastructure for poverty alleviation, (ii) infrastructure for environmental improvement, (iii) roads, (iv) capacity strengthening. The total investment cost is 218 million USD, 152 million USD of World Bank Fund and 66 million USD as the counterpart capital of the Vietnam Government.
- (b) **Study Objective:** The main objectives of the project are the following:
- (i) Urban poverty alleviation through upgrading of technical infrastructure, environmental condition and improvement in living condition of the urban poor;
 - (ii) Improvement of environmental condition in polluted areas relating to waste water, sewerage issues;
 - (iii) Enhancement of economic growth through investment in development of strategic infrastructure, implementation of improvements and technical assistance to create an attractive investment climate;
 - (iv) Gradual adaptation to urban development planning;
 - (v) Socialization in process of planning, programming and implementing investment in urban infrastructure upgrading through participatory technical solutions, human resources and fund contribution;
 - (vi) Promotion in participatory project preparation, implementation and management in order to satisfactorily meet people's demand;
 - (vii) Provision of support to institution and enhancement in management capacity to City's administration authorities.
- (c) **Relation to DaCRISS:** The sectors within the scope of the project mainly related to DaCRISS are road construction and waste water treatment. DaCRISS has worked closely with the World Bank Team for coherence between both projects.

2) Feasibility Study for Improvement of Public Transport in Danang City (KfW)

- (a) **Study Scope:** The project is aimed to create all components of Public Transport. The main components are: (i) Public Transport Authority (PTA)., (ii) bus infrastructure, (iii) bus vehicles, (iv) maintenance of buses, (v) ticketing system, (vi) information system, and (vii) training. The total investment cost is 300,000 EURO.
- (b) **Study Objective:** The main objectives of the project are the following:
- (i) Set up of a public transport system in order to reduce individual traffic;
 - (ii) Reduction of emissions and improvements in traffic safety;
 - (iii) Poverty alleviation;
 - (iv) Jobs and market access for small business and farmers;
 - (v) Gender equality;
 - (vi) Improvement of social justice by facilitating participation in urban life; and
 - (vii) Access to culture and education, contributing to sustainable city development.
- (c) **Relation to DaCRISS:** The sector within the scope of the project mainly related to DaCRISS is public transportation. DaCRISS has worked closely with the KfW Team for coherence between both projects.

3) Developing Danang – The Environment City (GTZ)

2.60 Study Scope: The project is aimed to support Danang on public transportation and environmental management. The 2 main components of the project; “Establishment of public transport management system in Danang City (Component 1)” and “Development and implementation of general strategy for urban environment (Component 2)”. The total investment cost is 1,650,000 EUR, 1,500,000 EUR of GTZ Fund and 150,000 EUR as the counterpart capital of the Vietnam Government.

2.61 Study Objective: The main objectives of the project are the following:

- (i) Increase transport market share by clean, safe, environmentally friendly public transport vehicles; gradually reduce travelling demand by private means, reduce traffic jams; support low income people and labors in approaching state-of-the art and economic transport means (Component 1);
- (ii) Ensure public transport by bus playing the main role in urban transport, gradually invest to develop high-capability urban transport system which has lower effects on ecological environment, along with a suitable development (Component 1);
- (iii) Develop urban infrastructure comprehensively and completely, meet the standards of national urban level 1 in terms of public works, make the city “clear, green, clean, beautiful, clearance and spaciousness of roads and pavements” and sustainable development (Component 1);
- (iv) Enhance the capacity of Danang City to organize the implementation of active program concerning to urban environment (Component 2).

2.62 Relation to DaCRISS: The sectors within the scope of the project mainly related to DaCRISS are public transportation and environment. DaCRISS will work closely with the KfW Team for coherence between both projects.

3 VISION AND GOALS

3.1 Opinions of Stakeholders

3.1 Through the DaCRISS Household Interview Survey, which covered a total of 5,000 households and their members, the opinions of the citizens about the government's vision of becoming an "Environmental City" and its main development themes were gathered. The results indicate that the government's vision matches the people's thoughts and desires. The people even went further as to expect an environmental city to be more extensive in its coverage rather than simply being a city free from pollution (see Table 3.1.1). The people's opinions are summarized as follows:

- (i) They strongly expect the city to be environmentally rich and to function as a competitive growth center in the country, like Hanoi and Ho Chi Minh City, based on stronger economic sectors including tourism, diverse services, high-tech industries, and education;
- (ii) They believe the city should give importance to health, cleanliness, social harmony, equality, as well as solidarity of communes and families. The need to preserve the culture and natural environment is also emphasized; and
- (iii) They believe that international integration should be strengthened through such ways as developing the east–west gateway corridor.

3.2 The opinions of managers, owners, and officers of 312 establishments about an environmental city were also gathered through a questionnaire survey. These establishments are engaged in different activities and are located in Danang City (see Table 3.1.2). Survey results show that:

- (i) Sixty-seven percent (67%) of the respondents knew the city's policy on developing an environmental city, while 33% said no. About 91% of them agreed ("strong yes"/"yes") to the concept;
- (ii) As to their ideas and images of an environmental city, the respondents gave importance to: less air and water pollution, clean and good sanitary conditions, preservation of important ecosystems, protection against natural disasters, elimination of traffic congestion, as well as provision of easy access to services and good landscape;
- (iii) Environmental priorities varied by economic sector. The primary sector gave importance to people's consciousness about the environment, while the secondary and tertiary sectors highlighted the need to ensure environmental quality. Safety, people's health, as well as prevention of environmental pollution and degradation, were also considered important across sectors; and
- (iv) Almost all enterprises expressed their willingness to participate and contribute to promoting Danang as an environmental city by way of: funds (41%), manpower (35%), and knowledge/technology (20%), and others (2%).

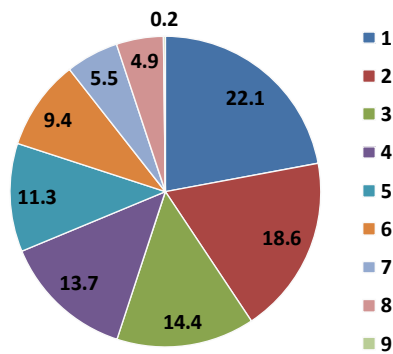
3.3 Through the questionnaire survey of enterprises, their willingness to participate and their mode of participation were obtained, to wit (see Table 3.1.3):

- (i) Ninety-seven percent (97%) of the surveyed enterprises were willing to participate in promoting Danang as an environmental city;
- (ii) The enterprises would participate through monetary contribution (41%), manpower contribution (35%), and transfer of knowledge or technology (20%); and

(iii) The recognition of the importance of being an environmental city is highest in the primary sector covering agriculture, fishery, and mining.

3.4 While it is clear that the people, enterprises across all sectors, and city authorities accept the “Environmental City” concept, there is a need to further elaborate the concept by formulating strategies, plans, and concrete mechanisms for implementation.

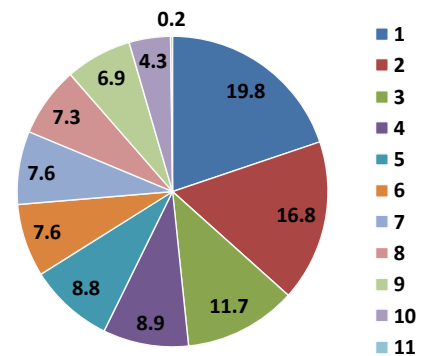
Figure 3.1.1 People’s Opinion on the City Vision (%)



- 1: Environmentally rich city supported by services and tourism
- 2: Growth center in central VN which can compete with Hanoi and HCMC
- 3: Center for culture, arts, and tourism
- 4: Industrial and manufacturing city exporting cheap goods to the world
- 5: Modern tourist city offering outdoor activities and entertainment
- 6: Center for hi-tech industry and education
- 7: Gateway to the east-west Greater Mekong Subregion corridor
- 8: Center for processing natural resources from the central region
- 9: Other

Source: DaCRISS HIS, 2008.

Figure 3.1.2 People’s Opinion on Key Themes for Development of the City (%)



- 1: Health and cleanliness
- 2: Strong communities and families
- 3: Social harmony and equality
- 4: Futuristic and high-tech industry
- 5: Commerce and business
- 6: International and outward-looking
- 7: Fun and entertainment
- 8: Nature and natural environment
- 9: Culture, history, and the arts
- 10: Order and careful control
- 11: Other

Source: DaCRISS HIS, 2008.

Figure 3.1.3 Ideas & Images for the Environmental City (%)

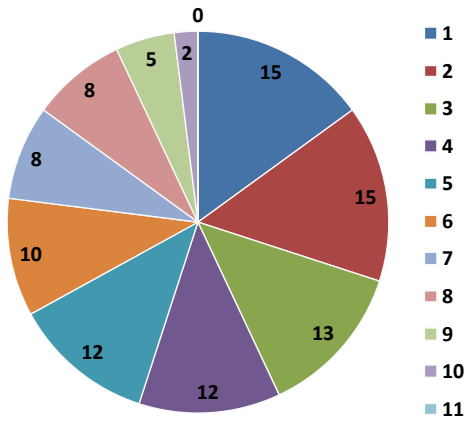
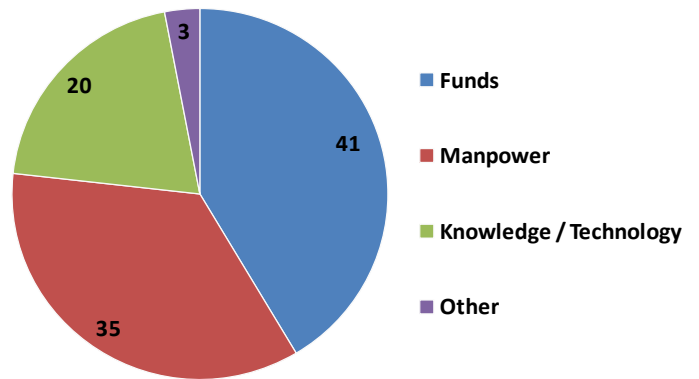


Figure 3.1.4 Type of Participation and Contribution (%)

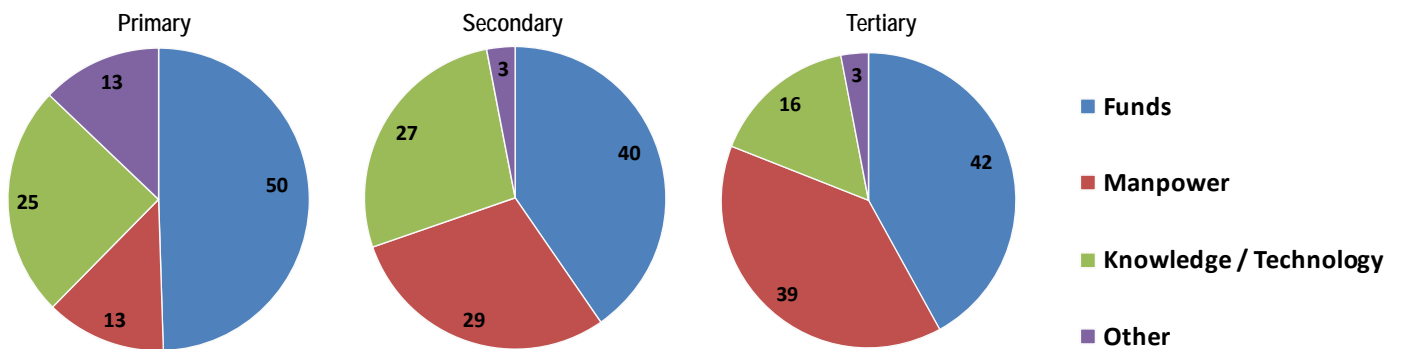


Source: DaCRISS HIS, 2008.

1. Less air and water pollution
2. Clean with good sanitary conditions.
3. Preserved important ecosystem
4. Protected against natural disasters
5. No traffic congestion; destinations easy to reach
6. Improved landscape
7. Preserved traditional values and culture
8. Energy-efficient
9. No crimes and drug problems
10. No poor people
11. Other

Source: DaCRISS HIS, 2008.

Figure 3.1.5 Type of Participation and Contribution by Industrial Sector (%)



Source: DaCRISS HIS, 2008.

3.2 Vision

3.5 Since the suggested vision for CFEZ is to become an “eco-tech region” which promotes economic development, ecological balance, and harmonious coexistence of different ethnic groups based on the maximum use of technology, it is expected that Danang City, being the region’s center, should take the lead in realizing such vision. Hence, the vision for Danang City, which is for it to become an “environment city” has been further elaborated as follows:

**Danang to be an Internationally Competitive Environmental City
beyond being Pollution-free**

3.6 The above vision for Danang City, which is fully supported by the stakeholders of the city, connotes the following ideas and intentions:

- (i) For Danang City to become not only free from pollution but also to ensure broader environmental sustainability by preserving ecosystems and cultural assets; protecting itself from natural and manmade calamities; responding to global climate change calls; shifting the economic structure to new technology-based environmental businesses and industries, tourism, education, health care and services; and promoting an environment-friendly urban system;
- (ii) For Danang City to develop a distinct identity and an appealing image as a significant urban core in the Asia-Pacific region with a key role of connecting CFEZ with the world; and
- (iii) For Danang City to become a national center for developing new industries which the country must promote in the 21st century such as new technology-based environmental industries, health care businesses, and human resource development for ecotourism, MICE, environmental protection, disaster management, and support services.

3.7 In order to promote the Environmental City concept, the city government would need the unequivocal and strong support of the people and various enterprises to prepare the elaborate mechanisms needed to effectively involve all sectors of society in the entire development process.

3.8 Based on the above-stated vision, it can be assumed that the city will have the following characteristics:

- (i) Free from air, water, and soil pollution;
- (ii) Ecosystems and cultures are preserved;
- (iii) Green businesses take the lead in economic growth;
- (iv) People’s awareness of the environment is high;
- (v) Socioeconomic activities impose a small load on the environment; and
- (vi) People and investments are protected against natural and man-made disasters.

3.9 In summary, Danang intends to create a strong identity and an appealing image as a truly environmental city, generating the following outcomes:

- (i) Safety and security are ensured;
- (ii) Ecological stability is realized;
- (iii) Urban amenities are improved;

- (iv) Poverty is reduced and a strong economy is promoted;
- (v) Cultural values are preserved; and,
- (vi) People's hospitality is enhanced.

3.10 In order to achieve the vision for the city, a set of goals is further elaborated, as follows:

- (a) **Manage Growth Effectively:** The city's future growth in terms of size and quality must be managed effectively. Target population is set at 2.1 million by 2026. The urban area will be compact and designed to minimize pollution and maximize safety, convenience, and amenity through a much more integrated development of land use and urban form, transportation, and environment. Growth management must consider a possible future integration of the urban area with those in adjoining provinces.
- (b) **Develop a Competitive Economy:** The city's economic development must be oriented toward developing new industries, in addition to conventional ones. Economic restructuring must be associated with increases in productivity in all sectors.
- (c) **Ensure an Inclusive Social Development:** The city must be livable not only for residents but also visitors including tourists. People from all walks of life must be provided with adequate services and protected against natural and human disasters. The capacity of human resources must be continuously strengthened.
- (d) **Manage Environment Effectively:** The urban environment must be effectively managed not only from the perspective of removing pollutants but also in terms of improving the city's preparedness in times of natural disasters, preserving ecosystems, being responsive to the impacts of climate change, enhancing stakeholders' environmental consciousness, formulating needed policy interventions, and implementing effective monitoring.
- (e) **Strengthen Governance:** The city must be financially sustainable based on a rational tax base, expanded user charges, and use of PPP schemes. City officials and staff must be equipped with sufficient capacity to manage the city, while the public has to be given the chance to participate in the development process.

3.3 Socio-economic Framework

1) General

3.11 Vision and development goals are farther interpreted in terms of selected key socio - economic indicators to concretize strategies to achieve the vision and goals. Main indicators include, among others, population, households, employment, student/enrolment, GRDP, and vehicle ownership which provide a basis for various planning work. The existing socio – economic indicators of the city for 2020 have been duly considered in formulating those for 2025 in the Study.

2) Population and Households

3.12 In DaCRISS, target population for 2025 has been set at 2.1 million based on the discussions held in previous chapters that the city must respond its important role at CFEZ and national level under the rapid urbanization and industrialization process of the country. The reason of settling Danang's future population to 2 million is an expression of strong policy orientation that Danang is determined to function as a truly competitive growth centre of Vietnam and lead the development of CFEZ. Unless Danang will become a big city equipped with high level of infrastructure and urban function, it is difficult to attract quality investments in competition with other cities in Asia including Hanoi and HCMC. It is also a view of the Study Team that Danang must target and grow even beyond 2 million in the future.

3.13 Although the current trend is not high enough to reach the target level, there is an ample opportunity that larger population will be attracted for expanded and better employment, and enrolment to higher education when proposed socio – economic development and environmental management strategies are undertaken. The official population forecast in 2020 under the city plan is 1.5 million, and this will reach 1.7 million when the same trend growth rate is applied to estimate the population in 2025. In addition, current population figures exclude unenumerated migrants, which should be included in the official population statistics in the future. Preceding studies from the World Bank¹ indicate around 20% of such unenumerated migrants exist, and when this is considered, the population in 2025 is 2.1 million, which agrees with the figure presumed by the Study Team (see Table 3.3.1).

Table 3.3.1 Estimated Population

		2007	2020	2025
Population (no)	SEDP	806,744	1,369,000	1,738,554
	Including 20% Unenumerated	968,093	1,642,800	2,086,265
Growth Rate (%/year)	Natural Growth (%)	1.19	1.00	1.00
	Net Migration (%)	0.51	3.90	3.90
	Total	1.70	4.90	4.90
Average Annual Net Migration		3,843	45,395	57,650

Source: SEDP and DaCRISS Study Team.

1) 2025 figures are estimated based on that the growth rates assumed for 2015 – 2020 will continue to 2025.

3.14 Average household size of Danang City is 3.93 as of 2009 which, however, is expected to decrease to 3.71 in 2025, partly due to the increased number of migrants and partly due to the change in lifestyle as has been experienced in many other cities during the process of economic development. Thus, the number of households of the city will be

¹ David Dowell, Low Income Housing Assessment Study, World Bank.

563,000 as compared to 278,000 in 2009.

3) Economic Structure and Employment

3.15 It is expected that the industrial structure of the city will change considerably as is also stated in the SEDP. A significant change is a shift to service sector such as, among others, tourism, commerce, ICT software, banking services, though secondary sector will also grow to sustain the development. Primary sector will reduce significantly in the city but will be rather accommodated in adjoining provinces. Thus the city will be highly in one with urban nature.

Table 3.3.2 Economic Structure and Employment

		2007	2009	SEDP		2025	Growth (09-25)	
				2010	2020		Ratio (25 / 09)	% / year
GRDP: VND billion	Primary	396	459	596	1,448	1,401	3.1	7.2
	Secondary	4,450	5,226	8,310	38,061	37,469	7.2	13.1
	Tertiary	5,169	6,054	8,602	49,442	48,674	8.0	13.9
	Total	10,015	11,738	17,509	88,951	87,543	7.5	13.4
GRDP / capita	VND million	12.4	13.2	20.3	65.0	41.7	3.2	7.5
	US\$	730	775	1,156	3,022	2,452		
Employment by sector: (000) ²⁾	Primary	40	39	-	-	19	0.5	-4.5
	Secondary	123	135	-	-	222	1.6	3.2
	Tertiary	203	234	-	-	493	2.1	4.8
	Total	366	408	-	-	734	1.8	3.7
Productivity by sector: VND million / employment ³⁾	Primary	10	12	-	-	75	6.3	12.2
	Secondary	47	39	-	-	169	4.4	9.6
	Tertiary	22	26	-	-	99	3.8	8.7
	Average	27	29	-	-	114	4.0	9.0

Source: SEDP and DaCRISS Study Team.

1) All prices converted to 2000 constant price. 1USD=17,000 VND.

2) Calculated from target GRDP and productivity.

3) Estimated based on comparison of international figures.

4) School Enrolment

3.16 School enrolment is set according to the SEDP, at 100% for primary and secondary sectors. For tertiary, since the 2007 figures based on the HIS include vocational training, this percentage is excluded from 2025 figures, and set at 30% as the enrolment ratio for university and college students, 50% including vocational training. The resulting number of students is calculated from cohort population and the target enrolment ratio.

Table 3.3.3 School Enrolment

		2007	SEDP		2025	Growth (07-25)	
			2010	2020		Ratio	% / year
Enrolment Ratio: (%) ¹⁾	Primary	99.4	100.0	100.0	100.0	-	-
	Secondary	87.0	100.0	100.0	100.0	-	-
	Tertiary	46.7	-	-	50.0	-	-
Student: (000) ²⁾	Primary	50	-	-	144	2.9	6.0
	Secondary	116	-	-	224	1.9	3.7
	Tertiary	42	-	-	78	1.9	3.6
	Total	208	-	-	447	2.1	4.3

Source: SEDP and DaCRISS Study Team.

1) 2025 figures based on SEDP for primary and secondary, estimated based on comparison of international figures for tertiary.

2) Estimated based on cohort population and attendance ratio. Includes universities, colleges, and technical working schools (working students).

5) Vehicle Ownership

3.17 Vehicle ownership per household for cars and motorcycles is estimated at 23.2% and 69.9%, respectively. This is calculated by estimating the income distribution in the future, and assuming vehicle ownership will be proportionate to the anticipated change in income distribution.

4 DANANG CITY DEVELOPMENT STRATEGY

4.1 Overall Strategy for Sustainable Growth

1) Danang City to Become an Internationally Competitive Growth Center for CFEZ, Vietnam, and GMS

4.1 The sustainable growth of Danang City as an environmental city must be achieved under the context of an accelerated growth, because the growth of CFEZ is highly dependent on the growth of Danang City and vice versa. Ensuring the city's sustainable growth and development, as well as those of CFEZ, is a tremendous responsibility. Assuming that the current trend continues, wherein SFEZ grows the fastest, followed by NFEZ, the gap between CFEZ and the latter two focal economic zones may further widen. Therefore, the most fundamental policy for Danang City to pursue is to establish a firm and long-term accelerated growth strategy to enable the city to function as the third-important growth center in the country whose role is to facilitate the physical and socioeconomic integration of the two stronger focal economic zones, and in the process serving as the link to a more realizable national integration. Without a strong growth area in the center of Vietnam, the country would find it hard, even impossible, to integrate the northern and southern growth centers and distribute the benefits of development to other areas in Vietnam, including the hinterland mountain regions as well as the Greater Mekong Subregion along the east-west corridor.

4.2 In order to respond to the above regional requirements, Danang City has to grow faster than it is currently experiencing. Future city population is targeted to reach 2.1 million by 2025 and even higher beyond that year. Danang's large population in the future is the basis for providing the city and CFEZ with high-quality urban services and amenities not only for the people but also for investors and visitors alike.

2) Challenges

4.3 With a target population associated with a high level of economic development, as well as social and environmental sustainability, the management of such growth process will prove to be a significant challenge not only for the city but also for the central government which encourages balanced national development. Without coordinated and integrated development strategies at central, provincial, and city government levels, the proposed scenario for the city and the expected synergy from all sectors will be difficult to realize. The main challenges therefore are as follows:

(1) Competitive Economic Environment

4.4 Economic growth is at the heart of the envisioned strategic development of the city. The economic sector involves the significant expansion of the GRDP, a much increased productivity, as well as a shift to higher-value industries and the service sector. Competitive economic development is the key for creating attractive employment, improving the quality of life, attracting skilled immigrants, generating increased revenue for the city, enabling the city to provide better services, and increasing quality investments. Since Danang City intends to accelerate the shift from an agriculture-industry-service structure to service-industry-agriculture, it is necessary to elaborate this strategy.

4.5 While Danang is expected to function as the third internationally competitive growth center in Vietnam, its growth strategy must not be a replication of that adopted by

the north and south, which has been driven mainly by the accumulation of FDI-led manufacturing industries and the availability of large domestic markets. Danang must forge its own development path bearing in mind the presence of three World Heritage Sites, as well as the rich and diverse natural environment within its influence area which covers Danang, Hue, and Quang Nam. The existence of the Danang University also works to the city's great advantage as it provides a steady supply of skilled workers. These factors suggest that Danang's growth can be achieved through the strategic development of eco-tourism, environmental businesses, and related R&D activities, as well as human resources, especially in the service and knowledge industries.

(2) Connectivity with the World, NFEZ, and SFEZ

4.6 For this, Danang must be more directly connected with the world in parallel to strengthening its connectivity with the north and south, which, however, may take some time due to the long distance separating them. However, Danang has ample opportunity and advantage to be connected with major Asian cities such as Bangkok, Singapore, Hong Kong, Shanghai, Seoul, and Tokyo. The role of airports is thus very important to attract direct regular airline services, wherein the following must be given due consideration:

- (i) Danang's international airport must be of high standard and the terminal buildings of comparable quality with those in Hanoi and Ho Chi Minh;
- (ii) The airport's current location is highly strategic for it provides easy access to the city center and various tourism destinations; and
- (iii) The Danang airport must function as the main gateway to central Vietnam. Therefore, its connectivity to land transportation, especially toward the direction of the popular World Heritage Sites of Hue and Hoi An, must be improved through the development of high-speed railway, etc.

4.7 Further strengthening the city's connectivity with GMS countries is also important. When socioeconomic activities along the east–west corridor develop, Danang must, as an international gateway connecting the subregion with the world, provide various supporting services and opportunities for commercial development.

4.8 Further investments in national and regional transportation infrastructure and services, such as north–south expressways, north–south high-speed railways, international airports and ports, as well as in the power and telecommunications sector, with strong central government initiative and support will likewise be vital.

(3) Sustainable Urban Development

4.9 Increased population and socioeconomic activities require adequate areas and generate various impacts that affect the environment. The city's population is most likely to further increase beyond 2025, an eventuality that the city must be prepared for. Not only is the urban space limited at the moment, but the city must also develop and be designed in an attractive and sustainable manner. It must enhance its appealing image as an internationally competitive environmental city.

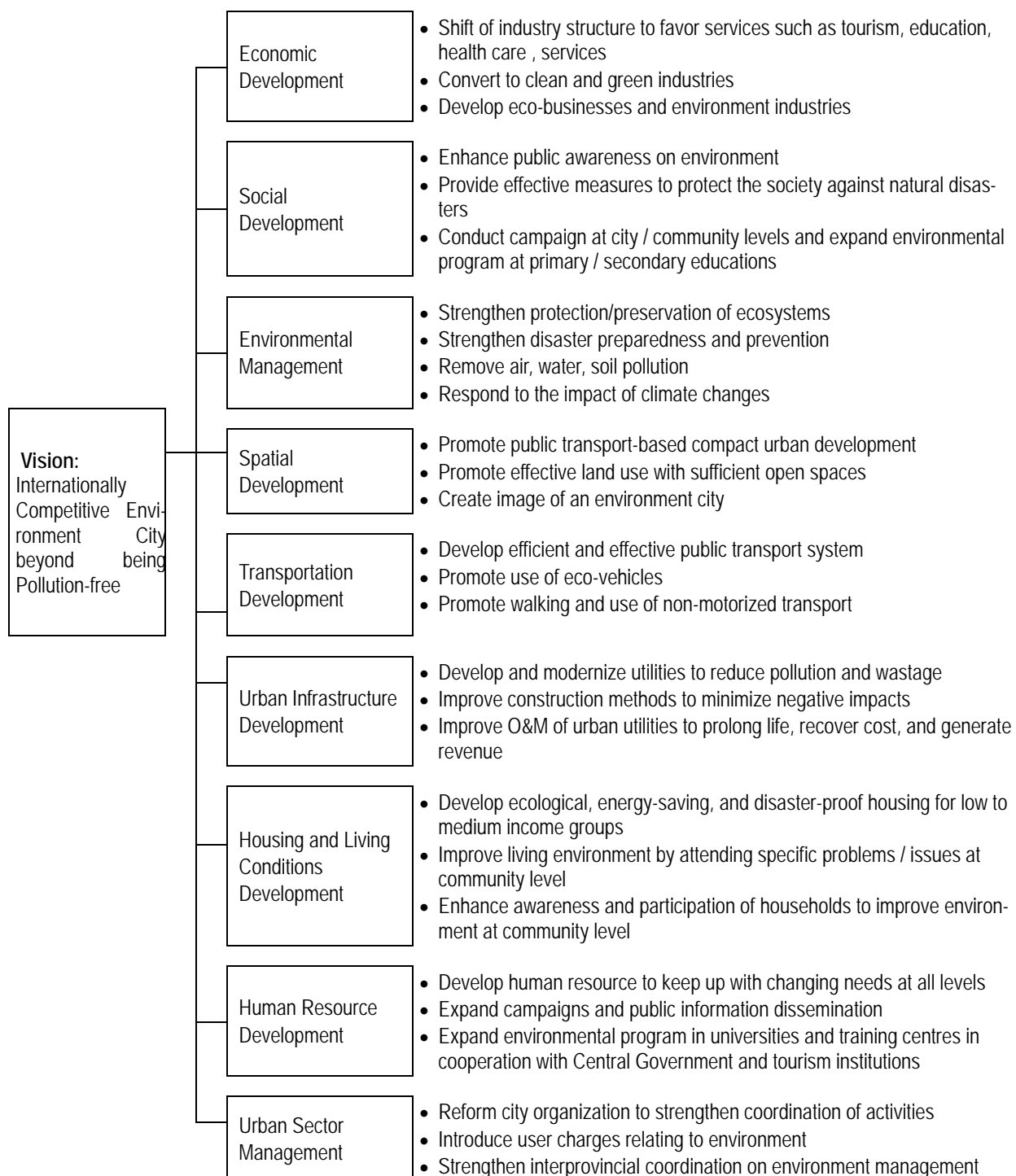
3) Need for Integrated and Coordinated Strategies

4.10 A weakness in urban development planning by many Vietnamese cities is seen in the uncoordinated implementation of policies and projects among them. Lack of coordination brings about not only wastage of limited resources but also ineffective outputs. For example, in introducing public transportation services, if the land use along the routes is

not developed in a compact manner, access to such services becomes difficult and the people are discouraged to avail themselves of them. If a development in an environmentally sensitive area becomes commercially successful, it will generate negative impacts to the society. The development of beach resorts for the exclusive use of their guests will most likely rob the common people of such recreational opportunities. In urban areas where different activities concentrate, there are always conflicting interests among stakeholders which require not merely coordination among relevant departments and policies but also call for broad-mindedness toward differing opinions. In order for Danang City to promote its envisioned development in the most effective manner, there is a need for an integration of strategies and close coordination among implementation bodies.

4.11 Thus, under the vision of an environmental city, the environment should not merely be an appendage to development; rather, it should be the driving force to promote the city's sustainable development. To realize this, strategies for each urban subsector should have environment components in synergy with those in other subsectors (see Figure 4.1.1).

Figure 4.1.1 Integrated Subsector Strategies towards Environment City



4.2 Economic Development

1) Issues

4.12 In order to accelerate the economic growth of the city as well as CFEZ, the city must deal with short- to long-term challenges as briefly explained below:

- (i) Modernize existing industries in a way that they become more competitive and, at the same time, pollution free;
- (ii) The city's economic competitiveness level is not as strong as that in other cities such as Ho Chi Minh, Hanoi, and Haiphong. Productivity is relatively low and the sector is rather dominated by SOEs. There is no significant industry that steers the economy. Meanwhile, the management of most of the industrial estates is not so attractive to investors;
- (iii) While the city is handicapped by a limited market (i.e., small size of the population), lack of infrastructure, and remoteness from large growth centers in the country and the world, adopting conventional methods of growth strategies to promote the location of manufacturing industries to the city through the development of industrial estates and provision of incentives would not be a long-term success;
- (iv) There is a need to find Danang's comparative edge or supremacy over NFEZ and SFEZ, and to establish a much more strategic approach to economic development, one that will help guarantee the sustainable development of the city and CFEZ; and
- (v) Promote and support locations of private sector investment.

2) Objectives and Core Strategies

4.13 The objectives of the economic sector of the city are to ensure employment and increased incomes for a burgeoning population and to establish a firm basis for the development of cutting-edge industries to boost its economy and be at par with NFEZ, SFEZ and other growth centers in the region. The economic development of Danang City is the key and the foundation for its future growth and that of CFEZ. It will greatly affect the city's capability to attract people by providing better employment opportunities. As it is briefly explained in the overall development strategies, the city must exert vigorous efforts to modernize its existing industries and, at the same time, establish a competitive base for industry locators. The core strategies for this include the following (see Table 4.2.1):

- (i) Develop strategic industries (environmental business, higher education, healthcare, services, etc.);
- (ii) Promote locations of conventional types of manufacturing industries in coordination with other provinces and reorganization of existing / planned industrial zones; and
- (iii) Promote local SMEs and informal industries.

Table 4.2.1 Objectives and Strategies for Economic Development

◀ Goal ▶	
• Achieve sustainable economic growth with new mixture of industries	
Objective	Strategy
Strengthen Economic Development and Investment Base of the City	<ul style="list-style-type: none"> • Improve infrastructure and management of industrial estates to make them clean, green, and attractive to investment by target industries. • Strengthen connectivity between the city and the world through the improvement of transportation and telecommunications. • Develop new urban centers through enhanced urban planning and development to further enhance competitiveness and livability of the city
Develop Strategic Industries as Growth Engine of City Economy	<ul style="list-style-type: none"> • Establish concrete economic development strategies and plan to promote strategic industries including tourism, ICT business, environmental industries/ business, health care, higher education, and services. • Establish human resource development programs, including higher education, training and retraining courses, to meet the demand of new industries. <p>Provide a conducive investment environment for industrial locators and incentives, including space, supporting services, and others, to new industries.</p>
Facilitate Creation and Growth of SMEs	<ul style="list-style-type: none"> • Improve investment and business environment for SMEs through the provision of adequate infrastructure and regulations. • Provide necessary training and supporting services for those shifting from the primary sector. • Establish an organization to provide necessary consulting and supporting services for SMEs

Source: DaCRISS Study Team.

3) Shifting Government's Role from Planning to Facilitating

4.14 The role of the non-state and foreign invested sectors has become increasingly important in the country as the new and vigorous players of economic development. The major industrial investments made in Danang so far are, however, state or state-linked investments. It is highly preferable for the city to promote more domestic private and foreign investment so as to shift its reliance on state investment and to make full use of the dynamic private and foreign-invested sectors. In order to promote private and FDI businesses, the government needs to first develop a system that will collect accurate and timely information about the current situation and needs of the private and FDI sectors. Then, it should introduce appropriate policies and measures to alleviate constraints to the growth of the private and FDI sectors. Unless the government fully understands the needs of these sectors, it cannot make the right decision in promoting their businesses.

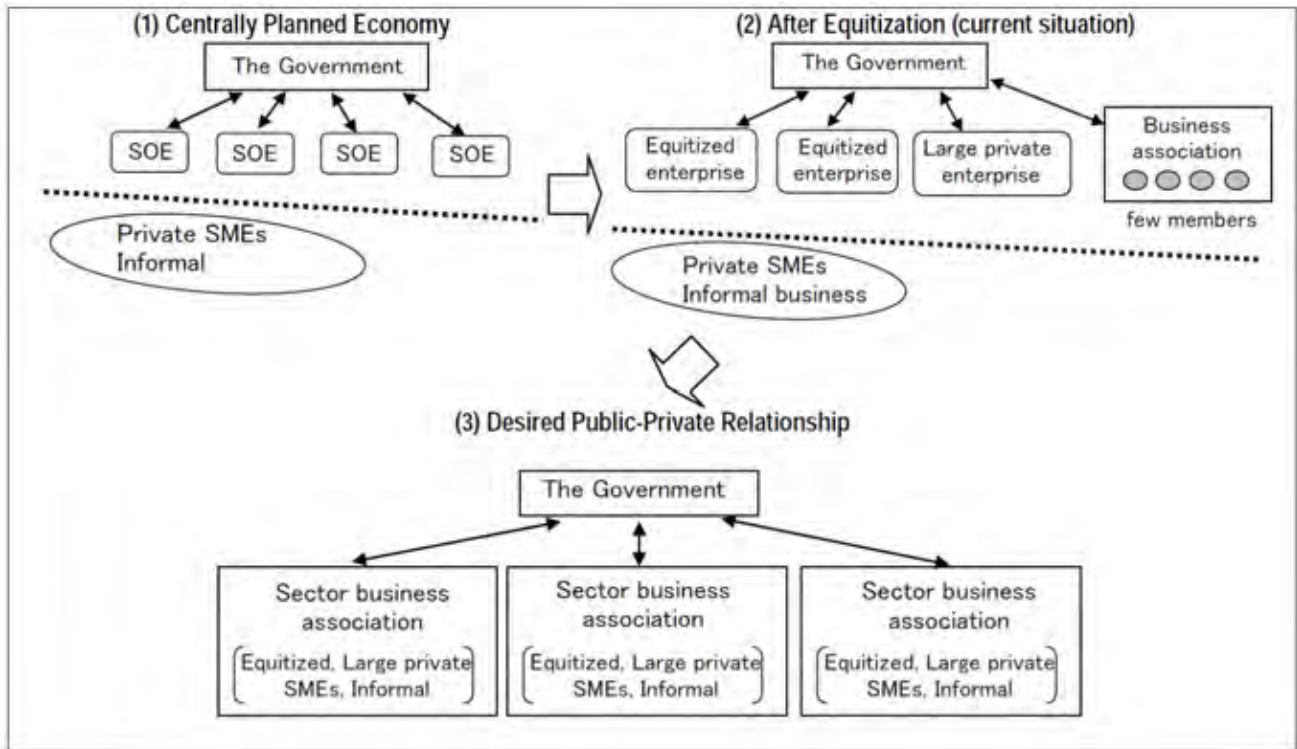
4.15 Poor understanding of the needs of the private and FDI sectors might result in wastage of government budget for implementing development projects that are not popular among private and foreign entrepreneurs. The construction of the "Software Development Park" in Danang City seems to be an example of such an unpopular project, where 70% of its office space is not yet utilized after it opened a year ago. If the government had a more accurate and proper understanding of the trends and needs of the local ICT industry, the project should have generated a different outcome by now. Moreover, the city's plan to construct a "high-tech industrial park" in Hoa Vang District is another cause for concern. The city authority expects that modern, and possibly middle-sized, high-tech manufacturers should be accommodated in this park; but local entrepreneurs, who are mostly neither modern nor middle-sized, might be unable to move into the park. Existing foreign manufacturers of high-tech products in Danang City, who are suffering from poor public utilities, show little interest in this new project, as well.

4.16 In order to have a better understanding of the private business, the government should implement fundamental changes to its relationship with the private sector. Under a centrally planned economy, the government is directly responsible for managing SOEs, and obtaining all kinds of information about them. Since the private sector is small or informal and played limited role in economic development, the government has little information about private businesses (see Figure 4.2.1 (1)).

4.17 After the full-scale implementation of the equitization program of SOEs, the government does not have direct responsibility for managing the equitized enterprises, but still keeps close relations with these enterprises to exchange information (see Figure 4.2.1 (2)). The government also talks with directors of newly established large private enterprises and representatives of business associations. The number of business associations is small, however, and for some reason their membership is limited to a few local enterprises. Majority of private enterprises, mostly small or informal, remain unconnected, and the government have no significant channels to communicate with them. Individual talks with a small number of business owners do not provide the government with a comprehensive view of the trends and needs of the private sector. Direct talks are also not efficient in collecting information. The government should better encourage the private sector to establish sector-based business associations, such as food processing association or construction material manufacturers' association, and use these associations to communicate with member enterprises (see Figure 4.2.1 (3)). All types of local enterprises could join these associations, and the government can communicate with the members in an efficient and comprehensive manner.

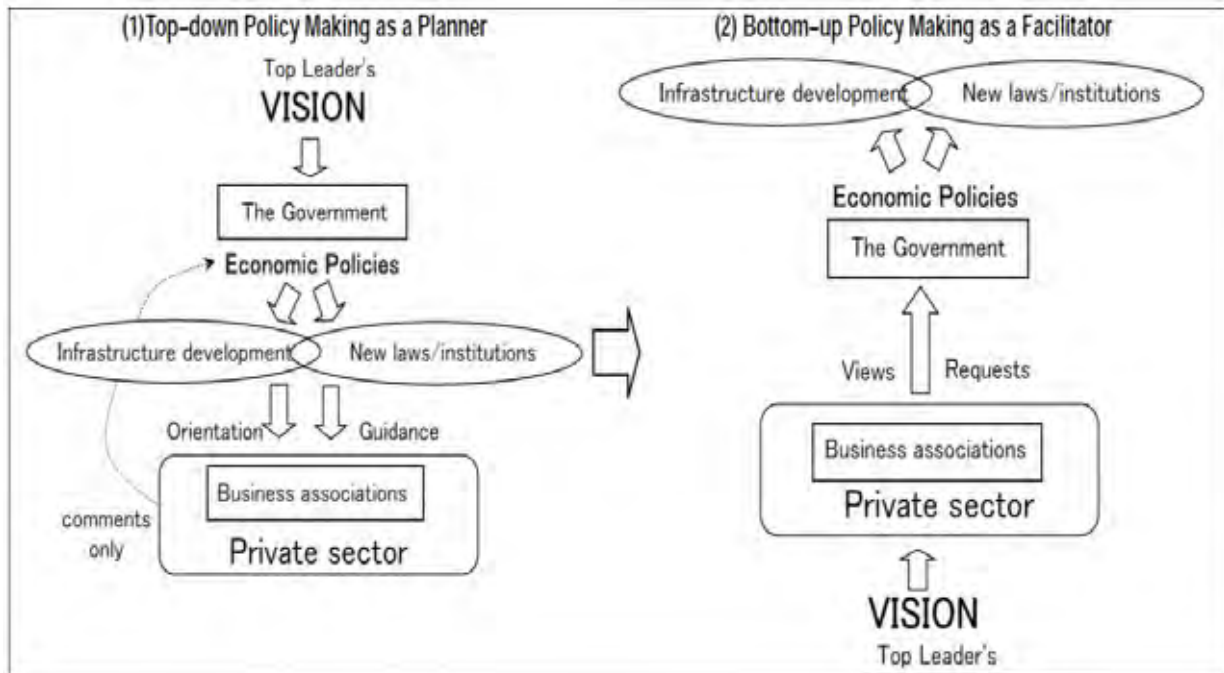
4.18 Furthermore, the city authority should better redefine and institutionalize its role as a facilitator of economic development rather than as a planner. The government was able to plan the growth of the state sector under a planned economy, but it can no longer "plan" private sector development under a market economy. The government, as a facilitator, can only help private and foreign businesses to expand. The imposition of the top leadership's vision of economic development on the private sector does not usually work, even if the vision looks attractive and progressive (see Figure 4.2.2 (1)). Any state initiative for private sector development without meaningful participation of the private stakeholders can not generate anticipated outcomes. The top leadership's vision of economic development should be presented to the private sector first, and then the government should carefully hear their views and requests through the business associations (see Figure 4.2.2 (2)). Based on the collective views and requests of the private sector, the government can develop its economic policies that can realize the top leadership's vision.

Figure 4.2.1 Changes in Public-Private Sector Relationship



Source: DaCRISS Study Team.

Figure 4.2.2 Changes in Policy-making Procedures



Source: DaCRISS Study Team.

4) Enhancing ICT Business

4.19 ICT-related businesses are one of the rapidly expanding industries in Vietnam, and Danang City is not an exception. Around 60 companies can provide ICT-related ser-

VICES in the city, employing over 4,000 ICT engineers¹. According to the directors of a foreign-invested ICT firm in Danang City, the city has several advantages in expanding ICT businesses. First, it has several higher educational institutions that supply a number of high-tech engineers to local industry. Danang University of Technology (DUT) is a notable example of such educational institutions, producing nearly 2,500 graduates in a year. The Department of Information Technology, with 250 students in each grade, is also a good source of ICT engineers for the local ICT industry. The ICT industry in the city is able to utilize this human resource pool. However, a number of DUT graduates leave Danang after graduation to look for better job opportunities in HCMC. Reportedly, however, many wish to come back to Danang City for various reasons after having working for a few years in HCMC.

4.20 Moreover, the conditions of the labor market for ICT engineers in Danang are attractive for foreign investors in comparison with those in HCMC and Hanoi. The average wage of an ICT engineer in Danang is fairly lower than that in other cities². Besides, the labor mobility of engineers in Danang is not high, partly due to the limited job opportunities in the city. Some types of software development companies need to strictly keep industrial secrets, so they prefer to locate in the city where staff members tend to work for the same company for long periods. The last but not the least advantage of the city is the strong commitment of the top leadership to ICT development. The city prepared a specific program³ to enhance ICT development in 2004 and expressed its determination to build an 'e-city' in Danang. The city authority has implemented e-government initiatives since 2006 as part of the World Bank's Vietnam-ICT Development Project⁴. Danang is one of the three pilot cities of this project which provides the basic foundation for the deployment of ICT in district offices and departments, as well as facilitates the development of various types of e-government services for citizens and businesses regarding land registration, business registration, delivery of IDs and driving licenses, procurement of goods, tax and custom procedures, etc. The project also supports local SMEs to apply ICT to their businesses by offering training and consultancy services, and enhance e-commerce by developing the city's portal site. The World Bank's project will finish in 2010, but the city's support to promote e-governance and e-commerce should be kept implemented after 2011 with wider focus.

5) Facilitating the Creation and Growth of Small and Medium Enterprises

4.21 The government defines small and medium enterprises (SMEs) as those independent business and production establishments that have registered their business under the current legislation and have a registered capital of less than VND10 billion or an average number of annual employees of less than 300.⁵ As of the end of 2006, Danang had 3,271 enterprises, of which 3,201 enterprises (98%) were regarded as SMEs employ-

¹ From interview with director of Department of Information and Communication, People's Committee of Danang City on 5 August 2009

² According to the vice general director of a software development firm in Danang City interviewed in November 2008, the average wage of its ICT engineer is from USD 200 to 300 per month, while that of ICT engineers in HCMC is over USD 800 per month.

³ Program: Focus on industrial and information technology development and strive to be one of the leading industrial and modern localities", attached to Decision No.12/2004/QB-UB dated 17th July 2004 of the Danang People's Committee

⁴ Project ID: P079344, approved on 15 September 2005
<http://web.worldbank.org/external/projects/main?pagePK=64283627&piPK=73230&theSitePK=387565&menuPK=387598&Projectid=P079344>

⁵ Decree 90/2001/CP-NDD, 23 November 2001.

ing less than 300.⁶ Fifty-eight percent (58%) of them (1,913 enterprises) are very small with less than nine employees. State-owned enterprises are generally large in size and Danang has no more than 100 SOEs in total⁷; so the majority of these SMEs is considered as private. The city might also have a number of unregistered and informal household businesses. Private SMEs have become a new dynamic force in economic development. The share of registered private enterprises in the total labor in enterprises in Danang reached 50% in 2007, up from 31% in 2004.⁸ The share of capital of Danang's private enterprises also significantly increased from 18% in 2004 to 37% in 2007.⁹

4.22 Despite its recent development, private SMEs in Danang still seem weak and have not developed their potentials. Many informal household businesses tend to stay small. SMEs in the country and in Danang face various difficulties, such as access to finance and land, shortages of skilled labor, bureaucratic hurdles, poor infrastructure and corruption.¹⁰ According to the DaCRISS survey of business establishments of Danang in 2009, access to land is still one of the major obstacles faced by local manufacturing companies (see Table 4.2.2). Results of the questionnaire survey of commune leaders also showed a similar result (see Table 4.2.3). Land available to local small private businesses is limited. It is preferable for the city authority to develop 'low-grade' industrial parks for private SMEs such as industrial clusters (*cum cong nghiep*), instead of expanding large and sophisticated industrial zones (*khu cong nghiep*).

Table 4.2.2 Major Business Obstacles for Manufacturing Companies in Danang City

Obstacle	Share of Major Obstacle (%)
1. Crime, Theft and Disorder	11
2. Access to Land	10
3. Electricity	5
4. Tax Administration	5
5. Macroeconomic Policy	5
6. Transportation	3
7. Regulatory Policy Uncertainty	3
8. Skills/Education	3
9. Access to Financing	3
10. Cost of Financing	3
11. Uncompetitive or Informal Practices	3
12. Custom and Trade Regulation	2
13. Corruption	2
14. Conflict Resolution	2

Source: Voice of 300 Companies/Establishments in Danang City, DaCRISS, January 2009

4.23 Access to finance seems to be another major constraint for SMEs in Danang, according to the two surveys. In order to enhance their access to financing, several commercial banks¹¹ in Danang have set up special lending programs for local entrepreneurs. Vietnam Bank for Social Policy (VBSP) also has a lending program for small business

⁶ p 182, Table 80, Statistical Yearbook of Vietnam, 2007, General Statistical House

⁷ p48, Table 27, Danang Statistical Yearbook 2008, Danang Statistics Office

⁸ p 49, Table 28, Danang Statistical Yearbook 2008, Danang Statistics Office

⁹ p 50, Table 29, Table 28, Danang Statistical Yearbook 2008, Danang Statistics Office

¹⁰ "Investment Climate Assessment, 2006 Vietnam", World Bank

¹¹ For instance, TECHCOM Bank started a new lending program for SME and Micro business unit in 2008, with technical support from HSBC (Interview with the vice director of the bank on 10 November 2008).

owners¹² at subsidized interest rates. The lending program to private SMEs and small businesses should be further expanded to alleviate their financial constraints.

Table 4.2.3 Required Inputs to Facilitate Development in Danang

Input	Share (%)
1. Skilled Labor	50
2. Price of Physical Inputs	50
3. Knowledge and Capacity of People	38
4. Land for Enterprises	30
5. Land for Agricultural Production	29
6. Access to Credit	21
7. Land for Housing	16

Source: DaCRISS Commune Survey, 2008

4.24 Technical and management support should also be required to expand the private business sector. Accession to international standards and certification, startup support and incubation services for young entrepreneurs, as well as modernization of commercial dispute resolution are among the focal points of SME support program in the country.¹³ Regarding incubation services, for instance, the Danang University of Technology implemented for the last three years a pilot project for its graduates and faculty members to set up their own businesses within the university premise.¹⁴ The university offered financial support and production space to the entrepreneurs. According to the Rector of the university, four commercial projects have been realized so far. Considering the difficulty of accessing land and finance, the provision of incubation services to young entrepreneurs should be very effective in creating new SMEs. VCCI Danang also implemented a comprehensive entrepreneurship support program from 1997 until 2004, called SYB (Start-up Your Business) & IYB (Improve Your Business) with technical support from the international Labour Organization (ILO).¹⁵ A variety of practical textbooks on marketing, storage management, accounting, cost calculation, HRD management, and labor and productivity were prepared, while master trainers were developed based on the textbooks. The know-how and teaching materials developed in this program should be further utilized.

6) Attracting Environmental Businesses

4.25 Since 2008, Danang City has been planned to become an environmental city that pursues sustainable development. With the efforts of the city authority in raising public awareness, many city inhabitants now know about this plan and share the vision. According to the DaCRISS survey of business establishments in 2009, 67% of the respondents are informed about the city's plan (see Figure 4.2.3). Moreover, majority of the respondents mentioned that they agreed with the plan. Over 90% of the respondents either agreed or strongly agreed with the city's plan.

¹² As of July 20, 2009, the bank's Danang branch lent to 45,000 households and 18 SMEs in the city. Average amount of loan for poor households was VND6.6 million, while that for SMEs was VND241 million (Interview with the director on 30 July 2009).

¹³ "Approaches to Support Development of an Enabling Environment for Small Enterprises, Country report: Viet Nam", August 2002, GTZ.

¹⁴ Information obtained from an interview with the rector of the Danang University of Technology on 11 November 2008

¹⁵ ILO has implemented similar technical assistance projects worldwide. The contents and focus of the textbooks are usually modified to meet local business circumstances.

Figure 4.2.3 Awareness and Agreement to Environmental City Concept



Source: Voices of 300 Companies / Establishments in Danang City, DaCRISS, 2008.

4.26 The idea of an environmental city, however, seems narrowly perceived by the local business persons. The survey shows that many of them regarded the features of an environmental city as “less air and water pollution,” “clean and good sanitary conditions,” “well protected against natural disasters,” or “no traffic congestions.” It seems only a few of them envisage any business opportunities in the city’s plan. In many industrialized countries, the concept of an environmental city or eco-town does not simply mean less pollution or good sanitation. It also suggests that environmental businesses are promoted in the city and such businesses become one of the driving forces of economic development. Recycling of industrial waste is one of such environmental business. For instance, there are a number of recycling operators, who are located in a specific estate of ‘Tokyo Super Eco Town.’¹⁶ Due to the rapid economic growth in East Asia, the prices of mineral resources rose sharply and the recycling of industrial waste has become increasingly profitable. Moreover, with the concept of becoming an environmental city, business establishments and households in Danang City are requested to be careful about any causes of environmental disruption, including the way to dispose garbage. DaCRISS survey tells us that 17% of the respondents segregate solid waste (see Table 4.2.4). This ratio is higher among respondents in the manufacturing and construction sectors which generate a large amount of solid waste, at 28% and 20%, respectively.

4.27 Manufacturing and construction establishments are also active in recycling solid waste (see Table 4.2.5). A third of the manufacturers and 23% of the construction companies replied that they recycled solid waste. Regarding the system to collect the waste, 20% of the manufacturing and 38% of the construction respondents pointed out that “other enterprises” collect solid waste for recycling (see Table 4.2.6). Moreover, nearly half of the manufacturing establishments recycle solid waste by themselves. This suggests that recycling of solid waste would be commercially viable at least for manufacturing and construction industries.

¹⁶ <http://www2.kankyo.metro.tokyo.jp/recycle/superecotown/outline.pdf>

Table 4.2.4 Compliance by Establishments with Requirement to Segregate Solid Waste

	%				Numbers			
	Yes	No	Don't know	Total	Yes	No	Don't know	Total
All Establishments	17	70	13	100	58	240	45	343
Manufacturing	28	67	5	100	17	41	3	61
Construction	20	71	9	100	7	25	3	35
Hotels and Restaurants	3	81	16	100	2	50	10	62
Commerce and Trading	13	67	20	100	7	36	11	54

Source: Voices of 300 Companies / Establishments in Danang City, DaCRISS, 2009

Table 4.2.5 Establishments' Practice of Recycling Solid Waste

	%				Numbers			
	Yes	No	Don't know	Total	Yes	No	Don't know	Total
All Establishments	16	73	11	100	55	250	38	343
Manufacturing	33	58	8	100	20	35	5	60
Construction	23	66	11	100	8	23	4	35
Hotels and Restaurants	5	82	13	100	3	51	8	62
Commerce and Trading	22	67	11	100	12	36	6	54

Source: Voices of 300 Companies / Establishments in Danang City, DaCRISS, 2009

Table 4.2.6 Initiators of Recycling Waste among Establishments

	%					
	Ourselves	Individual Collectors	Other Enterprises	Government	Don't know	Total
All Establishments	34	44	15	0	7	100
Manufacturing	48	28	20	0	4	100
Construction	25	38	38	0	0	100
Hotels and Restaurants	33	67	0	0	0	100
Commerce and Trading	27	73	0	0	0	100

Source: Voices of 300 Companies / Establishments in Danang City, DaCRISS, 2009

4.28 Paper and cardboard, metals, and plastics seem to be the three major types of waste for recycling. Survey results showed that 48% of the respondents who recycled said they reprocessed paper and cardboard and that 24% of them recycled metals (see Table 4.2.7 and Figure 4.2.4). In the manufacturing sector, many respondents seem to recycle plastics, wood, and glass as well.

4.29 Despite a sizable potential for business opportunities, the recycling business in Danang City is neither active nor modernized. According to one foreign-invested firm at the Hoa Khanh Industrial Zone, the sale value of scrap metal, that of copper in particular, has become higher every year¹⁷, prompting the firm to sell its industrial solid wastes (e.g., metals and others) weekly to garbage collectors from as far as HCMC. According to a manager of URENCO, 300 to 400 scavengers visit the garbage disposal sites every day to gather valuable scraps which are then sold to 12 to 15 individual garbage collectors, and transferred to HCMC for recycling or reuse. The manager also mentioned that the city has few tiny workshops that recycle metal scraps, but they usually have only simple facilities without proper control of pollution.

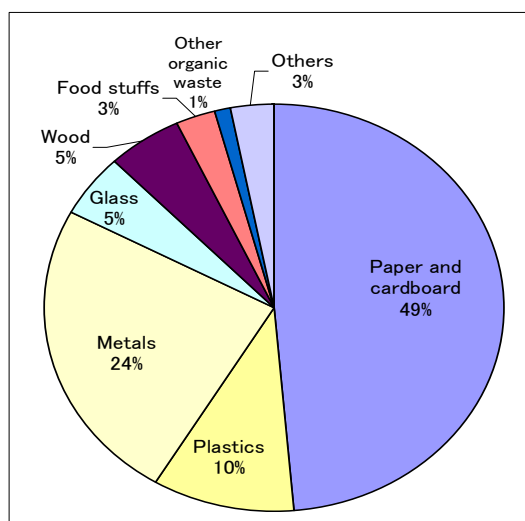
¹⁷ Interview with the managing director of a foreign-invested machinery firm at Hoa Khan IZ on 22 September 2008.

Table 4.2.7 Types of Recycled Waste

	%									
	Paper and Cardboard	Plastics	Metals	Glass	Wood	Food stuffs	Other Organic waste	Others	Don't know	Total
All Establishments	48	10	24	5	5	3	1	3	0	100
Manufacturing	21	13	36	10	13	3	0	5	0	100
Construction	64	14	21	0	0	0	0	0	0	100
Hotels and Restaurants	75	0	0	0	0	25	0	0	0	100
Commerce and Trading	92	0	0	0	0	0	0	8	0	100

Source: Voices of 300 Companies / Establishments in Danang City, DaCRISS, 2009

Figure 4.2.4 Types of Waste Recycled by All Establishments



Source: Table 4.2.7

4.30 Since the early 1990s, pollution from small recycling workshops is a significant problem in several provinces in the north, such as Bac Ninh, Vinh Phuc, and Hung Yen, where a number of individual recycling workshops get together in so-called “recycling villages” (*lang nghe tai che*).¹⁸ Without proper pollution control, these workshops tend to spread dust, liquid metal or noise all over the village, damaging the natural environment. The central government attempts to control the pollution problem by requesting the local authority to set up pollution control facilities in all newly built industrial parks. However, it is reportedly difficult to relocate existing small recycling workshops to the new industrial parks due to financial constraints. It is possible for these recycling workshops to be forced to close in the near future and for the country not to have any major recycling operators. All valuable industrial waste will probably be transferred to recycling companies in neighboring countries, such as China.

¹⁸ Interview with senior research fellows of IDE/JETRO on 11 August 2008.

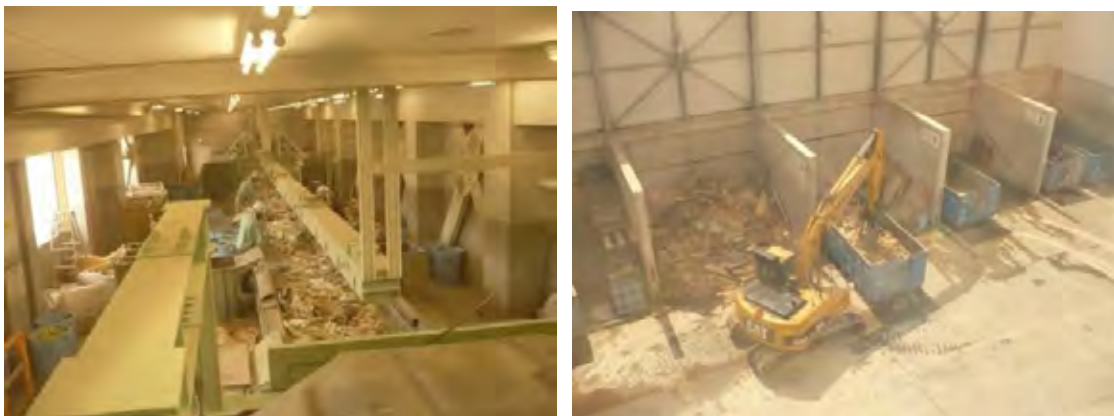
Figure 4.2.5 Recycling Workshop for Scrap Metal in Quang Nam Province



Source: Visit to the workshop on 30 September 2008 by DaCRISS consultants.

4.31 The environmental city Danang hopes to become should have a great opportunity to promote a modern recycling industry in specific industrial estates (see Figure 4.2.6). DUT and other educational institutions could supply plenty of qualified engineers and entrepreneurs to such industry. A large amount of industrial waste could also be procured from large economic zones in neighboring provinces, as well as from the industrial and urban areas in the north and south. As a number of factories, commercial buildings, housing complexes, and tourist facilities are being constructed in central Vietnam, volumes of construction waste could be obtained for recycling. The East–West corridor could also be utilized to collect solid waste from neighboring countries. With the geographical advantages and the rich human resources of Danang City, it can become a model city for recycling businesses in the country.

Figure 4.2.6 Recycling Factory for Construction Waste at Super Eco Town Tokyo



Source: Visit to the factory on 21 August 2008 by DaCRISS consultants.

4.32 There are currently wide range of eco-business opportunities which can be introduced and developed in the city (see Table 4.2.8). Experiences from Japan are summarized as well (see Table 4.2.9 and 4.2.10). The role of science and technology development is crucial for the success of such new industries.

Table 4.2.8 Classification of Eco-business

Category		Example	
Environmental Pollution Control	Equipment and Material for Pollution Control	Air Pollution Control	Piping, Bulb, Catalyzed reactor, Chemical treatment equipment, Dust collection equipment, Separation equipment, Incineration equipment, Scrubber, Deodorization Equipment
		Waste Water Treatment	Aeration system, Chemical treatment equipment, Biological treatment equipment, Defecation tank, Oil separator, Film, Strainer, Sewerage treatment equipment, Water quality control, Recycled water production equipment, Piping, Bulb equipment
		Solid Waste Treatment	Storage and treatment equipment of hazardous waste, Collection and transportation equipment, Treatment and disposal equipment, Collection bags, Container, Box, etc, Sorting equipment, Recycle machinery, Incineration equipment
		Purification of Soil and Water Quality	Adsorbent, Treatment equipment, Water treatment equipment
		Noise and Vibration Prevention	Muffler, Silencer, Sound absorbing material, Anti-vibration device, Sound-proof wall of highway
		Environmental Measurement, Analysis, Assessment	Measurement, Monitoring equipment, Sampling equipment, Control device, Data collection device, other equipment and device
		Others	
	Service	Air Pollution Control	Emission monitoring, Assessment/Evaluation/ Planning
		Waste Water Treatment	Sewerage treatment, Water treatment supply, Pipe installation
		Solid Waste Treatment	Emergency response, Leakage treatment, Waste collection/ transport/ disposal, Management of waste disposal facilities, Recycle (classification/ packing/ washing), Operation of recycle facilities (Material recycle), Hazardous waste disposal, Medical waste management
		Purification of Soil and Water Quality	Purification equipment, Operation of water treatment facilities, Service for industries
		Noise and Vibration Prevention	Assessment/ Monitoring
		Environmental R&D	Low environmental load process, Emitted load reduction
		Environmental Technology	Design/ Making specification/Project management, Ecosystem study, Environmental impact assessment, Audit, Water treatment, Environmental planning, Risk evaluation, Hazard evaluation, Laboratory/ Field study, Environmental economy study, Legal service (Management of environmental regulation) Environmental management
		Analysis, Data Collection, Measurement, Assessment	Measure and monitoring, Sampling, Sampling treatment, Data collection, Others
		Provision of Education, Training and Information	Environmental education, Training, Environmental information search service, Management and analysis of environmental data
		Others	
	Construction and Set up of Equipment	Air Pollution Control Equipment	
		Waste Water Treatment Equipment	Sewerage system, Waste water treatment system
		Solid Waste Treatment Equipment	Waste disposal, Storage, Disposal facilities, Hazardous waste treatment facilities, Recycle facilities
		Purification Equipment of Soil and Water Quality	
		Noise and Vibration Prevention Equipment	Sound-proof wall of Highway
		Environmental Measurement, Analysis, and Assessment Equipment	
	Environmental Load Reduction Technology and Goods	Environmental Load Reduction and Save Resources Technology and Process	Environmental Load Reduction / Efficient Use of Resources Technology, Biotechnology
		Environmental Load Reduction and Save Resources Goods	Environmental Load Reduction / Efficient Use of Resources Goods
	Efficient Use of Resources	Indoor Air Pollution Control	
		Water Supply	Portable water treatment equipment, Purification system, Portable purification and water supply device
Eco-material		Used paper, Other recycle products	
Renewable Energy Facilities		Solar power plant, Wind power plant, Tidal power plant, Geothermal power plant, Others	
Save Energy and Energy Management			
Sustainable Agriculture and Aquaculture			
Sustainable Forestry		Afforestation, Forest management	
Natural Disaster Prevention			
Eco-tourism			
Others	Nature conservation, Resource management, Machine/Furniture repair, Housing reform/mend, Green city, etc		

Source: OECD.

Table 4.2.9 Clean Energy Business in Japan

Type	Feature
CCT (Clean Coal Technology)	This is technology being developed that aim to reduce the environmental impact of coal energy generation. These include chemically washing minerals and impurities from the coal, gasification (see also IGCC), treating the flue gases with steam to remove sulfur dioxide, carbon capture and storage technologies to capture the carbon dioxide from the flue gas and dewatering lower rank coals (brown coals) to improve the calorific quality, and thus the efficiency of the conversion into electricity.
CCS(Carbon Dioxide Capture and Storage)	This is a technology based on capturing carbon dioxide (CO ₂) from large point sources such as fossil fuel power plants and storing it away from atmosphere by different means.
GTL (Gas to Liquid)	This is a refinery process to convert natural gas or other gaseous hydrocarbons into longer-chain hydrocarbons such as gasoline or diesel fuel. This is clean energy without sulfur and benzene. While LNG needs to be liquefied by radiator at ultra-low-temperature, GTL can be transported at fixed temperature.
Oil Sand	Oil sands, also known as tar sands, or extra heavy oil, are a type of bitumen deposit. Petroleum is refined after separating sands and bitumen at high-temperature and adding hydrogen. But production needs huge energy and exhaust CO ₂ maximum three times of that of petroleum production.
CBM (Coal Bed Methane)	Coal bed methane (CBM) or coal bed gas is a form of natural gas extracted from coal beds. CBD buried is related to coal buried, therefore it is easy to find and the low exploration risk.
Solar Power	Solar power is produced by collecting sunlight and converting it into electricity. This is done by using solar panels, which are large flat panels made up of many individual solar cells.
Solar Thermal Power	Solar thermal power is a technology for harnessing solar energy for thermal energy (heat), which is converted solar energy directly into electricity. Solar thermal collectors are defined by the USA Energy Information Administration as low-, medium-, or high-temperature collectors.
Solar Thermal Use	Solar Thermal Use is defined thermal use of solar water heater on the roof, hot water supply and heater by solar system and so on.
Passive Solar	Passive Solar technologies are means of using sunlight for useful energy without use of active mechanical systems. Such technologies convert sunlight into usable heat (water, air, and thermal mass), cause air-movement for ventilating, or future use, with little use of other energy sources. A common example is a solarium on the equator-side of a building. Passive cooling is the use of the same design principles to reduce summer cooling requirements
Biomass Power/ Waste Power	They are the direct combustion generation from ordinary waste which contributes to biomass component and woody biomass. They also include biogas and gas energy generation from sewerage sludge, food waste, and animal waste.
Biomass Thermal Use/ Waste Thermal Use	They are the direct combustion generation from ordinary waste which contributes to biomass component and woody biomass. They also include thermal power use of biogas and gas energy generation from sewerage sludge, food waste, and animal waste.
Biomass Fuel/ Production of waste Fuel	They include RDF (Refuse Derived Fuel) which is produced by shredding and dehydrating municipal solid waste (MSW) in a converter or steam pressure treating in an autoclave, wood pellet fuel, bio-ethanol, BDF (Bio Diesel Fuel) which is produced from waste oil.
Wind Power	Wind power is the conversion of wind energy into a useful form of energy, such as electricity, using wind turbines.
Hydroelectric Power	Hydroelectric Power is produced through use of the gravitational force of falling or flowing water.
Geothermal Power	Geothermal power is power extracted from heat stored in the earth. This geothermal energy originates from the original formation of the planet, from radioactive decay of minerals, and from solar energy absorbed at the surface. There are three geothermal power plant technologies being used to convert hydrothermal fluids to electricity. The conversion technologies are dry steam, flash, and binary cycle.
Geothermal Use	Geothermal reservoirs of hot water, which are found a couple of miles or more beneath the Earth's surface, can be used to provide heat directly.
Snow & Ice Energy	Snow and ice are stored during the winter, and then it is used as cooling energy for public facilities and apartment houses and as heating and cooling energy for agriculture.
Thermal Energy Conversion	Thermal energy conversion is used as cooling and heating energy with heat pump and heat exchanger by temperature difference between water resources/geothermal and ambient temperature.
Ocean Thermal Energy Conversion	Ocean thermal energy conversion is hydro energy conversion system which uses the temperature difference that exists between deep and shallow waters to run a heat engine.
Aquamarine Power	Aquamarine Power is generated by wave energy.
Tidal Power	Tidal power, sometimes called tidal energy, is a form of hydropower that converts the energy of tides into electricity or other useful forms of power. Tidal energy is generated by the relative motion of the Earth, Sun and the Moon, which interact via gravitational forces. This energy is produced through the use of tidal energy generators. These large underwater turbines are placed in areas with high tidal movements, and are designed to capture the kinetic motion of the ebbing and surging of ocean tides in order to produce electricity.
Fuel Cell	A fuel cell is an electrochemical cell that produces electricity from a fuel tank. The electricity is generated through the reaction, triggered in the presence of an electrolyte, between the fuel (on the anode side) and an oxidant (on the cathode side).
Co-generation	Cogeneration (also combined heat and power, CHP) is the use of a heat engine or a power station to simultaneously generate both electricity and useful heat. It is one of the most common forms of energy recycling.

Source: DaCRIS Study Team.

Table 4.2.10 Eco-business in Japan

Technical Environmental Business	End-of-pipe (Pollution prevention)		Air pollution measurement/prevention, Water pollution measurement/prevention, Soil pollution measure device/ purification, Combined Household Wastewater Treatment Facility
	Waste recycle & 5RE	Waste recycle	Waste insulator, Intermediate treatment facilities and final disposal facilities, Hazardous waste management
		5RE	Classification/Dismantling, Emission reduction/weight reduction/volume reduction of waste, Reuse, Renew, Fuel conversion
	Eco-material		Biodegradable resin, Biodegradable lubricating oil, Titanium dioxide (Photocatalytic), Nonwood paper, Tin-free paint for ship bottoms, Non-VOC ink
	Environmental-conscious facilities (housing)		Environmental symbiotic housing, saving energy housing with thermal insulation, high airtight and high insulation, sick house syndrome measures, Green roof and green wall, recycled waste water, rain water utilization
	New energy/ Save energy	New energy	Natural energy (solar power, solar thermal use, wind power, aquamarine power, ocean thermal energy conversion, hydrogen energy (fuel cell, hydrogen storage alloys), plant biomass energy, waste to energy (solid fuel, biomass energy of wood and hazardous waste)
		Save energy/ Unused energy	Co-generation system, Heating pump, Waste thermal & unused energy utilization system, energy saving equipment
Nature renovation		Green/ afforestation business, bio-tope, renovation of nature oriented river/ natural reproduction river, artificial beach, soil improvement, agricultural land improvement, forest renovation, natural conservation oriented agriculture	
Service Environmental Business	Environmental consulting		Environmental management system introduction support, ESCO (environmental service company), Eco-hotel promotion, Purification of polluted soil (factory), Real estate evaluation, Environmental device lease
	Environmental impact assessment		Environmental survey/ analysis/ assessment
	Information/ Education		Environmental information disclosure (environmental report, environmental account), Environmental education and human resource service, Environmental related information media, Eco-tourism, Environmental advertisement
	Finance		Eco-foundation(investment trust), Environmental Impairment Liability Insurance, Emission trading
	Distribution		Eco-goods innovation, Eco-shop/ Mail order, Secondhand market, Recycle resources market
	Logistics		Waste transport (Vein logistics)

Source: DaCRISS Study Team.

7) Working with Foreign Investors and Strategic Partners

4.33 Danang is strategically located on National Highway No. 1 and has an international airport and a deep seaport. Five industrial zones (IZs) were established with good access to the seaport. The city has several higher-education institutions, including the Danang University of Technology, which churns out more than 2,000 graduates annually. These advantages of Danang City are, however, not fully utilized to promote foreign investment. The following factors are pointed out as constraints to promoting foreign investment. First, the shipping costs from Danang Port to major foreign ports are high, i.e., three times higher than those from Saigon Port. It is sometimes cheaper for local garment enterprises in Danang to transfer products to HCMC and export them from Saigon Port. Second, vessels do not frequently visit Danang Port¹⁹. This poor shipping schedule from Danang Port has made it difficult for local export manufacturers to schedule their production.²⁰ Ho Chi Minh, with frequent vessels to many destinations in the world, has become their preferred port.²¹ Third, the supply of labor force is limited and its cost is rising in Danang²². In comparison with HCMC and Hanoi, the size of local labor market is small even though the labor markets of neighboring provinces are included. Furthermore, the recent increase in the level of minimum wage requirement in Danang makes the city less attractive for foreign investors.²³ The poorly maintained industrial infrastructure of Danang is another constraint to promoting FDI, particularly with regard to electricity supply and drainage.²⁴

4.34 Despite these constraints, however, there are foreign enterprises that have preferred to locate in Danang for various reasons²⁵, and manufacture products for exports in one of the industrial zones (IZs) in the city. With more active and vigorous efforts, it should be possible to attract more foreign investors to Danang. One of the most effective measures to promote FDI is to work with a foreign strategic partner, who participates in the development and management of IZs regarding land development, governance, marketing, etc. A highly experienced and internationally recognized developer of IZs is able to

¹⁹ According to data in 2006, the amount of port throughput of Danang Port was 2 million ton, while that of Saigon and Haiphong ports were 31 million ton and 11 million ton, respectively, p12 'Freight Transportation Sub-sector Analysis Da Nang, Vietnam', March 2008, Vietnam Private Sector Support Programme, EU.

²⁰ For garment industry, in particular, it is very important for the producers to deliver products to foreign customers on time. With few ships calling in Danang Port, the local garment exporters often choose to ship from other busier ports like Saigon.

²¹ P20, 'Economic Potential Study Da Nang Final Report', July 2006, Vietnam Private Sector Support Programme, EU.

²² Enterprises in garment sector view that labor force has become increasingly scarce, p19-20, 'Economic Potential Study Da Nang Final Report', July 2006, Vietnam Private Sector Support Programme, EU.

²³ Danang used to be in the third category regarding the level of minimum wage, but the city is now in the second category just like Haiphong. The amount of minimum wage of Danang was increased by 35% from USD 80 to USD 108 with this change. This increase is considered as a negative message for foreign investors, which look for a large number of inexpensive industrial workers.

²⁴ According to foreign enterprises located in Hoa Khanh IZ, the supply of electricity is often unstable and the enterprises suffer from frequent cut off. For IT enterprises that develop software for instance, even a short period of electricity cut off should cause detrimental damage on their production. They have to invest in back-up facilities to prepare for electricity cut off, which results in the rise of production cost. Poorly maintained drainage facilities should be a severe constraint for seafood processing enterprises. Even in Tho Quang IZ, which is particularly developed for seafood processing manufacturers, the capacity of drainage facilities is small and often become out of order. Consequently, untreated waste water comes out from factories, and this causes environmental problem in the local society.

²⁵ For instance, a manufacturer in electronic sector produces highly value added electronic components in small quantity, so it exports products by air. High shipping cost or the poor shipping schedule does not affect its export. A manufacturer of precious equipment, which supplies products mainly to Hong Kong market, uses Danang Port for exporting. According to this enterprise, the shipping schedule from Danang Port to the Hong Kong port is relatively well and the shipping cost is not very high.

provide high-quality services to foreign manufactures located in the IZs, as well as to promote the IZs to potential overseas investors in an effective way.²⁶ Local management companies find it difficult to meet the requirements of foreign investors and to promote its IZs overseas. In fact, many of the successful IZs in Vietnam are managed by foreign strategic partners, including Thang Long in Hanoi, Nomura in Haiphong, Tan Tuan EPZ in HCMC, and many others (see Table 4.2.9).

Table 4.2.11 Vietnam's Largest IZs by Registered FDI in 2003

IZ Name	Province	Nationality	Total FDI (million USD)
Bien Hoa II	Dong Nai	Vietnam	1,107
Nhon Trach I	Dong Nai	Vietnam	628
Tan Thuan	HCMC	Taiwan–Japan	612
VSIP	Binh Duong	Singapore–Vietnam	596
Nhon Trach II	Dong Nai	Vietnam	448
Thang Long	Hanoi	Japan–Vietnam	440
Amata	Dong Nai	Thailand–Vietnam	356
Sai Dong B	Hanoi	Korea–Vietnam	322
Kim Hoa	Vinh Phuc	Vietnam	270
Nomura	Haiphong	Japan–Vietnam	221
Loteco	Dong Nai	Japan–Vietnam	175
Phu My I	BR-VT	Vietnam	151
Lien Trung I	HCMC	China–Vietnam	119

Source: UNDP Policy Dialogue Paper 2008/2, Hanoi, July 2008

4.35 Danang City has five IZs (Table 4.2.10), four of which have been developed and are being managed by a local state company called DAIZICO (Danang Industrial Zones Infrastructure Development and Exploitation Company). The remaining IZ, Danang IZ, is being managed by a foreign developer called MASSDA, which is part of a Malaysia-based company called MASSCORP with a rich experience of managing IZs overseas. DAIZICO was established by the state authority, DIEPZA, which is responsible for issuing business licenses to foreign investors. Many foreign investors located in one of the four IZs complained about the way how their IZs are managed and facilities are maintained by DAIZICO. Moreover, DAIZICO does not seem to implement to promote the IZs to overseas investors. The information about these IZs seems to be delivered to overseas investors as part of general promotional activities of the IPC (Investment Promotion Center) Danang. It is preferable for the city authority to relinquish its direct management of IZs, and find a foreign strategic partner to develop and manage them.

Table 4.2.12 Danang's IZs and Their Management Companies

Name of IZ	Developer/ Managing Company	Nationality
Danang	MASSDA	Malaysia – Vietnam
Hoa Khanh	DAIZICO	Vietnam (State)
Hoa Khanh (extension)	SDN	Vietnam (Private)
Lien Chieu	DAIZICO	Vietnam (State)
Lien Chieu (extension)	SDN	Vietnam (Private)
Tho Quang	DAIZICO	Vietnam (State)
Hoa Cam	DAIZICO	Vietnam (State)

Source: DPI, Foreign Affairs Division (13. Nov. 2008).

²⁶ It is often pointed out that management of IZs is similar to that of hotels. If you have an internationally recognized good management, such as Hyatt, Hilton, etc., you are able to have a good hotel of the international standard, having a good network with overseas markets. On the contrary, if you have a weak management with limited knowledge of the international standard and a poor overseas network, you can never attract a number of foreign tourists to your hotel.

8) Tourism

4.36 Tourism has become an increasingly important sector for economic development and is expected to become a core industry of the city in its plan to become a world-class gateway to the World Heritage Sites in Hue, Danang, and Quang Nam. Tourism is discussed in detail in Part V of this report.

9) Monitoring Indicators

4.37 In order to ensure the local economy develops in sustainable manner, it is suggested to introduce a set of indicators to monitor the performance of the economic development (see Table 4.2.11).

Table 4.2.13 Main Indicators for Economic Development

Scope	Key Concerns	Indicators
Economic Level	<ul style="list-style-type: none"> Expand GRDP Increase income 	<ul style="list-style-type: none"> GRDP and growth rate Per capita GRDP
Economic Structure	<ul style="list-style-type: none"> Shift to services Expand new business Expand SMEs 	<ul style="list-style-type: none"> Share of 1 / 2 / 3 sectors Share of new industries Share of SMEs
Economic Performance	<ul style="list-style-type: none"> Shift to quality Enhance productivity 	<ul style="list-style-type: none"> Productivity of economic subsectors Productivity of establishments by type of ownership
Investment	<ul style="list-style-type: none"> Expand investment Improve investment environment Encourage local SMEs 	<ul style="list-style-type: none"> Amount of FDI and domestic investment Investment environment index Provision of supporting services

Source: DaCRISS Study Team.

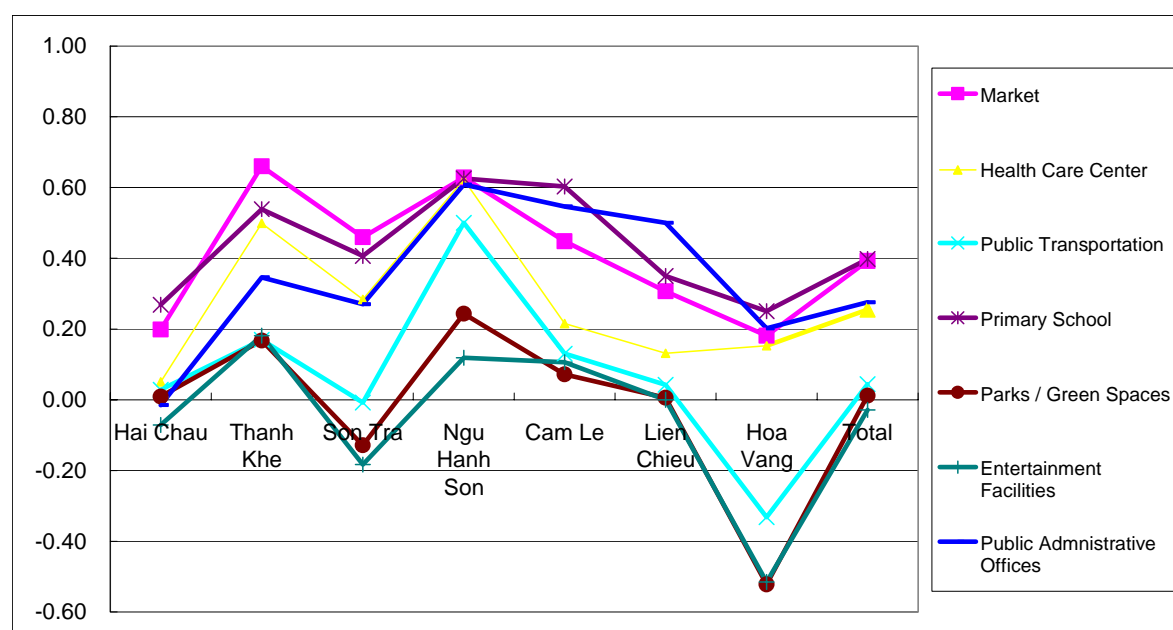
4.3 Social Development

1) Issues

4.38 While Danang City provides the people with relatively good social environment and services compared to other cities in the country, these are still inadequate. The following are the concerns that have been identified:

- (i) **Need for further reduction in poverty and inequality:** On the basis of DoLISA's definition of poverty (VND 260,000 / person / month in urban area and VND 200,000 / person / month in rural area are the threshold), it is estimated that there are about 4,000 poor households as of 2008 or 2% of the total households of the city.
- (ii) **Need for filling the demand–supply gap in urban services:** While provision of overall urban services is appreciated by the citizens in general, there are dissatisfaction against urban services in specific area and specific services.
- (iii) **Need for improved security against crimes, as well as in food and health:** Similarly there are needs for farther improvement in specific areas while overall situation is rather satisfactory.

Figure 4.3.1 Assessment on Access to Urban Services



Source: DaCRISS HIS, 2008.

Table 4.3.1 Security and Safety Perceived by Residents

	Current Conditions (%)			Compared to 5 years ago (%)			
	Bad	So - so	Good	Worsened	No Change	Improved	
City in General	3.7	35.6	60.3	6.3	20.7	23.0	
In Community of Respondents	Daytime	4.4	29.1	66.5	5.5	21.8	72.7
	Nighttime	7.6	37.2	55.2	7.8	24.6	67.6

Source: DaCRISS HIS, 2008.

2) Objective and Core Strategies

4.39 The objective of this sector is to ensure adequate living conditions, social harmony, intact communities, and poverty-free and equitable society. The core strategies for achieving these are the following (see Table 4.3.1):

- (i) Eradicate poverty;
- (ii) Provide improved basic services; and
- (iii) Improve safety/security in the city.

Table 4.3.2 Objective and Strategy for Social Development

◀ Goal ▶	
• Ensure basic services and guarantee safety / security for all	
Objective	Strategies
1. Eradicate poverty	<ul style="list-style-type: none"> • Identify causes and impacts of economic poverty specifically to establish effective measures. • Eradicate economic poor by providing adequate measures such as employment, training, financial support, etc. • Establish own criteria of the city to assess and identify poverty more comprehensively.
2. Provide improved basic services	<ul style="list-style-type: none"> • Establish effective method to identify specific needs for improved services through systematic survey and analysis with involvement of the people (e.g. household interview survey and Urban Karte conducted in DaCRISS) • Involve communities in improving local issues more effectively by empowering local initiatives (e.g. roadside parking, 3R in solid waste management, cleaning community roads and space, etc.)
3. Improve safety / security in the city	<ul style="list-style-type: none"> • Identify blackspots for various reasons at commune / area level with involvement of communities and prepare adequate maps. • Consolidate the blackspot maps and establish adequate measures with role - sharing at city and community levels. • Organize an adequate mechanism to improve the situation at community level with local initiatives and support of the city.
4. Enhance public awareness on urban issues and strengthen participatory approach	<ul style="list-style-type: none"> • Establish an adequate mechanism to gather voices of stakeholders • Establish an adequate mechanism for stakeholders to get involved in the process of planning and administration.

Source: DaCRISS Study Team.

3) Monitoring Indicators

4.40 The main monitoring indicators are as follows (see Table 4.3.3).

Table 4.3.3 Main Indicators for Social Development

Scope	Key Concerns	Indicators
Poverty	<ul style="list-style-type: none"> • Expand definition of poverty • Remove economic poverty • Attend wider aspect of poverty 	<ul style="list-style-type: none"> • Availability of expanded definition of poverty • Number of poor households according to DoLISA criteria • Availability of measures to attend poverty in expanded scope
Demand – supply gap in urban services	<ul style="list-style-type: none"> • Identify demand – supply gap specifically • Provide measures to fill the gaps 	<ul style="list-style-type: none"> • Coverage of services • Satisfaction of services • Availability of measures
Community involvement	<ul style="list-style-type: none"> • Establish a mechanism to gather satisfactions / opinions of residents • Establish a mechanism to involve communities in attending local issues 	<ul style="list-style-type: none"> • Availability of mechanism to hear voices of communities / residents • Availability of mechanism for communities / residents to get involved in the activities

Source: DaCRISS Study Team.

4.4 Environmental Management

1) Issues

4.41 Danang City faces the challenge of ensuring environmental sustainability which is currently being threatened by the lack of effective environmental management systems, the increasing numbers of industries and development moving to the city, and the low awareness of the people and establishments on the need to preserve and protect the environment. While the reduction and control of air, water, and soil pollution, as well as noise levels, is urgent and important, the city must likewise pay attention to the need to preserve the natural environment and the biodiversity of ecosystems because they are the very foundation of tourism. Building the city in a way that it is well prepared and provided with adequate measures against various natural disasters such as typhoon, flooding, erosion of river banks, salinization is also important. The main issues are briefly as follows:

- (i) Reduction and control of air, water, and soil pollution;
- (ii) Vulnerability to various natural disasters;
- (iii) Preservation of ecosystems; and
- (iv) Commitment to the global environmental agenda.

2) Objectives and Core Strategies

4.42 The city's environmental sustainability is the most important element to ensure economic and social sustainability. Compared with other cities, the environmental sustainability in Danang is much more closely linked with economic and social development; a rich and diverse natural environment, if preserved and enhanced, would bring about tremendous economic benefits through tourism and related industries, as well as environmental businesses, which attract quality investment and tourists from all over the world. A well-preserved natural environment also provides valuable space and attractions for residents in the city and surrounding regions. However, the current development trend does not guarantee the achievement of the above objectives. Objectives of environmental management are more specifically as follows:

- (i) Establish an effective system to remove and prevent from pollutions;
- (ii) Preserve ecosystem and develop eco-tourism;
- (iii) Strengthening of disaster preparedness and prevention measures;
- (iv) Commitment to global climate change;
- (v) Enhance social awareness and knowledge on environmental issues; and
- (vi) Develop institutional and organizational systems to manage the environment sustainably.

4.43 While management of environment sector needs to be looked from different angles as discussed in Table 4.4.1, it is proposed to establish integrated network of space including all valuable ecosystems, forests and green space, hazard areas, landscape resources, water bodies and so on. This network provides the city with foundation and backbone for conservation and development. This understanding is farther elaborated in spatial planning.

Table 4.4.1 Objectives and Strategies for Environmental Management

◀ Goal ▶	
<ul style="list-style-type: none"> • Establish environmental sustainability as the foundation and backbone of the growth management of the city • Develop environment as a driving force of socio – economic development and enhancement of the city's image 	
Objective	Strategies
Establish an effective system to remove and prevent from pollutions	<ul style="list-style-type: none"> • Attend to hotspots urgently • Provide anti – pollution measures • Establish effective monitoring system
Preserve ecosystems and develop improved eco – tourism	<ul style="list-style-type: none"> • Designate ecosystems for preservation • Establish environmental zoning • Expand eco – tourism in farther integration with environmental management
Strengthening of disaster preparedness and preparation measures	<ul style="list-style-type: none"> • Improve drainage system • Develop flood free urban lands • Establish early warning system
Commitment to global climate change	<ul style="list-style-type: none"> • Promote reducing carbon dioxide in all related subsectors • Prepare for the impact of global warming such as rise in sea level and frequent flooding, etc.
Enhance social awareness and knowledge on environment issues	<ul style="list-style-type: none"> • Incorporate environment issues in curriculum of primary / secondary education • Conduct adequate campaigns and public information • Facilitate access by stakeholders to necessary information
Develop institutional and organizational systems to manage environment sustainably	<ul style="list-style-type: none"> • Establish adequate institutions to oversee and promote environmental activities • Strengthen inter – sectoral and inter – department coordination

Source: DaCRISS Study Team.

3) Monitoring Indicators

4.44 The main monitoring indicators are as follows (see Table 4.4.2).

Table 4.4.2 Main Indicators for Environmental Management

Scope	Key Concerns	Indicators
Pollution	<ul style="list-style-type: none"> • Assess pollution levels • Provide measures • Monitor the situation 	<ul style="list-style-type: none"> • Appropriateness of established monitoring stations and methods (air, water, soil, coverage) • Practice of adequate measures
Ecosystems preservation	<ul style="list-style-type: none"> • Designate valuable ecosystems • Preserve designated ecosystems 	<ul style="list-style-type: none"> • Specification of ecosystems to be preserved • Availability of legal arrangement for preservation • Availability of monitoring system
Disaster preparedness	<ul style="list-style-type: none"> • Identify hazard areas • Provide countermeasures 	<ul style="list-style-type: none"> • Availability of hazard mapping • Practice of measures and their effectiveness
Response to climate change	<ul style="list-style-type: none"> • Reduce green house gas • Assess impact of climate change scientifically and prepare for its impact • Expand information and knowledge exchange on climate change 	<ul style="list-style-type: none"> • Share understanding on the impacts of climate change in the society • Estimate of carbon foot print • Preparedness for possible negative impacts of climate change
Social awareness	<ul style="list-style-type: none"> • Strengthen environmental education 	<ul style="list-style-type: none"> • Expand environment in text book • Conduct campaigns • Access to necessary information
Environmental management institutions	<ul style="list-style-type: none"> • Establish adequate organizations for coordinated management • Provide adequate rules and regulations 	<ul style="list-style-type: none"> • Availability of effective organization and capacity • Provision of adequate regulations • Allocation of adequate budget

Source: DaCRISS Study Team.

4.5 Spatial Development

1) Issues

4.45 Danang City is compact like many cities in Vietnam. The urban area is small, has a high population density, provided with necessary services, and bustling with business activities. Nighttime and daytime population densities are high, often exceeding 400 to 500 persons per hectare. This compact urban area suits walking and using bicycles and motorcycles so much that the people spend a short time only in commuting to offices, to school, as well as for business and private purposes. Although a high-density development with low-rise houses/buildings does not allow the people to live in large spaces, the living conditions in Danang City are in general satisfactory to most people. In short, the traditional urban area which developed in Vietnamese cities is a successful model in spatial development which many cities in both developed and developing cities in the world are commonly aiming for.

4.46 While the conventional urban areas are compact, new developments tend to spread thinly, creating urban sprawl. This is evident not only in Danang but also in almost all the cities in Vietnam, including Hanoi and Ho Chi Minh. Under the banner of modernization, such prototype development is taking place all over the world. Would urban areas with wide streets, high-rise apartments and buildings, and big, open spaces be the desired model for Vietnamese cities in the future? The answers are both yes and no. Physical appearance is one thing, but the more important issue is whether or not this type of development can guarantee the people with good access to public transportation, affordable housing, and convenient services in a cost-effective manner and efficiently using limited land without harming the environment. At present, however, many modern development projects in the country are private car-oriented, which not only produce the exact opposite of the above, but also effectively shut out low- to middle-income groups. These development projects likewise do not show any hint of the rich and diverse culture of the country, something that many existing communities possess.

4.47 In Danang City, investors prefer constructing high – rise buildings for commercial / business and residential purposes in the existing urban areas by clearing the existing buildings / facilities, mainly due to readily available infrastructure, amenities and services in surrounding areas and the market. Although, it is logical from a private sector investment viewpoint if the trend continues concerns may arise on the following:

- (i) Farther densification and concentration of the new high – rise development may attract more vehicular traffic and amplify congestions;
- (ii) The diversification of the activities may bring about excessive pressure on available activities; and
- (iii) Development of high – rise building may become a conflict with airport operation.

4.48 Location of the international airport in the city centre involves both pros and cons. Advantages include proximity to the city centre and main destinations, while disadvantages include noise and safety as well as restriction in building height in the area around the airport. Opportunity cost of the airport at existing location is also high. Notwithstanding, it is the study team's view that the airport might as well stay as it is, due to the following reasons;

- (i) Danang's role and capacity may be reduced if the airport is relocated to outside the city. In fact there is no adequate alternative locations in the vicinity of the city;

- (ii) Nearness to the international gateway airport is a critical factor for success of Danang City which intends to function as the connecting points with the world and the service centre of CFEZ; and
- (iii) As estimated, frequency of the flights will not be as much as the current Tan Son Nhat airport, the expected noise pollution will be within tolerable level. Technological improvement on the aircrafts also be a positive factor.

4.49 In Danang City, three main different types of developments are notable. One is the construction of high – rise buildings in the existing urban centre and its neighboring areas, and the second is low – density development in the fringe and suburban areas, and the third is resort development along the long beach. This development trend is a cause for the following fears:

- (i) Excessive development of high – rise buildings for commercial / business and residential purposes for higher income market, will promote farther densification of the city centre and generate more car traffic which may worsen traffic situation.
- (ii) Development of high – rise buildings unless they are properly guided may spoil urban landscape of the city centre with traditional value and affect negatively to the operation of the airport which is becoming more and more important for the future development of the city.
- (iii) Expansion of the urban area towards outer area may contribute accelerating the sprawl which is feared to lead to ineffective and low density landuse. This type of development will require higher cost for providing necessary infrastructure, reduce accessibility to necessary services, consume more energy and generate more pollutions and carbon dioxide. It is also difficult to provide public transport services effectively. It is necessary to guide this type of developments in a way that they enhance convenience of the people and various urban activities, reduce costs for necessary infrastructure provisions, mitigate negative impacts on environment and strengthen disaster preparedness.
- (iv) Resort developments along the beach and coastline must be more regulated and guided not only from environmental viewpoint but also securing access of the people to precious public space. It is feared that current developments constrain or limit the access to and openness of the beaches only for the use of resorts. Impacts of the resorts development on marine ecosystems need also to be assessed.
- (v) Preservation and controlled development of forest and mountain areas are important for the city to mitigate natural disasters, preserve precious fauna and flora, maintain skyline and landscape. It is also important to integrate rural and mountain areas with urban areas to improve the access and provision of necessary urban services in those areas, and to encourage environmental friendly development such as eco – tourism.

4.50 The main issues in spatial development are briefly as follows:

- (i) Sprawling urban areas;
- (ii) Lack of land-use control; and
- (iii) Lack of growth management strategies.

2) Objectives and Core Strategies

4.51 An important objective of spatial development is to build a spatial framework to promote and support the desired economic, social, and environmental development, since urban form and structure affect the efficiency of economic and social activities and environmental sustainability. In addition, Danang must build a more distinguishable image to appeal to the world with due consideration to the fact that Danang is the entrance to the heritage sites in the country. A clear recognizable image of Danang is the passport to the competitive world of tourism and FDIs. For this, spatial development including urban design is an important planning element. The core strategies to achieve the objective are briefly as follows:

- (i) Update urban master plan and control mechanism to ensure envisioned development;
- (ii) Establish effective mechanism to control / manage land use especially peri-urban areas;
- (iii) Develop new urban centers and redevelop existing urban areas;
- (iv) Enhance urban landscape; and
- (v) Enhance amenity by developing parks / green space and recreation facilities.

Table 4.5.1 Objectives and Strategies for Spatial Development

◀ Goal ▶	
• Develop competitive, livable and environmentally sustainable urban area through strategic management of available land and space	
Objective	Strategies
Establish green and open space network as foundation of spatial development	<ul style="list-style-type: none"> • Establish environmental zoning provided with adequate legal basis • Develop green and open space network involving, among others, forests, ecosystems, water bodies, hazard areas, heritages, park and gardens, beaches, which provide foundation of urban development • Preserve water front space both from disaster management and landscape viewpoints • Establish coordinated mechanism to manage the environment network to enhance its quality and appropriate utilization
Promote public transport – based compact city	<ul style="list-style-type: none"> • Build consensus on the concept of public transport based compact city • Establish an effective public transport system to provide the residents with attractive mobility • Guide urban development in integration with public transport development (e.g. new CBD + LRT/BRT, underground space development for commercial facilities and parking facilities + underground LRT stations, commercial / business / administration facilities + new railway station, new airport terminal + business complex)
Develop new urban centres and redevelop existing urban centre	<ul style="list-style-type: none"> • Establish three distinctive CBDs with adequate role – sharing among them to avoid excessive concentration to existing urban centre (Shift from mono – centre to poly – centric spatial pattern) • Develop competitive new CBD in the south of the city to meet increasing demand for high quality urban services for locations of global / international business entities, and to guide further urban development in organized manner • Develop administrative centre in the north – west of the city in integration with planned regional transport services (VNR and high – speed railway)
Upgrade existing urban areas	<ul style="list-style-type: none"> • Clarify existing urban areas for several clusters with own unique characteristics. For example, urban clusters along the beach and Han River, those in historical areas, those in rural and mountain areas, and those adjoining the airport and port. • Establish unique and sustainable development concept for each cluster • Establish practical methods for development of the existing urban areas to achieve envisioned concepts
Exercise urban design for strategic areas or locations to enhance image of the city	<ul style="list-style-type: none"> • Identify and designate areas / zones which need special attention for urban design and landscape such as, among others, “traditional urban areas”, “areas along Han River”, “areas along beaches”, “Son Tra”, “Hai Van” • Establish adequate zoning system to ensure landscape and urban design of the designated areas • Prepare and enforce guidelines on landscape and urban design for designated areas / zones
Establish effective mechanism to control / manage developments and landuse in all areas in the city	<ul style="list-style-type: none"> • Establish effective mechanism to guide and control developments in a way to promote envisioned concepts • Establish clear guideline for the development in the areas affected by airport operation

Source: DaCRISS Study Team.

3) Monitoring Indicators

4.52 The main monitoring indicators are as follows (see Table 4.5.2).

Table 4.5.2 Main Indicators for Spatial Development

Scope	Key Concerns	Indicators
Overall growth management	<ul style="list-style-type: none"> • Avoid sprawl • Promote compact use of space • Promote effective use of lands 	<ul style="list-style-type: none"> • Control of development outside growth boundary • Population density • Landuse by purpose
Green and open – space network	<ul style="list-style-type: none"> • Secure appropriate space for green and open – space network • Ensure connectivity of network • Establish adequate management mechanism 	<ul style="list-style-type: none"> • Area of green and open – space • Degree of connectivity • Availability and effectiveness of management mechanism
Public transport based compact city	<ul style="list-style-type: none"> • Ensure mobility by public transport • Promote integrated urban development 	<ul style="list-style-type: none"> • Population within the coverage of public transport services • Degree of business / commercial activities along the public transport routes

Source: DaCRISS Study Team.

4.6 Housing and Living Conditions Development

1) Issues

4.53 Housing and living environment are the most critical concerns of the people living in the city. Moreover, the people's needs and demands for better conditions will increase as economic levels increase and lifestyles change. Increasing number of immigrants to the city must also be provided with adequate shelter. The main issues in this aspect are as follows:

- (i) Lack of affordable housing for low-income groups and migrants including workers and students;
- (ii) Housing structures that are vulnerable to natural disasters; and
- (iii) Need to respond to the changing lifestyles of the people.

2) Objective and Core Strategies

4.54 Providing adequate housing and satisfactory livability is one of the most important responsibilities of the government. However, this does not mean that the government will provide for all housing needs; rather, it should establish an effective mechanism that will provide affordable housing to all classes of people, especially the low-income groups. The mechanism must clarify the roles to be shared among government, the private sector, communities, and individuals. Housing demand by different types of households must also be made clear in view of their different housing requirements, their affordability levels, access to finance, etc., The core strategies to achieve the objective include the following:

- (i) Provide affordable housing for low income group;
- (ii) Develop improved housing standards and designs; and
- (iii) Establish comprehensive living environment improvement mechanism.

Table 4.6.1 Objectives and Strategies for Housing and Living Conditions Development

◀ Goal ▶	
• Provide adequate housing and living environment for all, especially the low income group	
Objective	Strategies
Provide affordable eco – housing for low income group	<ul style="list-style-type: none"> • Develop improved standards and designs on low – cost, energy saving and disaster proof collective housing which will fit to local conditions of the CFEZ • Establish affordable mechanism for low income group to access the housing • Coordinate with MOC on the low cost housing policy
Promote low cost eco – housing industries to meet the demand in the central region	<ul style="list-style-type: none"> • Encourage location of housing industries which are interested in the low cost eco housing business • Provide incentives for the interested housing industries • Introduce ODA to develop an initial base for industrial development
Establish comprehensive living environment improvement mechanism and implement it	<ul style="list-style-type: none"> • Establish an effective mechanism to assess living environment comprehensively based on Urban Karte prepared in DaCRISS • Establish an appropriate mechanism to reflect the results of assessment in the implementation plan of the city • Empower communities to participate in the process

Source: DaCRISS Study Team.

3) Monitoring Indicators

4.55 The main monitoring indicators are as follows (see Table 4.6.2).

Table 4.6.2 Main Indicators for Housing and Living Conditions Development

Scope	Key Concerns	Indicators
Demand for affordable housing	<ul style="list-style-type: none"> • Affordability • Physical aspect of housing • Access to services 	<ul style="list-style-type: none"> • Price • Space of housing • Structure • Utilities connection • Location
Supply of affordable housing	<ul style="list-style-type: none"> • Affordability • Technology • Government support to industries • Government support to end users 	<ul style="list-style-type: none"> • Cost • Supply capacity (space / units) • Adequate design standards • Housing loans • Subsidies
Comprehensive assessment of living conditions	<ul style="list-style-type: none"> • Objective assessment of living conditions at commune level • Satisfaction of the people on current living conditions • Identification of demand – supply gap in living conditions 	<ul style="list-style-type: none"> • Detailed descriptions are made in Urban Karte (indicators are grouped in the following categories: convenience, safety & security, health & well-being, amenity, capacity)

Source: DaCRISS Study Team.

4.7 Transportation Development

1) Issues

4.56 The overall transportation situation in Danang City is relatively good compared with other Asian cities. Compact urban areas and high levels of ownership of vehicles, such as bicycles and motorcycles, contribute to short travel times to address various travel purposes. The average travel time for door-to-door transportation in the city is as short as 14–15 minutes. Traffic congestion has been increasing but this is limited to certain locations and hours. The more serious concern is traffic safety due to higher travel speeds here than in other cities. Moreover, the real threat to the viability of urban transportation is expected to occur in the future, that is, if current motorcycle users shift to private cars. Streets that can be considered wide at present will instantly be filled up by cars and narrow city streets in the city center will get choked. The main issues in this sector are as follows:

- (i) Worsening traffic safety and congestion on certain roads / intersections;
- (ii) Lack of parking in the city center;
- (iii) Lack of public transportation services; and
- (iv) Need to prepare for increased number of cars.

4.57 Developing an efficient and effective public transportation is key to the future sustainability of urban transportation in Danang.

2) Objective and Core strategies

4.58 The objective of urban transportation is to ensure people's mobility and access to needed services, as well as goods movement, in the most cost-effective and environment-friendly manner, wherein the commitment to the global environment agenda is also considered. The core strategies to achieve the objective are as follows:

- (i) Establish effective interface between urban and regional transport;
- (ii) Develop attractive public transport system integrated with urban development;
- (iii) Develop effective roads system in integration with land use;
- (iv) Strengthen traffic management system for efficient and safe movement of passenger and freight; and
- (v) Develop water transport services.

4.59 Transportation development of Danang City must consider both urban transport and regional transport in an integral manner to ensure smooth traffic of two different types of transport (see Table 4.7.1 and 4.7.2).

Table 4.7.1 Objectives and Strategies for Urban Transportation Development

◀ Goal ▶	
Objective	Strategies
<ul style="list-style-type: none"> • Safety must be ensured for passenger and goods transport • People must be provided with adequate means of transport • Access to various destinations must be ensured • Transportation services must be provided with affordable price • Transportation should not be harmful to environment 	
Ensure provision of safe transport	<ul style="list-style-type: none"> • Identify and remove black spots • Strengthen traffic enforcement • Improve infrastructure and facilities
Reduce traffic congestions	<ul style="list-style-type: none"> • Improve traffic control and management such as one – way, parking, lane control, intersection signalization, etc. to increase available road capacity • Expand public transport and control car use • Introduce demand management such as commuting and schooling at staggered time initially and more drastic measures later
Improve traffic management	<ul style="list-style-type: none"> • Introduce comprehensive traffic management measures for CBD and main traffic corridors in combination of infrastructure / facilities provision, traffic control and enforcement and education of the people • Manage road side parking in coordination with local communities more effectively • Enforce urban development (office / commercial buildings) to provide adequate space and parking facilities for their customers and activities • Control the use of cars through adequate pricing such as higher fees for parking and registration
Develop competitive public transport services	<ul style="list-style-type: none"> • Establish core public transport network which provides the backbone of the city, linking main CBDs and traffic generating sources such as airport, railway stations, and ports. • Introduce attractive and congestion free services for the backbone public transport lines such as BRT, LRT and the like. • Establish comprehensive public transport network in integration with the core network and feeder services by bus and other modes. • Provide affordable services for all including the poor and disabled. • Leverage private sector’s capacity to tap their investment funds and management capabilities.
Promote green and clean urban transport	<ul style="list-style-type: none"> • Shift urban transport vehicles to those of clean energy and low carbon emission types • Expand opportunities to use bicycles and walking by improving infrastructure and environment
Enhance awareness of the people on urban transport	<ul style="list-style-type: none"> • Incorporate urban transportation issues in the text book of primary and secondary school • Conduct adequate campaigns at city and community levels on traffic safety, driving manner, public transport use, etc.

Source: DaCRISS Study Team.

Table 4.7.2 Objectives and Strategies for Regional Transportation Development

◀ Goal ▶	
<ul style="list-style-type: none"> Strengthen connectivity through improved infrastructure and competitive services between Danang and other regions at CFEZ, national and international levels Strengthen function of transportation hub for GMS through improved intermodal services via road and air 	
Objective	Strategies
Strengthen direct connection between Danang City and the world, to make Danang as an internationally competitive gateway	<ul style="list-style-type: none"> Strengthen gateway function of existing airport by expanding facilities and air routes between major cities in Asia Expand air routes within GMS, especially those connecting world heritages (e.g. Luan Prabang, Siem Riep, Li Jiam, Pagan, etc.) Improve environment at the gateway airport to provide good image for visitors and tourists Expand cruise ship services including Danang as a destination Strengthen feeder land transport and logistics services to provide integrated services with destinations in adjoining provinces
Strengthen integration between inter – provincial and urban transportation	<ul style="list-style-type: none"> Establish proper interface between inter – provincial transport network (NH01, North – South Expressway, VN Railway, and High – speed railway) to ensure smooth transport without traffic conflict Provide adequate access to the airport and railway stations to ensure inter – modal connectivity
Strengthen transport connectivity within CFEZ	<ul style="list-style-type: none"> Improve road network connecting Danang with adjoining provinces to ensure good accessibility to tourism destinations in the region Develop new tourism routes and tour services

Source: DaCRISS Study Team.

4) Monitoring Indicators

4.60 The main monitoring indicators are as follows (see Table 4.7.3).

Table 4.7.3 Main Indicators for Transportation Development

Scope	Key Concerns	Indicators
Traffic safety	<ul style="list-style-type: none"> Cause of traffic accidents General satisfaction on traffic safety 	<ul style="list-style-type: none"> Number of traffic accidents
Traffic congestion	<ul style="list-style-type: none"> Traffic management measures General satisfaction on traffic conditions 	<ul style="list-style-type: none"> Average time to reach destination
Competitive public transport development	<ul style="list-style-type: none"> Government support (including subsidies) Satisfaction of public transport users 	<ul style="list-style-type: none"> Coverage of area provided by service Modal share between public and private transport modes
Regional connection	<ul style="list-style-type: none"> Access to airports, railway stations, etc. Satisfaction of regional transport service users (road, air, rail, etc.) 	<ul style="list-style-type: none"> Number of cities connected via regional transport (domestic and international) Increase of tourists to / from other regions

Source: DaCRISS Study Team.

4.8 Urban Infrastructure and Utilities

1) Issues

4.61 Many locations in the city still lack sufficient coverage of basic urban infrastructure and utilities in both quantity and quality. Ageing facilities result in losses and cause disruptions to services, and inefficient services cause low productivity and higher operating costs. They also affect the environment and the quality of life in various ways. The main issues in this sector include the following:

- (i) Need for infrastructure and services to cover the entire population;
- (ii) Need to improve the efficiency of providing services;
- (iii) Need to enhance the recovery of investment costs.

2) Objective and Core strategies

4.62 The provision of adequate urban infrastructure and utilities is the foundation for competitive and livable cities, affecting economic and social development and environment sustainability. The provision of facilities and services is the responsibility of the government, but it is important to involve the private sector more actively in the development and operation of the services and encourage users to pay more to cover the costs of services. The core strategies include the following:

- (i) Develop efficient and effective supply network and facilities including water supply, power, telecommunications, drainage and sewerage, solid waste management, etc;
- (ii) Improve operation and management mechanism; and
- (iii) Promote user-paying principle / Awareness for saving consumption.

Table 4.8.1 Objectives and Strategies for Urban Infrastructure and Utilities Development

◀ Goal ▶	
<ul style="list-style-type: none"> • Ensure the people's safety and healthiness • Provide adequate services for economic activities • Contribute to enhancement of environment, removal of pollution and disaster prevention 	
Objective	Strategies
Expand coverage of improved utilities services both for urban and rural areas	<ul style="list-style-type: none"> • Identify areas which still lack of basic utilities services, especially in rural areas such as Hoa Vang • Renew and upgrade old facilities in the existing urban areas • Establish beneficiaries – pay principle to ensure sufficient financial resources for further investment in utility services
Improve drainage / sewage system to improve sanitary conditions and prevent from flood	<ul style="list-style-type: none"> • Enforce connection of households to centralized sewer systems and phase out of conventional septic tanks to prevent further ground water pollution as well as flooding • Introduce wastewater treatment facilities in industrial areas, medical facilities, etc. to prevent pollution in water bodies and soil pollution (e.g. leachate from Khanh Son old landfill site)
Improve solid waste management	<ul style="list-style-type: none"> • Maintain the current solid waste collection system by periodically upgrading old facilities and equipments • Reduce the volume for final dumping and promotion of increase rate of recycle and reuse and take into account the establishment of intermediate treatment plants • Utilize and commence the operation of hazardous waste treatment facilities constructed in the Khanh Son landfill site

Source: DaCRISS Study Team.

3) Monitoring Indicators

4.63 The main monitoring indicators are as follows (see Table 4.8.2).

Table 4.8.2 Main Indicators for Urban Infrastructure and Utilities Development

Scope	Key Concerns	Indicators
Coverage of basic utilities	<ul style="list-style-type: none"> Expand serviced area Establish beneficiaries – pay principle 	<ul style="list-style-type: none"> Coverage of services Percentage of fees collected
Drainage / sewage system	<ul style="list-style-type: none"> Shift to centralized systems Treatment for special facilities (industries, hospitals) Discharge water during flood 	<ul style="list-style-type: none"> Household connection to centralized systems Percentage of treated wastewater Inundated area during flooding
Solid waste management	<ul style="list-style-type: none"> Maintaining the current collection system Reducing solid waste and recycling Treatment for special facilities (industries, hospitals) 	<ul style="list-style-type: none"> Number of bins in city Coverage of treatment Total amount of solid waste waste Percentage of treated solid waste Percentage of recycled solid waste Number of facilities for special treatment (industries, hospitals)

Source: DaCRISS Study Team.

4.9 Human Resource Development

1) Issues

4.64 While there is a rich potential reservoir of human resources in Danang and the rest of the region, it is not fully tapped nor developed in a way that it matches the actual demand for skilled workforce. The same is true for other provinces in the region. The main issues are briefly as follows:

- (i) Mismatch in available and needed human resources in the service sector;
- (ii) Need to improve the capabilities of the people; and
- (iii) Need to strengthen human capacity in Danang and CFEZ.

4.65 Training for high skilled labor forces is a major issue for the city. Currently, a national project to establish an international university is planned by ADB fund. France is funding for Hanoi, Germany for Ho Chi Minh, United States or Can Tho, and there is possibility for either Japan or United Kingdom to fund for Danang. This university should be the center of higher level education as well as the center of high technology research and development, in cooperation with the High – Tech Park planned by the city.

4.66 In addition, there is a need to for common workers in the city as well. The Study Team currently estimates nearly a net migration rate of 3.9% in 2025, accounting for more than an annual 57,000 migrants (see Chapter 3.3 for details). A portion of these migrants will supplement the labor force for needed common workers in the city.

2) Objective and Core strategies

4.67 A highly skilled workforce is a critical component of socio-economic development and environmental management. It is an asset that must be developed in accordance with the economic development orientation of strategic sectors as tourism, services, knowledge-based industries, environmental management, and public administration, among others. The core strategies to achieve the objective are as follows:

- (i) Expand and upgrade higher education;
- (ii) Strengthen vocational training in compliance with sector development strategies; and
- (iii) Expand interchange of human resources at national and international levels.

Table 4.9.1 Objectives and Strategies for Human Resource Development

◀ Goal ▶	
• Develop Danang as a centre of human resource development in Vietnam	
Objective	Strategies
Expand and strengthen higher education to meet increasing demand at city, CFEZ and national levels	<ul style="list-style-type: none"> • Strengthen higher education to match the needs of existing and new industries such as eco – business, eco – tourism, healthcare, business management, services, etc. for higher level of demand • Develop Danang City as a significant centre for higher education through development of University Town • Strengthen network with international quality universities in the world
Expand and strengthen vocational training	<ul style="list-style-type: none"> • Identify matching needs of the market to provide adequate training and retraining programs • Strengthen coordination with existing establishments with international standards located in Danang and its adjoining areas to provide trainees with the best internship opportunities • Strengthen coordination with existing vocational schools, training centres and higher education located in Danang and CFEZ to enhance synergy of coordination • Leverage various volunteer programs of donor countries and NGOs to integrate with the above vocational training

Source: DaCRISS Study Team.

3) Monitoring Indicators

4.68 The main monitoring indicators are as follows (see Table 4.9.2).

Table 4.9.2 Main Indicators for Human Resource Development

Scope	Key Concerns	Indicators
Higher education	<ul style="list-style-type: none"> • Education for new business • Government support for universities and colleges 	<ul style="list-style-type: none"> • Enrolment Ratio • Variety of curriculum for students • Tuition fees
Vocational training	<ul style="list-style-type: none"> • Identification of demand – supply gap in vocational training • Government support for vocational schools • Cooperation between vocational schools and enterprises 	<ul style="list-style-type: none"> • Number of internships • Number of trained workers • Variety of curriculum for students • Tuition fees

Source: DaCRISS Study Team.

4.10 Management Capacity Development

1) Issues

4.69 Public management is key to the successful development of all sectors in a sustainable manner. It affects efficiency and effectiveness in implementing policies. The main issues in this sector include the following:

- (i) Time-consuming approval process;
- (ii) Lack of public information; and
- (iii) Lack of implementation mechanism for the approved master plan.

4.70 Municipal finance has always been a critical agenda of cities all over the world. Public fund is always insufficient to cover needed investments to satisfy all requirements of urban residents. The main issues in this sector include the following:

- (i) Lack of financial sources; and
- (ii) Need to improve the use of funds.

2) Objective and Core strategies

4.71 The role of government is changing not only in Vietnam but also in the rest of the world. Government is expected to play more the role of facilitator than as provider of infrastructure and services. Public management will eventually therefore involve the private sector and communities more in urban management. The core strategies to achieve the objective include the following:

- (i) Strengthen planning capacity and institutional framework for urban development and management; and
- (ii) Establish effective public participation mechanism in urban planning, development and monitoring process.

4.72 The development and management of a city need a long-term policy commitment and stable funding to constantly meet the demand for infrastructure and in the operation and management. It is not only government but all stakeholders who are responsible for raising funds. The core strategies to achieve the objective include the following:

- (i) Expand own funding sources;
- (ii) Expand users-pay principle for urban services;
- (iii) Introduce PPP schemes; and
- (iv) Develop public finance capacity.

Table 4.10.1 Objectives and Strategies for Urban Management Capacity Development

◀ Goal ▶	
<ul style="list-style-type: none"> • Ensure coordinated and integrated urban planning and management • Promote effective implementation of the projects • Improve efficiency of urban administrative functions 	
Objective	Strategies
Strengthen the role of urban planning	<ul style="list-style-type: none"> • Strengthen coordinated planning among relevant departments to reflect the outputs in an integrated urban plan • Prepare adequate guidelines to assess development projects which are open to the public • Strengthen urban planning capacity to meet increasing demands for urban development • Establish performance indicators which facilitate monitoring projects and actions by stakeholders
Strengthen sector funding capacity	<ul style="list-style-type: none"> • Establish beneficiaries – pay principle and value capture mechanisms • Expand borrowing capacity • Establish practical mechanism of PPP
Expand project implementation mechanism	<ul style="list-style-type: none"> • Review existing methods • Develop alternative development methods based on the best – practice of other countries (e.g. land readjustment system, urban renewal, etc.)
Promote e – Government to increase efficiency and facilitate participation of stakeholders	<ul style="list-style-type: none"> • Introduce / expand ICT in urban planning and development management

Source: DaCRISS Study Team.

3) Monitoring Indicators

4.73 The main monitoring indicators are as follows (see Table 4.10.2).

Table 4.10.2 Main Indicators for Urban Management Capacity Development

Scope	Key Concerns	Indicators
Role of urban planning	<ul style="list-style-type: none"> • Develop development guidelines • Initiative from government to apply development guidelines • Monitor performance of projects 	<ul style="list-style-type: none"> • Availability of adequate development guidelines which are open to the public • Performance indicators to monitor development projects
Funding capacity	<ul style="list-style-type: none"> • Establish beneficiaries – pay principle • Initiative from government to establish PPP mechanisms 	<ul style="list-style-type: none"> • Taxing systems based on beneficiaries – pay principle • Number of PPP projects
Project implementation mechanism	<ul style="list-style-type: none"> • Extract applicable experiences from other countries 	<ul style="list-style-type: none"> • Number of applied international experiences
Utilization of Information and Communication Technology (ICT)	<ul style="list-style-type: none"> • Initiative from government to promote ICT for urban planning and development management 	<ul style="list-style-type: none"> • Diffusion of ICT use in urban planning and development management

Source: DaCRISS Study Team.

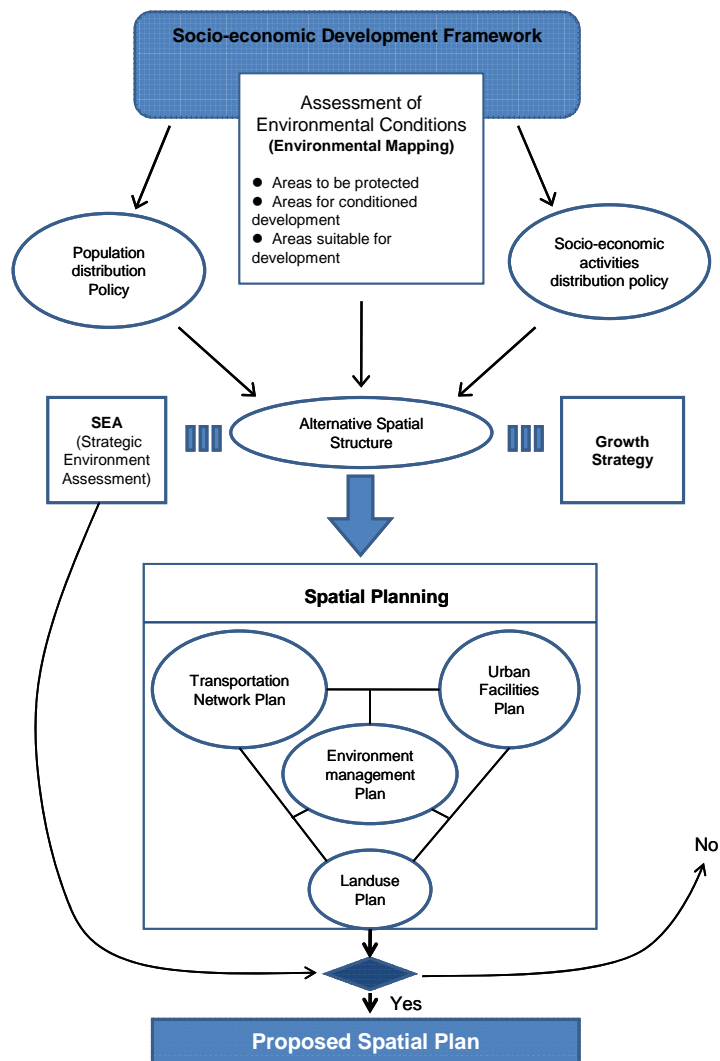
5 URBAN GENERAL PLAN FORMULATION

5.1 Methodology

5.1 Spatial planning intends to formulate physical urban structure and land-use plans in a way that environmental preservation and urban development ensures economic, social and environmental sustainability of the city. Approach adopted in the study for spatial planning is briefly as follows (see Figure 5.1.1);

- (i) Socio-economic development framework which represents future target size and quality of socio- economic activities of the city is elaborated;
- (ii) Natural conditions of the city are critically analyzed to identify areas for conservation and development;
- (iii) Alternative spatial structure is analyzed to assess optimum use of lands, costs of infrastructure and services as well as impact on environment; and
- (iv) Main components of spatial planning include land-use plan, transportation network plan and urban facilities plan which are to be integrated each other as well as with environment plan.

Figure 5.1.1 Approach to Planning of Danang City's Future Spatial Structure



Source: DaCRISS Study Team.

5.2 Analysis on Natural Environment and Development Suitability

1) Overview of Natural Conditions

5.2 For regional planning of Danang City, environmental consideration is one of the key issues to be analyzed, especially on those points above mentioned. In order to understand environmental constraints and development opportunities in Danang City, integrated DaCRISS GIS Database has been developed. Based on this GIS, various data analysis is conducted to support urban and regional planning work.

5.3 Danang City is located at the central part of Vietnam facing to South China Sea. Western part and northern part of the city is bounded by mountain ranges having more than one thousand meters above mean sea level. Alluvial flat land area formed by sedimentation by Han River and related river system is developed between these mountain range and coast line. Main characteristics are summarized as follows:

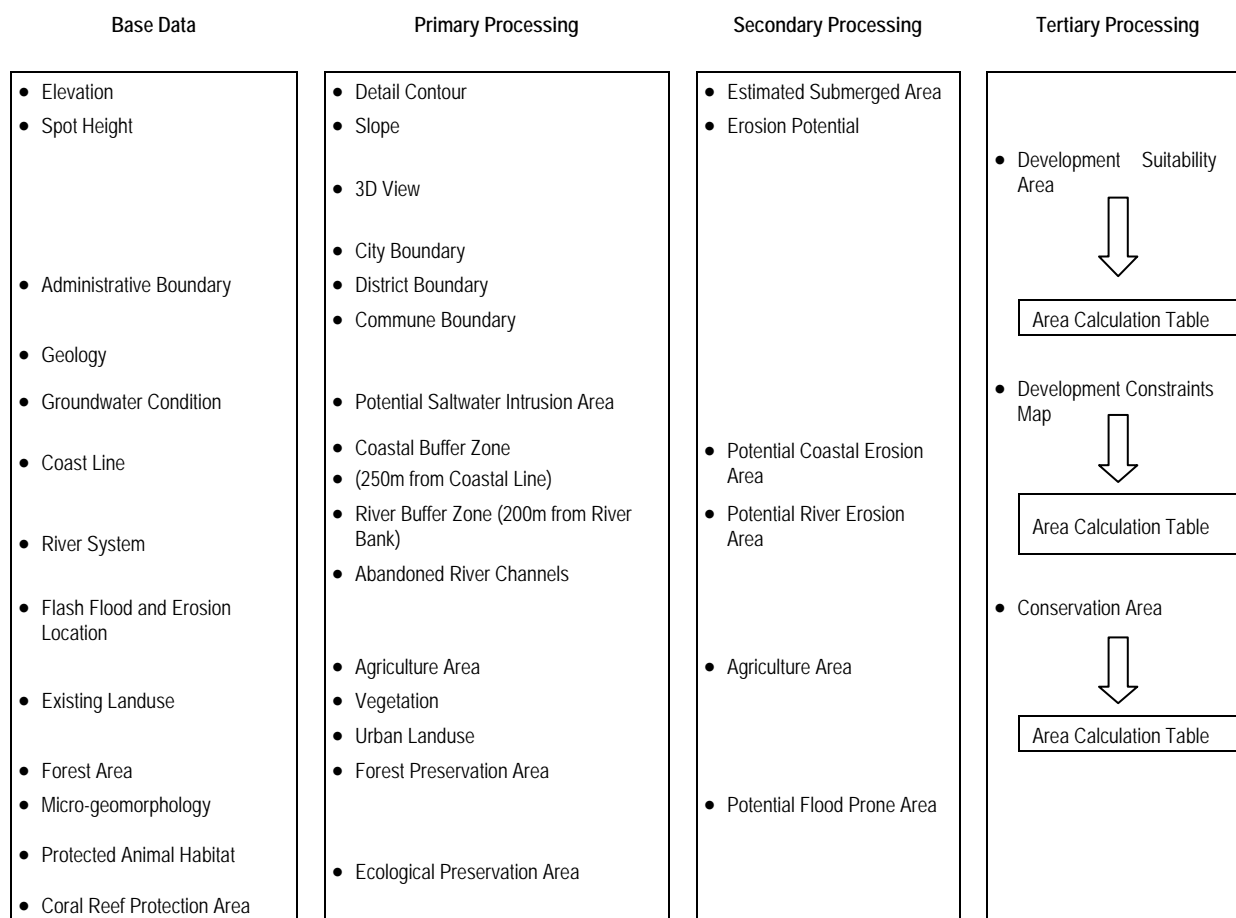
- (i) One of the topographic characteristics of flat land area is formation of large scale sand bar along the coastline. Some part of this sand bar topography, sand dune is formed. Deposition of coastal sand material can be transported and formed by combined process of tidal current, strong wave and wind.
- (ii) Rivers in upper reach are flowing basically from west to east and lower reach of river changed direction to north and flow into the sea. Along the lower reach of the river which is located at behind of coastal sand bar, low lying wet land area is developed. Generally, elevation of lowland area is showing 1–2 m above mean sea level, while coastal sand bar area is more than 2 m. Low lying wetland area will be vulnerable to flooding.
- (iii) Geology of lowland area is basically alluvium which is composed of sand, clay and gravels. Thickness of alluvium is around 30m or more near the coast. Volume of ground water use is not clear. However, over exploitation of ground water will cause salt water intrusion and land subsidence in future.
- (iv) Sedimentation process which is forming long and smooth coastline by river and coastal current in this area seems to be taking very sensitive balance. Any kind of large scale artificial structures which will break or affect on natural balance along the coastal area should be restricted.

5.4 Rise of sea level and climatic change such as change of rainfall condition or typhoon intensity by global warming will also affect on natural condition of this area from long term point of view. Natural disasters such as frequent flooding, land slide in sloped area, coastal erosion, high tide intrusion and strong wind damage will be caused.

2) Methodology

5.5 Basic geographic data has been collected as both paper maps and digital format and compiled into GIS Database as explained in the previous section. Out of input data items, physical and environmental data are combined to analyze development suitability and conservation suitability. Basic data items and data processing procedure are shown in Figure 5.2.1.

Figure 5.2.1 Structure of Development Suitability Analysis



Source: DaCRISS Study Team

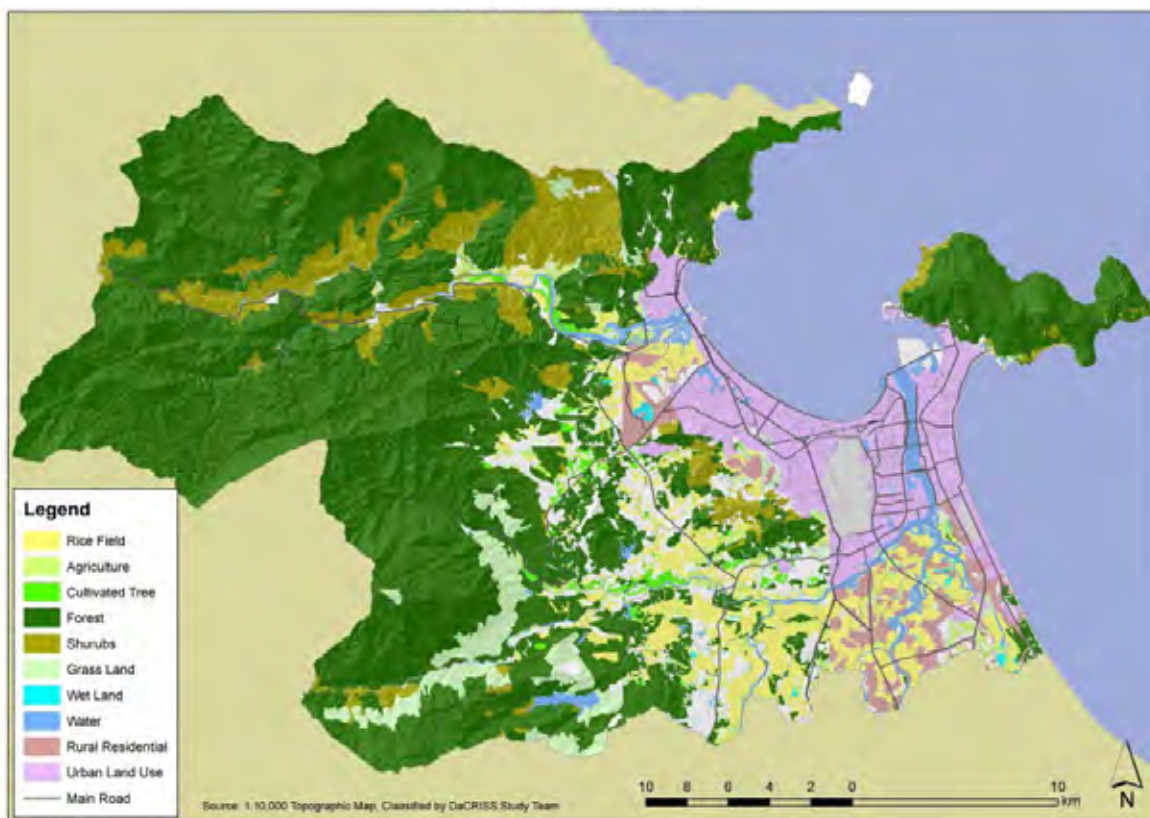
3) Primary Data Analysis

5.6 During primary data analysis, each collected data is examined, interpreted and various thematic maps were produced to highlight various aspects to get a better understanding of existing conditions. Brief explanations on the indicators used for analysis are made below. The indicators used are : (i) Land Use, (ii) Elevation, (iii) Micro-Elevation, (iv) Slope, (v) Geology, (vi) Micro-Geomorphology, (vii) Flood Water Depth, and (viii) River Erosion Sites and Flash Flood Locations.

5.7 **Land Use:** The land use types in the study area were categorized by the study team into nine types to show general land use based on the 1:10,000 topographic map. In Danang City, land use can be mainly classified in the urban and non-urban land use. The distribution of the land use shown in Figure 5.2.2. As compared to the total area of all Danang City (except Hoang Sa islands) of 950 km², the urban land use covers only 9% (88 km²).

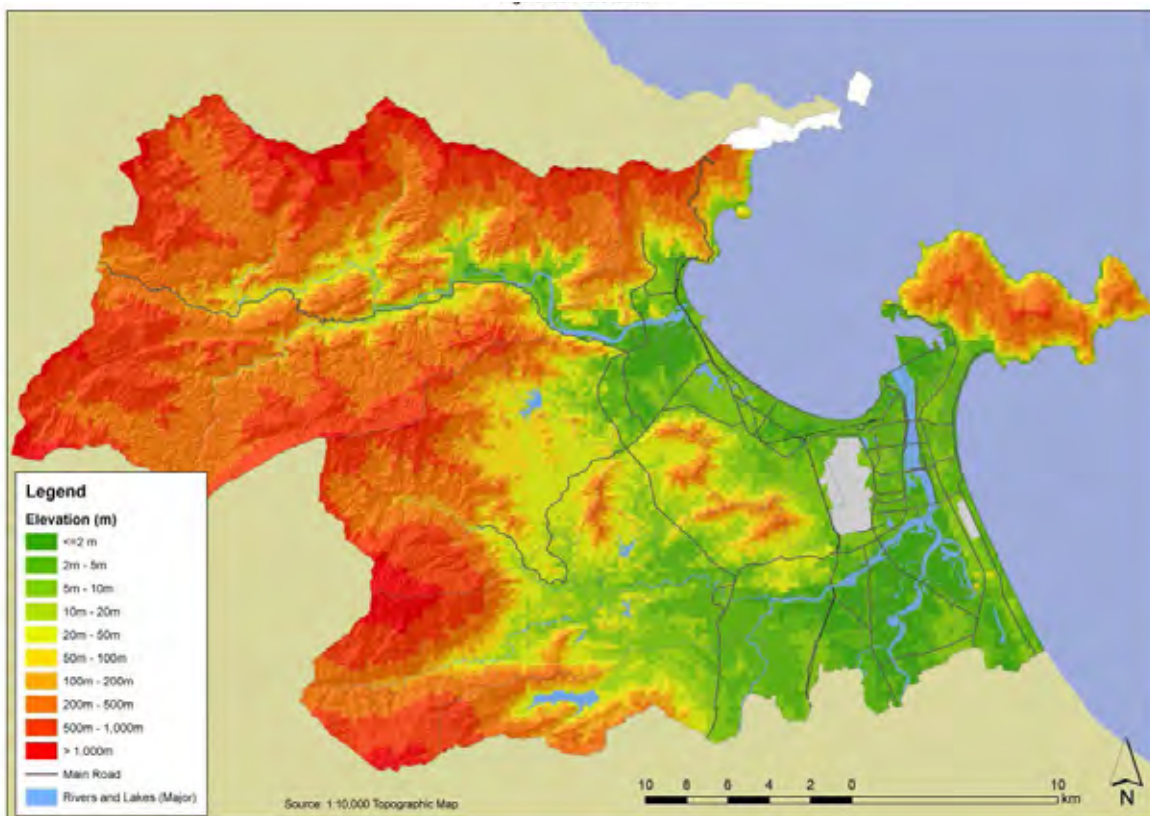
5.8 **Elevation:** The elevation of the Danang City ranges from 0m of seaside to 1670 m in the mountainous area in western part of the City. The eastern part of Danang City faces the sea and having the alluvial flatland, the western part is covered by the relatively high mountains. Based on topographic map, elevation distribution is shown in Figure 5.2.3.

Figure 5.2.2 General Land Use Condition



Source: DaCRISS GIS Database

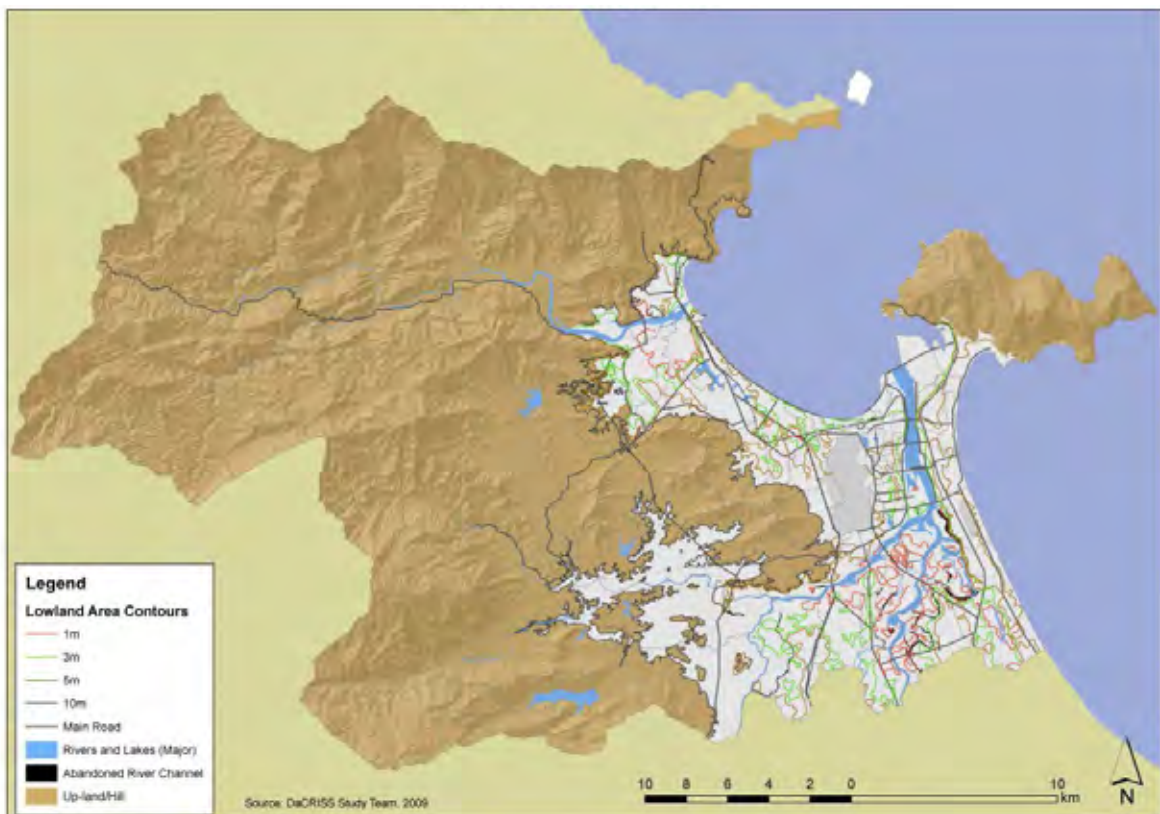
Figure 5.2.3 Elevation



Source: DaCRISS GIS Database, 2008

5.9 **Micro-elevation:** Alluvial lowland area of Danang City is formed by active sedimentation process both rivers and coastal current. Alluvial lowland is composed of very flat land area. However, topographic condition is different according to the type of micro-geomorphology. In order to identify micro-geomorphology of the lowland area, micro-elevation was analyzed based on spot height data. Spot height data were processed using TIN (Triangulated Irregular Network) software and contour lines were generated and drawn on the available topographical map. The contours were further edited (smoothing, etc.) based on topographic conditions as required. Detail contour lines such as 1 m, 3 m and 5 m were drawn and compiled to understand relative relief and difference of topographical condition in the lowland area (Figure 5.2.4). According to this detail contour map, urbanized area of existing Danang City including airport is mainly more than 5m above sea level and elevation of eastern coastal zones is also more than 5 m. The distribution of detailed contour lines is also indicative of flood prone areas.

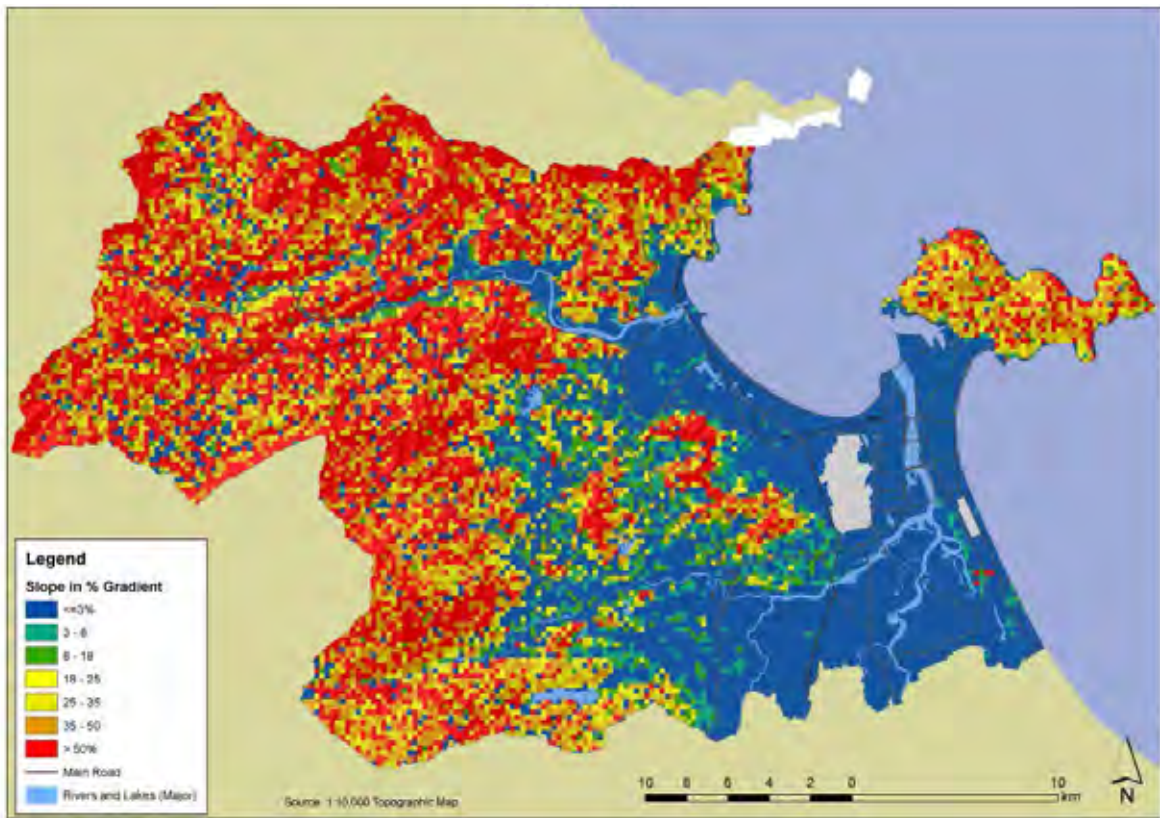
Figure 5.2.4 Micro-Elevation



Source: Compiled based on DaCRIS GIS Database.

5.10 **Slope:** Based on contour data, slope distribution was generated. Slope distribution is an important indicator for development suitability analysis. For convenience of calculation, 250 m grid cells were used. Slope degrees are classified into seven (7) categories in accordance to international standards. The distribution of slope is shows the flatlands in the eastern part along the coastal line and Han River as shown in Figure 5.2.5. According to slope map, 36% of Danang City covering 342 km² lies in flat areas having a slope of less than 3%, while 27% of the city which is equivalent to 257 km² lies in steep areas having a slope of more than 50%.

Figure 5.2.5 Distribution of Slope by Grid



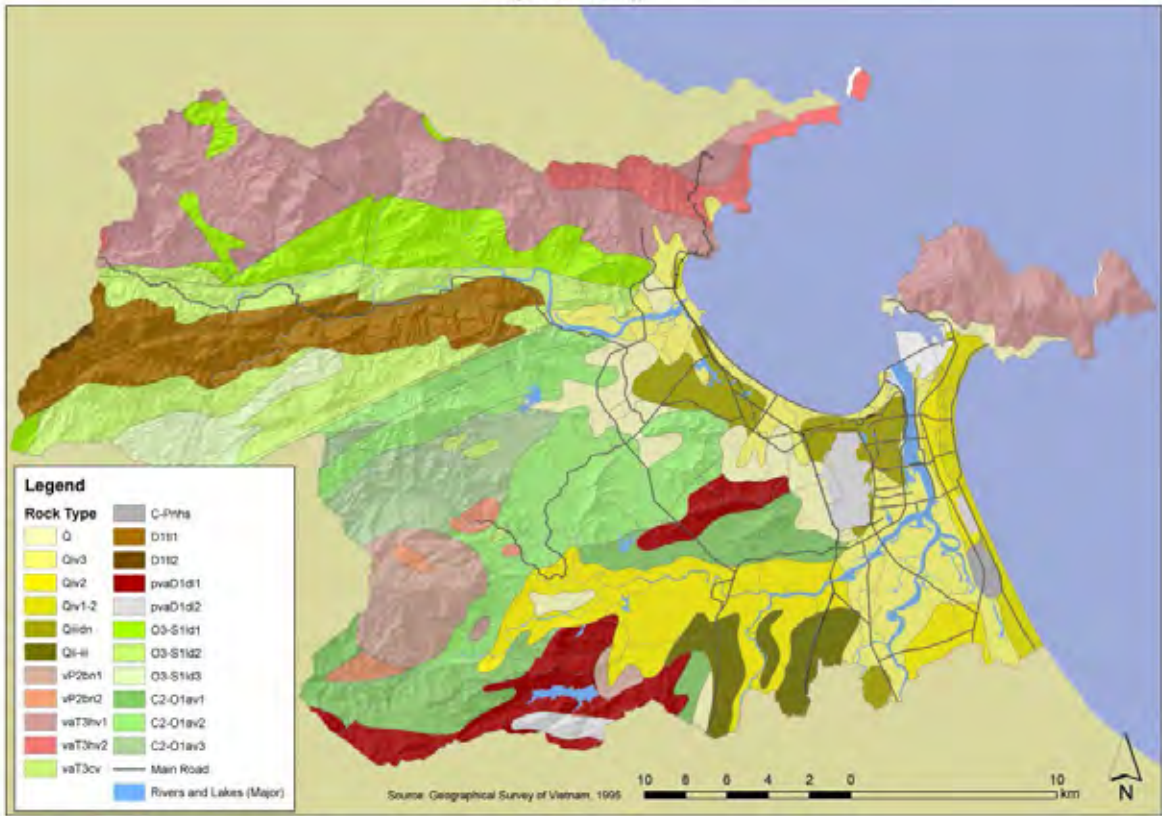
Source: Compiled based on DaCRISS GIS Database

5.11 **Geology:** The classification of the rock type is shown in Figure 5.2.6. Based on area calculation by GIS, 22% of Danang City land lies on Alluvium around the downstream area, which is suitable for development in terms of geology. In contrast, the mountainous areas are composed from Paleozoic which covers 49% of the city and Mesozoic which covers 19% of the city.

5.12 **Micro-Geomorphology:** Micro-geomorphology of alluvial lowland was interpreted from topographical characteristics and detail contour line together with satellite imagery. The results of interpretation were classified into seven items, namely (i) Deltaic Lowland, (ii) Flood Plain, (iii) Lagoon Low Land, (iv) New Sand Bar, (v) Old Sand Bar and Low Sand Dune, (vi) Abandoned River Channel and (vii) Up-land/Hill. The basic classification concept of micro-geomorphology is to differentiate micro-topography which can indicate vulnerability to flood inundation of alluvial lowland area (Figure 5.2.6). The characteristics of each micro-geomorphology are explained as follows.

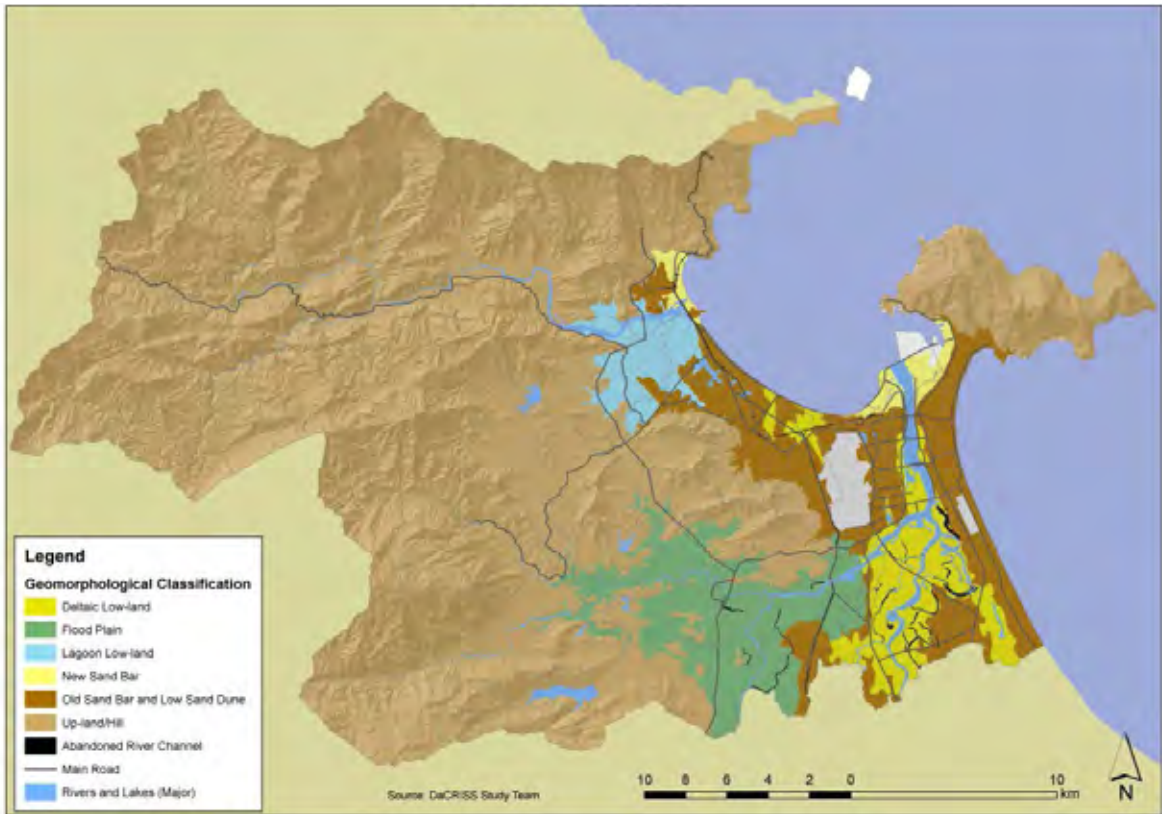
(i) **Deltaic Lowland:** This classification developed in the lower part of Cam Le River, Vinh Dien River and Co Co River including a part of Han River. The topographical characteristic of this area is low-lying flat land with high ground water level. Main land use is paddy, marshy wetland and partly used for fish culture pond. Elevation is mainly 1m above sea level. Sea water intrusion by tidal action is also significant in this area.

Figure 5.2.6 Distribution of Geology



Source: Geological and mineral resources map of Viet Nam on 1:200,000, Geological Survey of Viet Nam, Hanoi, 1995

Figure 5.2.7 Micro-Geomorphology



Source: DaCRISS GIS Database

(ii) **Flood Plain:** This classification is distributed immediately upstream of Deltaic Lowland. Rivers flowing down to lowland areas from the mountainous areas start meandering from the mountain foot slope and changes river channel courses freely during flooding periods. Large volume of sediments such as sand and gravel have been transported and accumulated in the surrounding area of main river channels. The flood plain has been formed by historical sedimentation process by main rivers in the middle part of each river. Elevation is mainly from 5m to 10m. Dominant land uses in this area are agriculture and rural settlements.

(iii) **Lagoon Lowland:** This landform unit is located at lower part of the Cu De River. The Five meters (5m) contour line clearly encloses lagoon topography which is surrounded by old sand bar in the coastal side and mountain foot slope in inland side. Low sand bar is formed at the river mouth area. Elevation of this area is less than 5m above sea level and seems to have a high potential for flooding.

(iv) **New Sand Bar:** In the river mouth of the Han River, low-lying sand bar is formed. Elevation is less than 2 m.

(v) **Old Sand Bar and Low Sand Dune:** Huge sand bar topography having more than 20 km to 30 km length formed in the eastern coast zone of central Vietnam. In the study area, large coastal sand bar also formed from north to south. This sand bar topography seems to have been formed by river sedimentation of Thu Bon River and coastal current. Thu Bon River is now flowing into the sea at Hoi An where an old trading port operated. In the southern coast area of Hoi An, large sand bar also formed. Large sand bar topography consists of two or three rows along existing coastal line. The largest width of this sand bar is more than several kilometers. Elevation is 5 m or more above sea level. Small scale sand dune which has 10 to 15 m height can be seen in some parts of this sand bar. However, the sand bar area is generally flat land. In Danang City, the main urban area including airport were built on this sand bar topography, agricultural land use is limited in this area due to poor soil condition

(vi) **Abandoned River Channel:** This landform unit developed in deltaic lowland and flood plain area. Free flowing rivers in flat land area, especially in deltaic lowland, river channel course change intermittently due to lateral erosion by large flooding. Many abandoned river channels are formed in lower reaches of Cam Le River, Vinh Dien River and Co Co River. This area is relatively lowland and mainly marshy wet land which is susceptible to deep flood inundation.

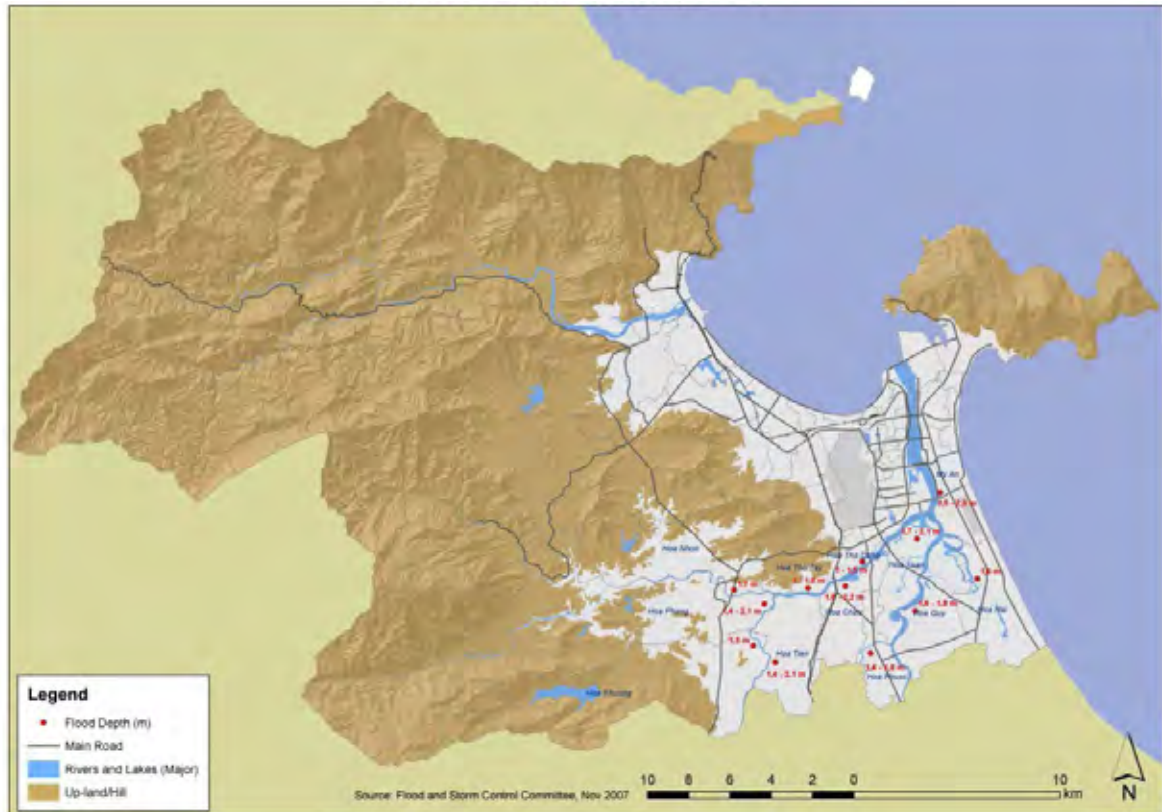
(vii) **Up-Land/Hill:** This landform unit is including mountain and hilly upland area.

5.13 **Flood Water Depth:** Flood is the most frequent natural disaster in study area. Flood plain, lagoon lowland and deltaic lowland areas are the most susceptible to flood inundation which are indicated in the micro-geomorphology map. Based on the recent flood data provided by Committee of Flood and Storm Control of Danang City, flood depth of November, 2007 flood is plotted on the map as shown in Figure 5.2.8. The data source only described flood depth by commune unit. Therefore, each flood depth record were plotted close to the river channel in their respective communes. In lowland area, flood depth was observed at 1.5–2.2 m (Figure 5.2.8).

5.14 **River Erosion Site and Flash Flood:** The Committee on Flood Control and Storm of Danang City also provided river erosion and flash flood data (Figure 5.2.9). River erosion is taking place at many points along the main river channels in the study area. Flood water causes lateral erosion which means river erosion at river bank. This phenomenon is usually occurs along the river bank of big rivers in Southeast Asia which

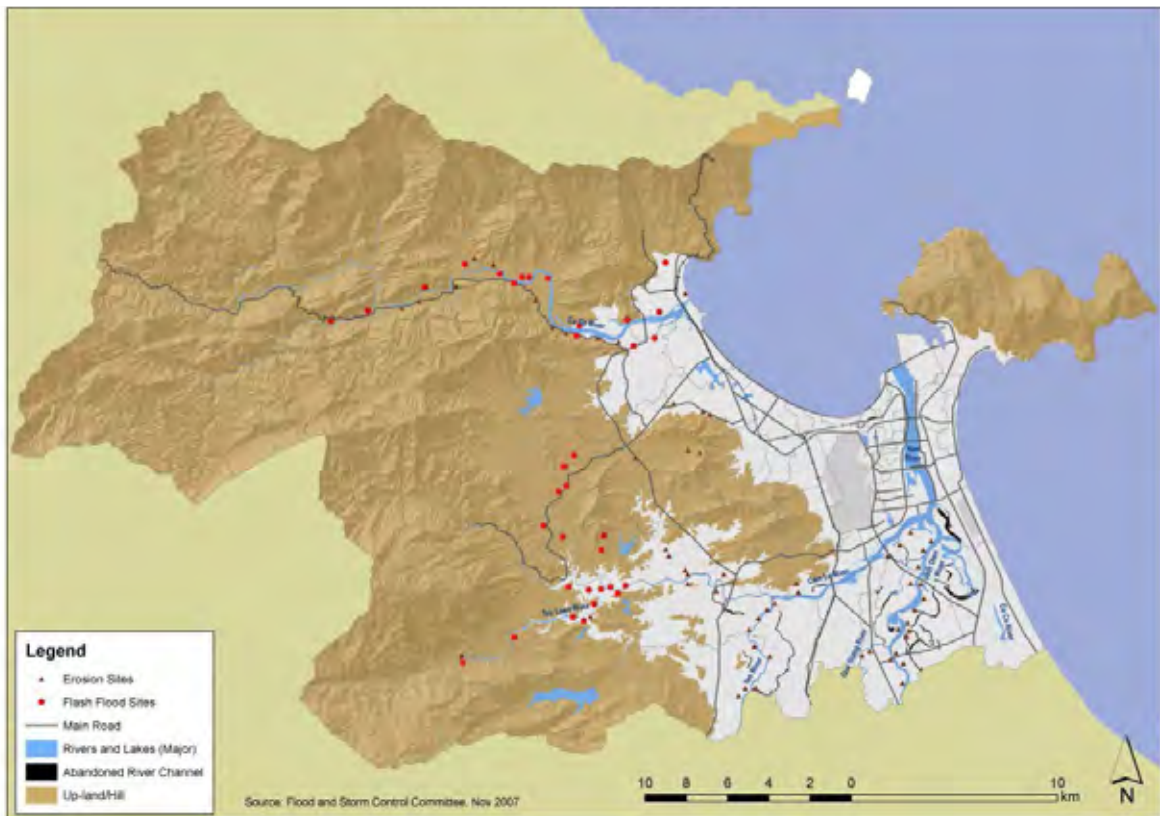
are not protected by artificial dykes. Flash flood sites are shown relatively upper stream of the main rivers. Flood water flows relatively quick and drain also quickly. Large volumes of flash flood sometimes cause sizable damage to houses and agricultural crops and also causes severe surface soil erosion.

Figure 5.2.8 Flood Water Depth in 2007



Source: DaCRISS GIS Database

Figure 5.2.9 River Erosion Site and Flash Flood



Source: DaCRISS GIS Database

4) Secondary Data Analysis

5.15 During secondary data analysis, development constraints of the Danang City were investigated and mapped based on collected data. These constraints are (i) Erosion potential (ii) Potential flood areas, (iii) Coastal and river buffer zones, (iv) Forest Areas, (v) Ecological Preservation Areas, (vi) Agriculture Areas, (vii) Saltwater Intrusion Areas, and (viii) Estimation of Sea Water Intrusion Areas

(1) Erosion Potential

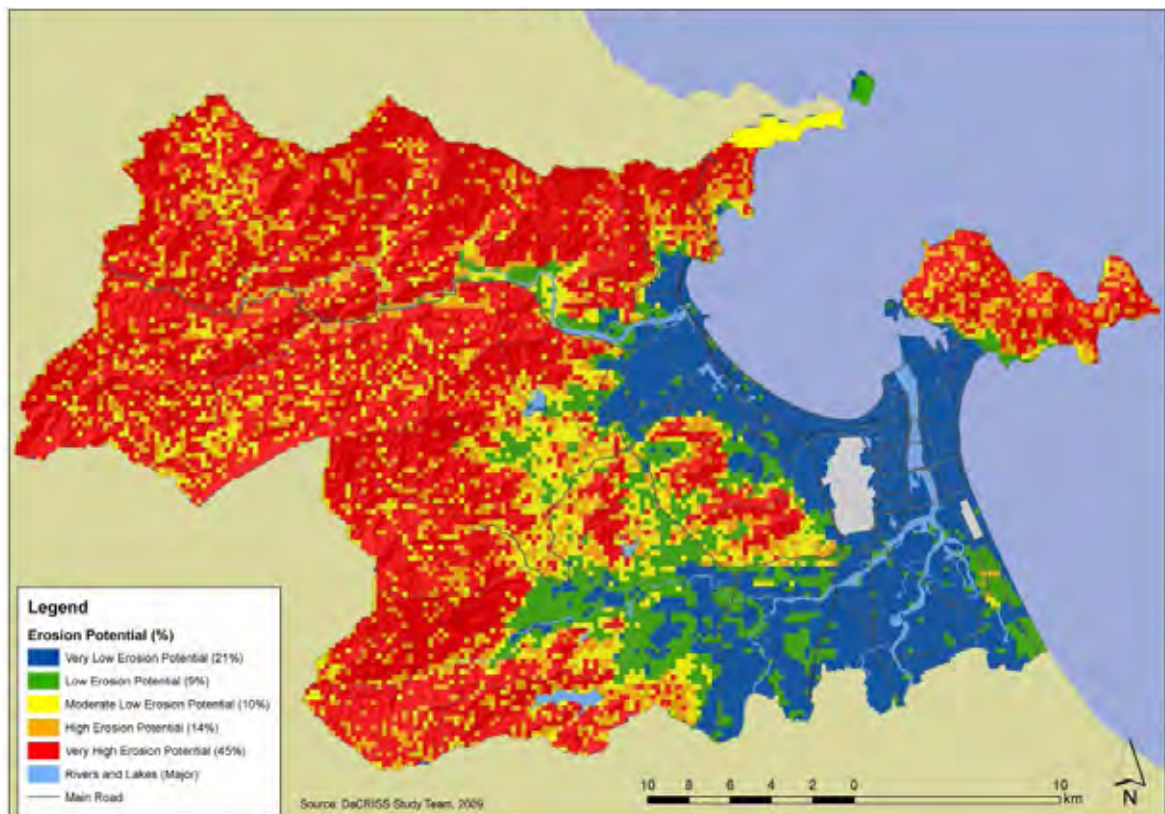
5.16 Surface soil erosion potential is evaluated by overlaying slope, geology and vegetation map. In general, the steeper the slope, higher the erosion potential. Vegetation coverage and type of geology are also key factors to evaluate soil erosion potential. Slope class, vegetation type and rock type are interpreted and given scores to measure the the study area's susceptibility to surface erosion by run-off (Table 5.2.1). For erosion potential analysis, 250 m by 250 m grid was used. Final map is shaded by five (5) colors to show erosion potential of the study area.

Table 5.2.1 Erosion Potential Analysis Score

		0	1	2	3	4	5	6	7
Slope (%)		/	0-3	3-8	8-18	18-25	25-35	35-50	>50
Geology	First Step	Alluvium	Diluvium	-	Tertiary Mesozoic	-	Paleozoic	/	/
	Second Step	-	-	-	-	-	Granite Schist	/	/
Vegetation		Rice Field, Agriculture, Wetland	-	-	Planted Trees, Forest	Grasslands	Shrubs	/	/

Source: DaCRISS GIS Database

Figure 5.2.10 Erosion Potential

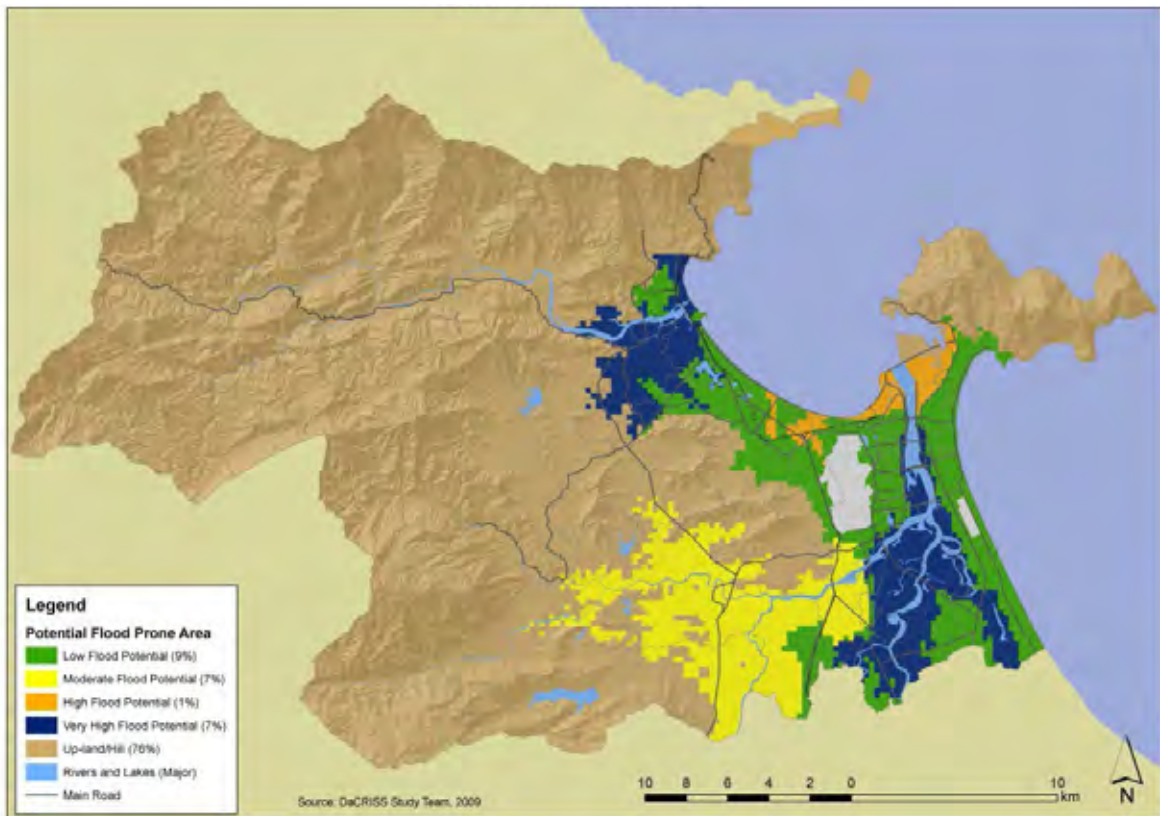


Source: DaCRISS GIS Database

(2) Potential Flood Prone Areas

5.17 Since Danang City is located at the low-lying estuary of Han River inflowing from the watershed covering Quang Nam Province, the land in Danang City is prone to flooding in the rainy season. In case of flooding because of heavy rain or high tide, it can be expected that not only the existing river but also the old river channels or wetland areas will be flooded. Detailed elevation data at 1m spot height was collected based on 1:5000 scale topographical map. According to the elevation data and micro geomorphological map, these areas are lying relatively low and have high potential for flooding. If the lowland areas are to be developed, flood disaster protection measures should be taken. The distribution of the areas is shown in Figure 5.2.11. To develop the potential flood area map, micro-geomorphology interpretation using satellite images was conducted. Additional flood prone area data and past flood area in rural areas were also compiled in this map to understand flood phenomena completely.

Figure 5.2.11 Potential Flood Prone Areas

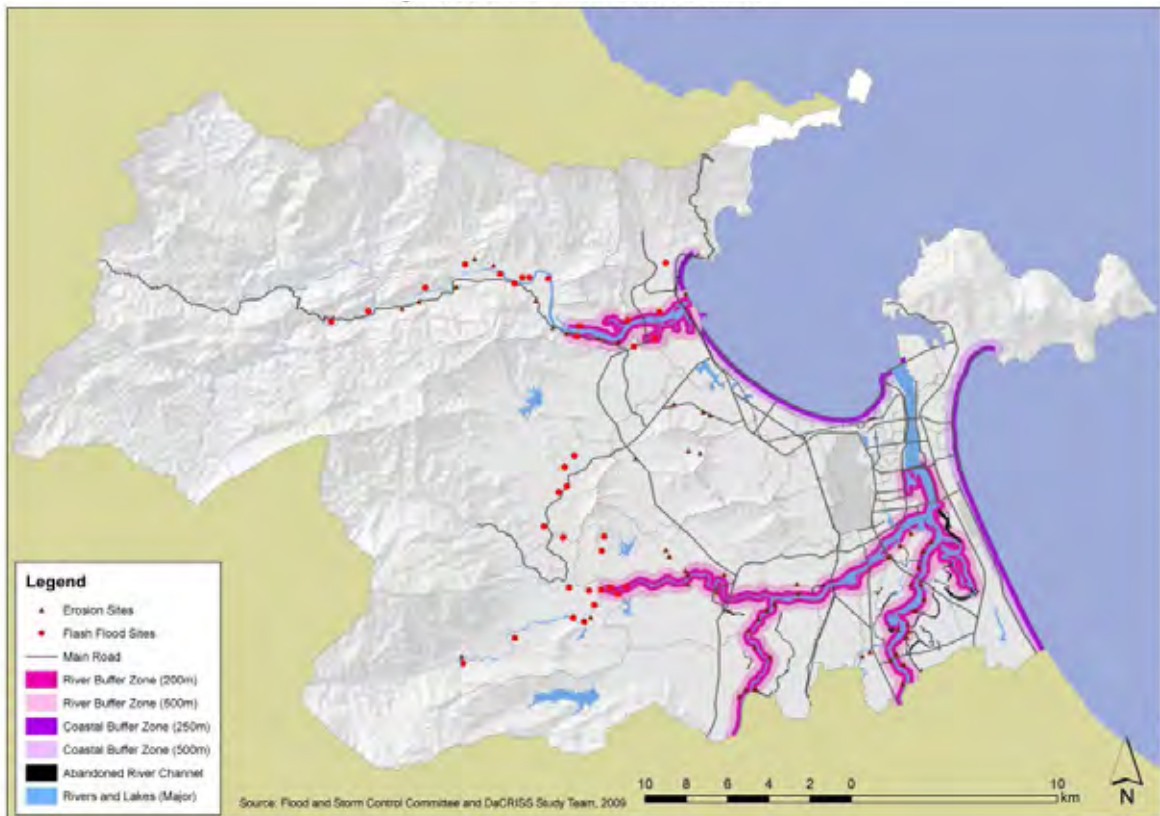


Source: DaCRISS GIS Database

(3) Coastal and River Buffer Zones

5.18 The waterfront areas in both coastal and riverside need to be considered for the coastal erosion and lateral erosion by river flow. To indicate the potential hazard area for erosion, Figure 5.2.12 shows the buffer areas of 250 m from the coastal line and 200 m from the riverside. Coastal erosion can be caused by the change of the condition of coastal current. Notably, the present coastal landform was formed by the sedimentation by the inland river flows, coastal current and ocean wave activities, and it is delicately balanced in the current land form. Therefore developments which will cause change in existing river flow and coastal current should be avoided. In addition, rise of sea level due to global warming will affect and change coastal sedimentation. Therefore the buffer zone was defined tentatively at 250 m from the coastline. The river which is not protected by artificial dyke need to be considered for lateral erosion. For this, a buffer zone of 200 m was defined from the river banks. These zones should be carefully managed and considered in development planning.

Figure 5.2.12 Coastal and River Buffer Zones



Source: DaCRIS5 GIS Database

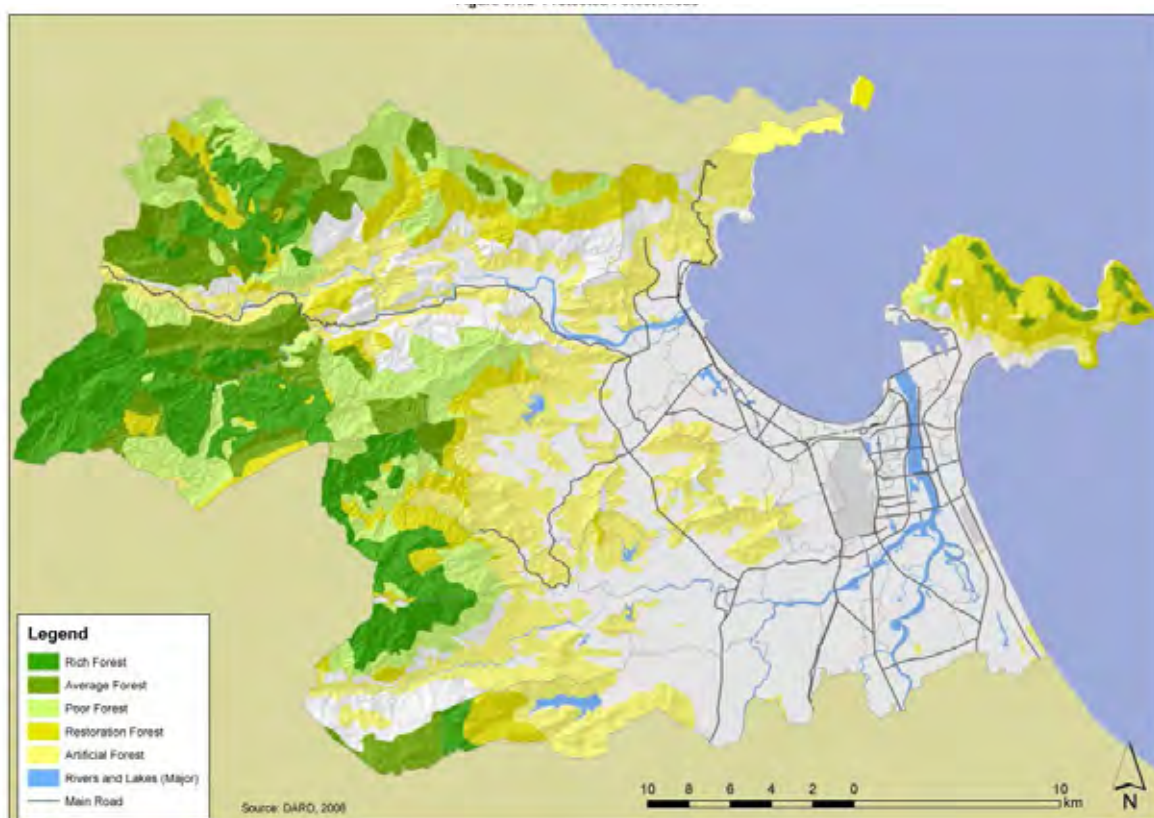
(4) Forest Areas

5.19 The forest areas are managed by DARD. The forest area was categorized into five (5) classes; (i) Rich forest (10,608 ha), (ii) Average forest (8,664 ha), (iii) Poor forest (10,640 ha), (iv) Restoration forest (9,528 ha), and (v) Artificial forest (20,608 ha) as shown in Figure 5.2.13. It is anticipated that the forest area will be developed for recreation or tourism, however, it requires careful consideration to conserve the ecology and manage the watershed.

(5) Ecological Preservation Areas

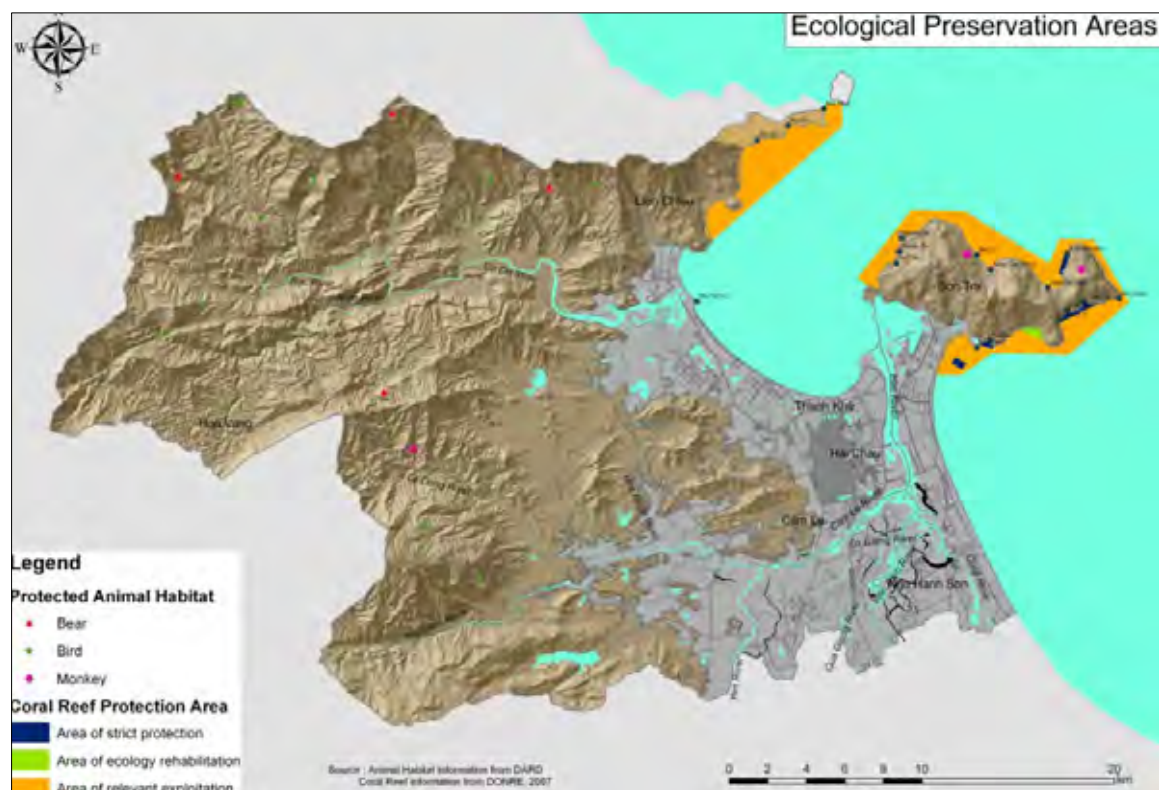
5.20 The areas that are to be protected considering ecological value are classified into two; (i) on sea and (ii) on land. Regarding the ecological preservation areas on sea, these were defined by the city government as shown in Figure 5.2.14. It is classified into three (3) categories, namely, (i) Area of strict protection (core area), (ii) Area of ecology rehabilitation and (iii) Area of relevant exploitation which includes 1 and 2 also. The designated areas are shown in Figure 5.2.14. On the other hand, the ecological preservation areas on land are shown by the distribution of the protected animal habitats depicted in Figure 5.2.14.

Figure 5.2.13 Distribution of Forest Areas



Source: DARD, 2008

Figure 5.2.14 Ecological Preservation Area

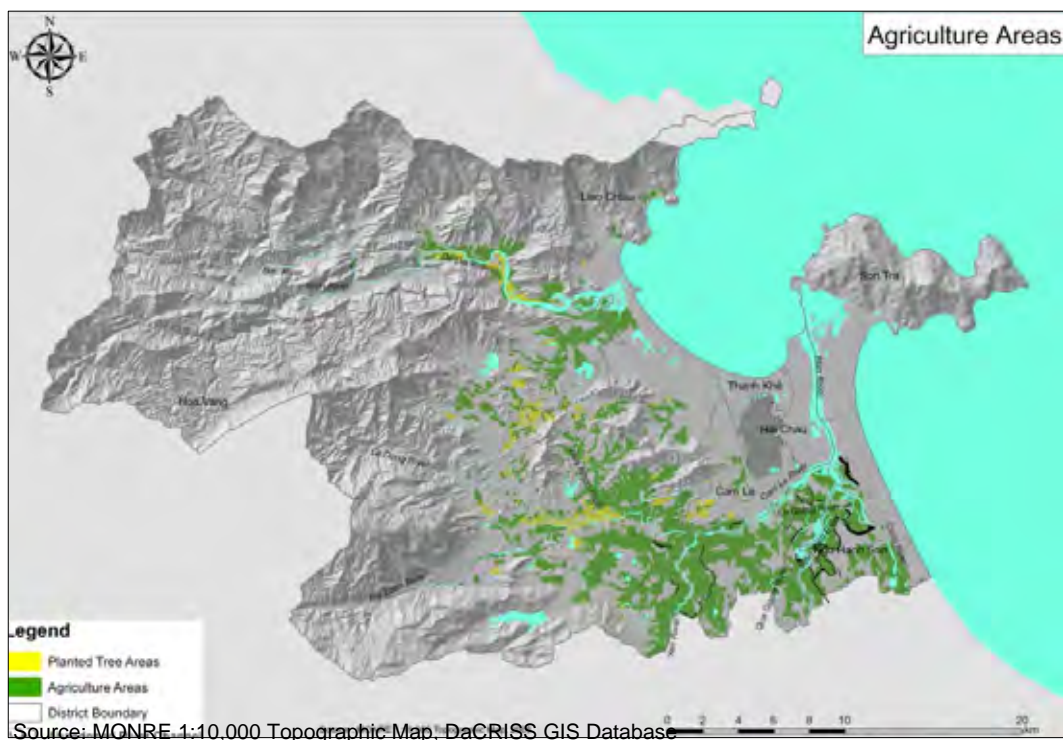


Source: DARD, DONRE

(6) Agriculture Areas

5.21 Agriculture area is composed of planted tree areas which cover 814 ha (0.8%) and other areas for agricultural use such as rice fields, upland fields, and gardening which covers 8,235 ha (8.4%) as shown in Figure 5.2.15. Basically, agriculture areas are considered highly suitable areas for development for any type of land use due to its flatness. In Danang City area, the alluvial lowland except urbanized area is basically used for agricultural purposes such as rice field. Future extension of present urban area will absolutely affect the existing agricultural land. Prime agricultural land with such conditions as excellent soil, no flood potentiality and availability of good irrigation system etc, can be evaluated by additional data such as land capability map, irrigation system and natural hazard data. Depending on data accumulation, detailed evaluation can be possible in future.

Figure 5.2.15 Agriculture Areas



(7) Saltwater Intrusion Areas

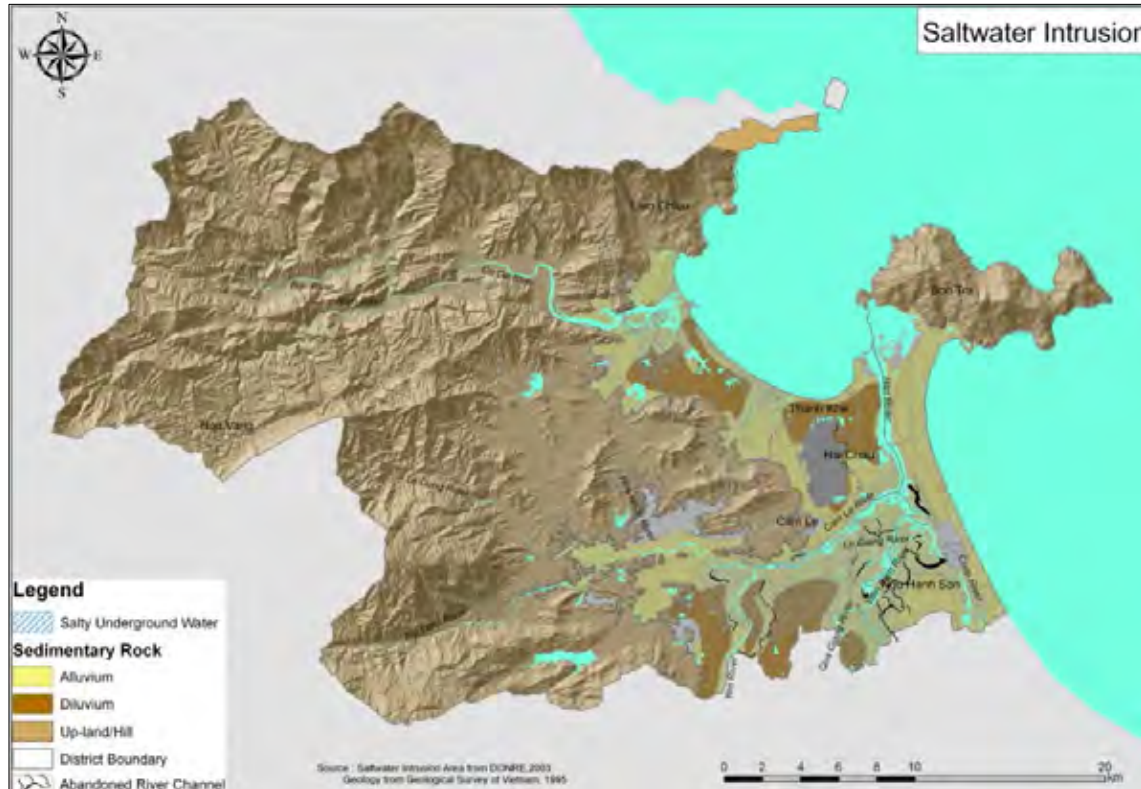
5.22 The excessive use of the groundwater will easily cause the degradation of groundwater quality by salinization in coastal area. The potential areas of the salinization of groundwater is indicated by the existence of alluvium and diluvium in general. The distribution of this geology overlaid with the potential salty underground water area as shown in Figure 5.2.16. This map is also showing potential land subsidence area by groundwater exploitation. For long term urban land use planning, these environmental aspects should be considered as one of the constraints in this area.

(8) Estimation of Sea Water Intrusion Area

5.23 Possible sea water intrusion area by sea level rise due to global warming is estimated based on detail contour map and micro-geomorphology. In this estimation, 1m sea level rise was applied as the maximum value by the end of 21st Century. Lagoon lowland area of lower reach of Cu De River and deltaic lowland area of Han River will be

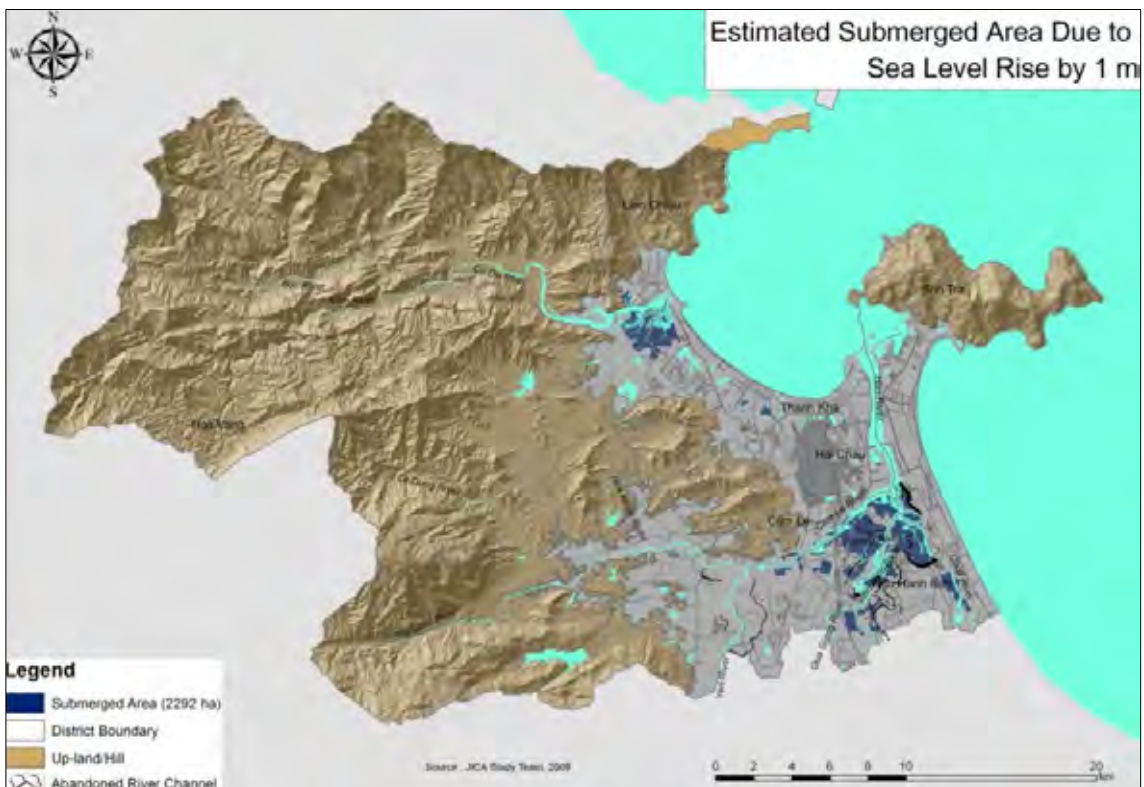
widely intruded by sea water. Total sea water intrusion area is estimated at 2,292 hectares (Figure 5.2.16)

Figure 5.2.16 Saltwater Intrusion Areas



Source: DaCRISS GIS Database

Figure 5.2.17 Sea Level Rise



Source: DaCRISS GIS Database

5) Identified Areas by Development Suitability

5.24 Environmental constraints and problem area for development were discussed and identified one by one in secondary data analysis. These data were combined and overlaid to determine for development suitability of the study area. A 250 m x 250 m grid system was developed to cover the study area. To cover the whole Danang City about 16,300 grids were used.

5.25 Indicators used for Development Suitability Analysis are (i) Erosion Potential Map, (ii) Potential Flood Prone Area Map, and (iii) Estimated Submerged Area Map. In this study area, topographic conditions such as flood free areas are key factors for evaluating land use potentiality. Another indicator used to analyze land use suitability is erosion potential which is an environmental constraint for development. Overall evaluation score is shown in Table 5.2.2. This modeling table is constructed based on available data and information by Study Team.

Table 5.2.2 Development Suitability Score

(A) Erosion Potential Area	(B) Potential Flood Prone Area	Development Suitability	Grade (A+B)	Distribution	
				%	km
1-3 => 1	1	Suitable	2-4	13	120
4-7 => 3	3	Moderately Suitable	5-7	6	60
8-10 => 5	4	Low Suitable	8-10	3	33
	(C) Potential Submerged Area	Low Suitable			
11-17	5	Unsuitable		75	718
		River & Lake		2	20
		Total		100	950

Source: DaCRISS GIS Database

5.26 The total area of Danang was then classified for development suitability by summarizing the overall scores resulting from erosion potential, potential flood prone area analysis and estimated submerged area analysis map. The scores were classified into three categories: 1) suitable, 2) moderately 3) suitable and low suitable. Hilly upland area is designated unsuitable.

5.27 According to this analysis, it was determined that approximately 13% of the Study Area or 124 km² is suitable for development. Finally, river and coastal buffer zones should be applied to determine the net suitable areas for development. Figure 5.2.18 shows the final results of development suitability analysis.

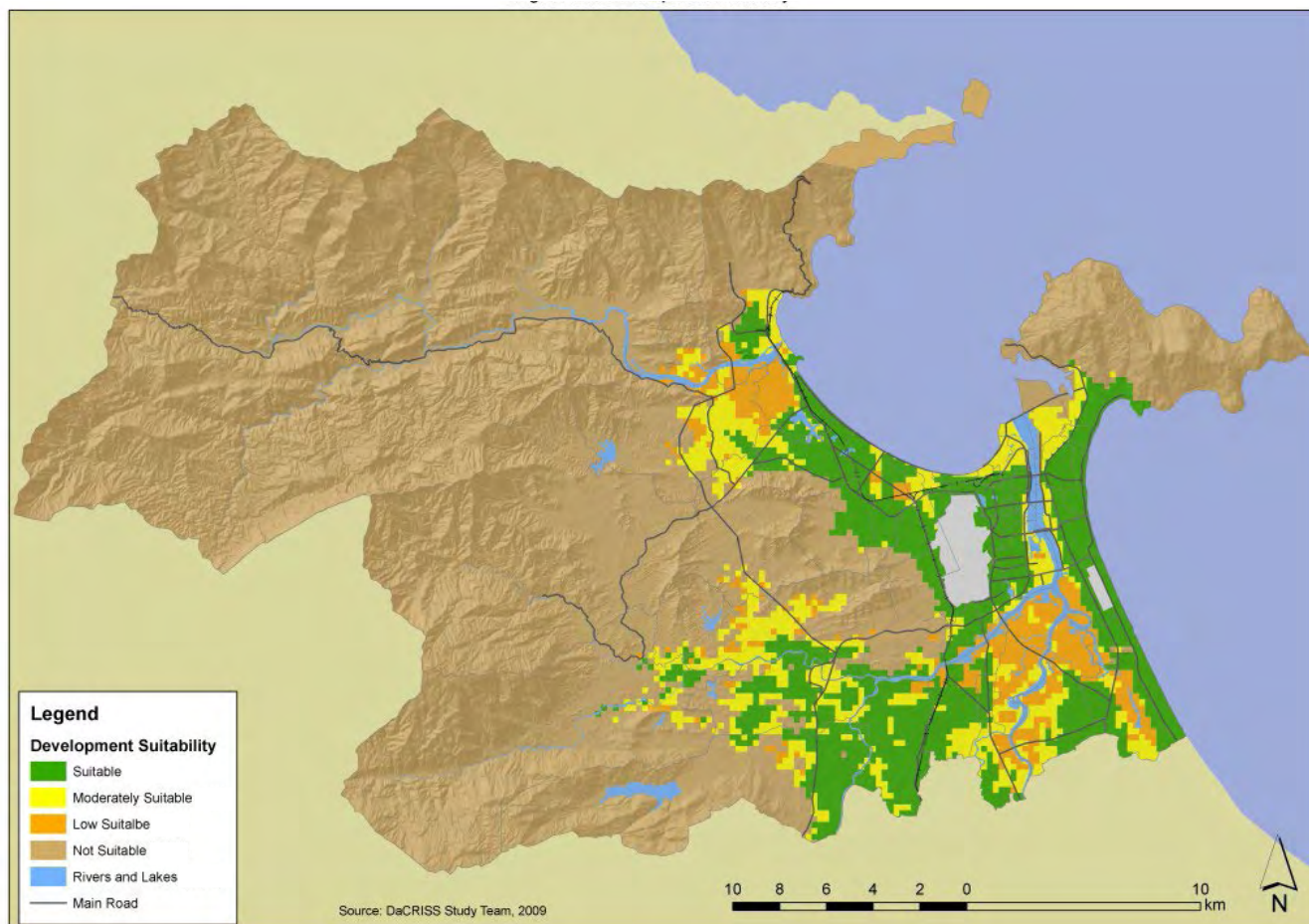
5.28 Table 5.2.3 shows the criteria of development suitability in Danang City. It can be observed that most areas in Hoa Vang District and Son Tra peninsula are not suitable for development, as these areas are mainly mountainous areas. Areas not suitable for development account for 76% of the total area of Danang City. The delta of Han River is low in elevation as seen in the micro-elevation map discussed in this chapter and is a flood prone area, and therefore rated as a low suitable area. Most areas suitable or moderately suitable for development which adds up to 20% of the total area in Danang City, they are already developed in Hai Chau and Thanh Khe districts. There is room for further development in the future in districts such as Ngu Hanh Son, Cam Le, Lien Chieu, and southern Son Tra districts.

Table 5.2.3 Criteria of Development Suitability

Environmental Zone	Development Suitability	Distribution	
		%	km ²
Development Zone	Suitable	13	124
Transition Zone	Moderately Suitable	7	66
Buffer Zone	Low Suitability	4	38
Preservation Zone	Not Suitable	76	722
-	Total	100	950

Source: DaCRISS Study Team

Figure 5.2.18 Environmental Zoning



Source: DaCRISS Study Team

5.3 Assessment of Alternative Growth Scenarios

1) Alternative Scenarios for Spatial Growth

(1) Alternative Scenarios

5.29 Section 7.2 described the future framework of society and economy of Danang in 2025. This section analyzes each land use pattern by three scenarios based on the socio-economic framework. Finally a land use framework is examined for the selected scenario. Based on the land use framework, other sector plans are examined for its viability.

5.30 In order to promote the vision and goals for the future development of the city, the following scenarios were developed and tested:

- (a) **Scenario 1 (Base Case):** This scenario shows a future urban development situation wherein the current trend continues without significant intervention to the growth of urban areas. The future population is estimated to be about 1.2 million by 2025;
- (b) **Scenario 2 (Current Construction Plan):** This scenario envisages a future urban development situation that follows the existing urban plan prepared by the Department of Construction. The future population is set at 1.5 million by 2025; and
- (c) **Scenario 3 (Accelerated Growth Strategy):** This scenario refers to a future urban development situation that responds to the need for accelerated growth in the Central Focal Economic Zone as well as the need for sustainable development in Danang City. The future population will be large enough for the city to provide internationally competitive and high-qualified services to investors. The expected population in 2025 is about 2.1 million, and in 2030 is about 2.5 to 3 million.

5.31 For these three scenarios, the likely urban growth patterns were prepared and evaluated in the context of sustainable development. Sustainability as defined in this study encompasses the economic, social, and environmental aspects. For each of these aspects, a number of parameters were selected to assess each of these aspects. For example, economic sustainability was determined based on investment attraction, level of industrial mix and its impact on the region. Social sustainability was assessed based on employment opportunities, equality, and access to services. Environmental sustainability was estimated based on pollution levels, preservation of ecosystem, and disaster preparedness.

(2) Scenario 1: Base Case Scenario

5.32 In estimating the future urban form and development under the base case scenario, the following assumptions were used:

- (i) Average increase and decrease in population rates experienced between 2000 and 2007;
- (ii) Urban infrastructure was provided to support the above growth; and
- (iii) No strategic intervention to urban and transportation development was implemented.

5.33 Under Scenario 1, the future population of Danang City was estimated to be about 1.2 million. Population would increase toward the northwest and south along National Road No. 1 in an unplanned manner, while the growth in the city center, including Hai Chau and Thanh Khe districts, would slow down to approximately 1–2 %/year. The fastest population growth would be in Lien Chieu district. The population density of Hai

Chau and Thanh Khe districts would be high compared to other districts in the city (see Table 5.3.1 and Figure 5.3.1). The main concern in this scenario would be congestion in the existing city center and sprawl with low population density in the outer areas, making it difficult to provide the latter with the necessary services effectively.

Table 5.3.1 Estimated Population under Scenario 1: Base Case

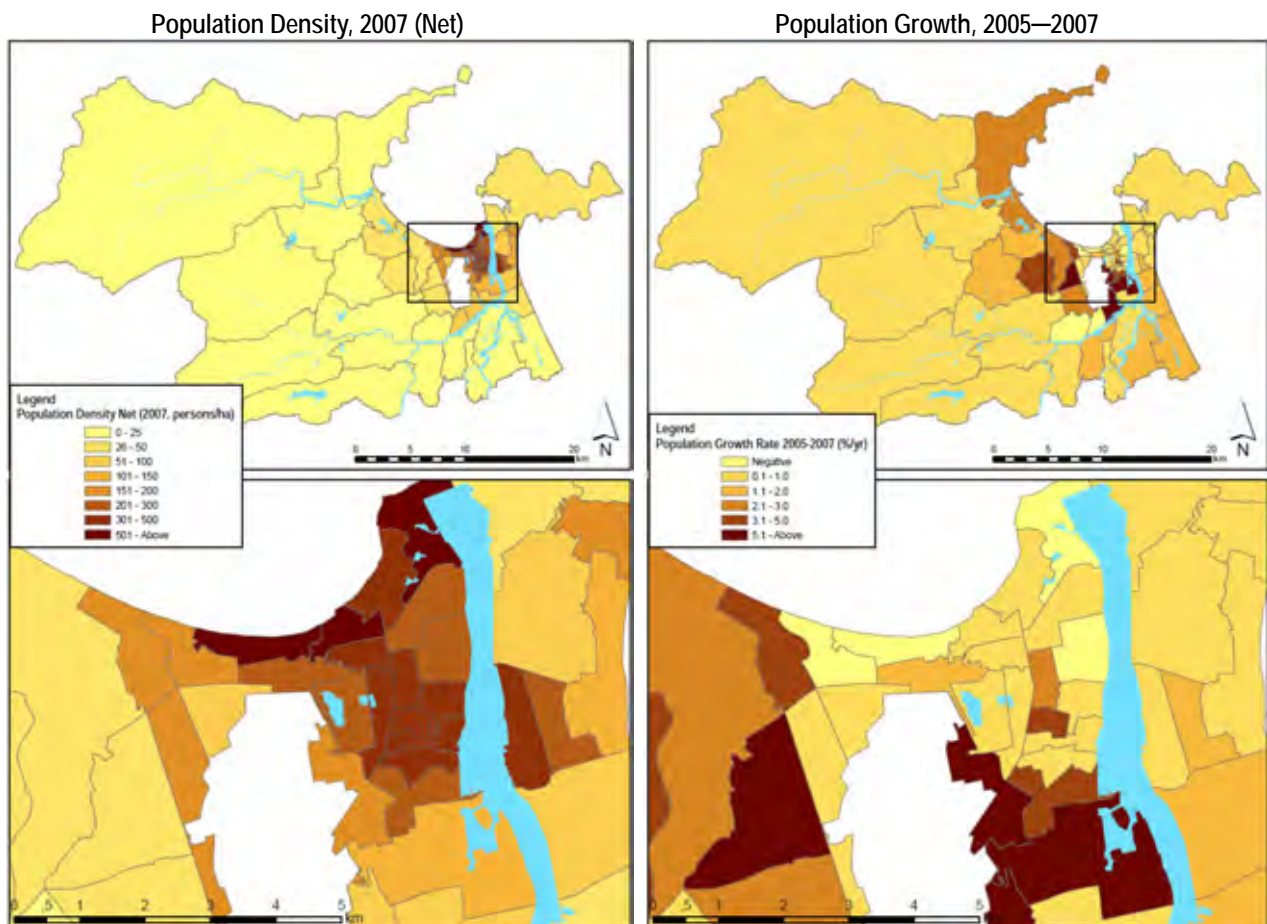
Districts	Actual						Future			
	Population (000)		Growth Rate (%/yr)		Population Density (no/ha)		2025			
	2000	2007	2000—2005	2005—2007	Gross ¹	Net ²	Assumed Growth Rate (%/yr)	Pop. (000)	Density (no/ha)	
									Gross ¹	Net ²
1. Hai Chau	184	195	0.8	1.0	92	206	1.1	238	113	251
2. Thanh Khe	154	167	1.5	0.3	180	250	1.6	222	239	331
3. Son Tra	103	120	2.8	0.7	20	76	2.5	186	31	118
4. Ngu Hanh Son	46	54	2.9	1.2	15	23	2.5	84	23	36
5. Cam Le	60	68	1.4	3.1	21	32	2.1	99	30	46
6. Lien Chieu	66	95	6.6	2.5	11	26	6.0	270	33	74
7. Hoa Vang	105	107	0.1	0.7	2	14	0.3	113	2	14
Total	716	807	1.9	1.2	8	39	2.3	1,213	13	59

Source: GSO.

¹ Total land area excluding Hoang Sa Islands.

² Net area refers to urban areas and other areas suitable for various types of development. It is calculated based on a suitability analysis which excludes areas vulnerable to erosion, rivers and lakes, forest land, transportation land, cemeteries, military land, and areas that need special protection such as natural habitats, coral reefs, etc.

Figure 5.3.1 2007 Population Distribution



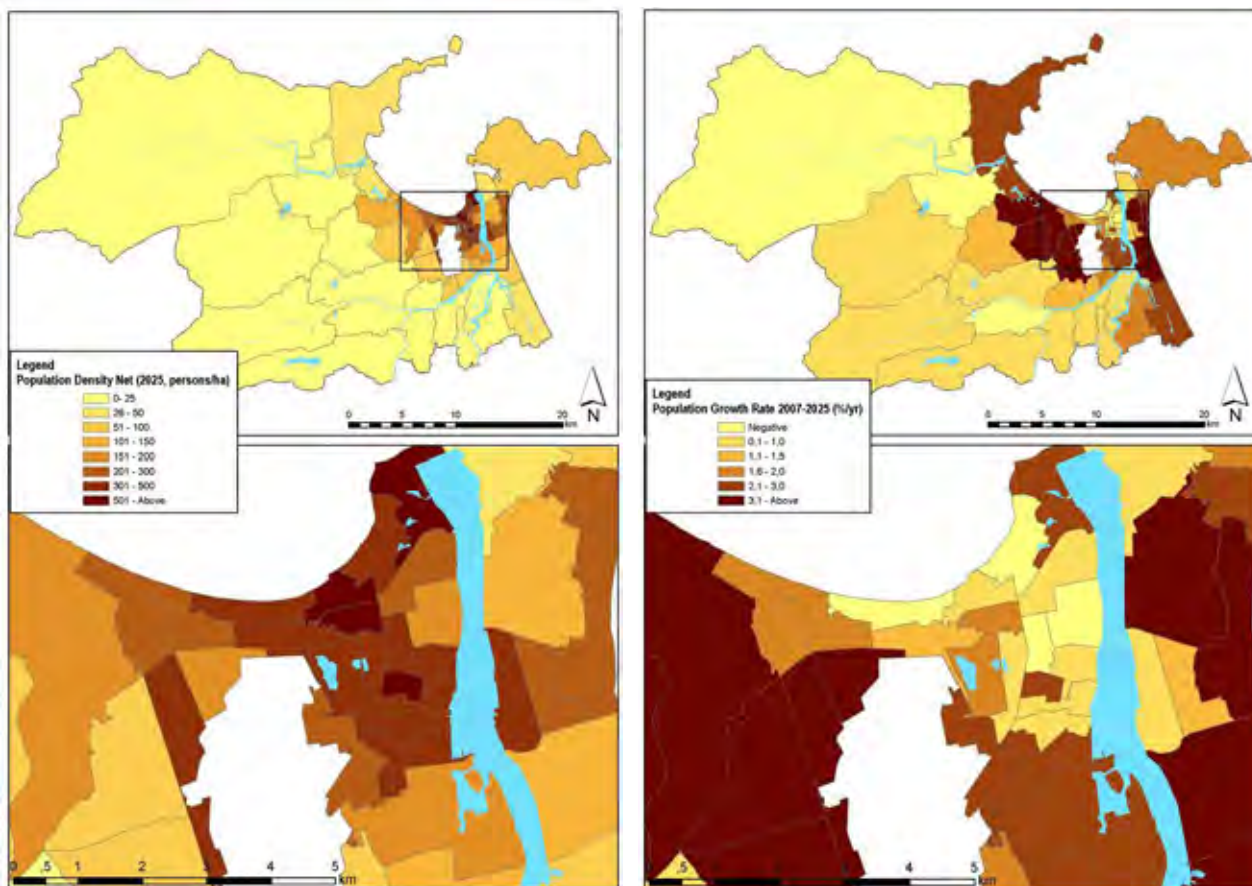
Source: Worked out by DaCRISS Study Team based on GSO data.

Source: Worked out by DaCRISS Study Team based on GSO data.

Figure 5.3.2 2025 Population Distribution under Scenario 1: Base Case

Population Density, 2025

Population Growth, 2007—2025



Source: DaCRISS Study Team.

Source: DaCRISS Study Team.

(3) Scenario 2: Current Construction Plan

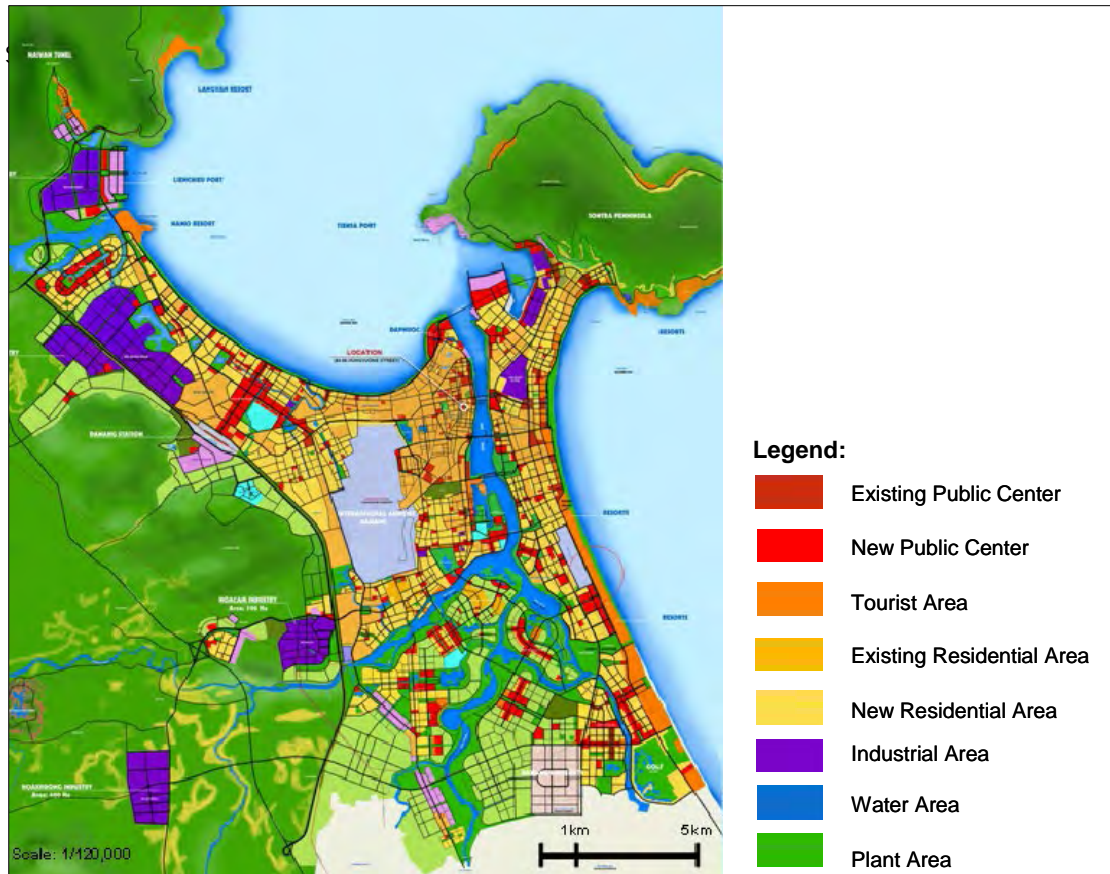
5.34 Scenario 2 represents the current construction plan’s intention to accommodate future populations in a planned manner. The main planning principles adopted for the plan include the expansion of urban areas toward the northwest and south directions along relatively flat areas and control of development toward the mountainous and forested areas. The plan foresees the integration of urban areas in the south of Quang Nam Province. The improvement of water bodies is adequately incorporated into the plan, and industrial zones are located mainly along regional transport corridors to separate inter-city from urban traffic.

5.35 While the basic concept for and structure of the future city under this plan and scenario are deemed appropriate, the following concerns are pointed out:

- (i) The net area (land suitable for development) in the DOC plan is roughly 240 km² to accommodate a population of 1.5 million at an average net population density of about 60 persons/ha (in 2025). Considering that the population density of existing urban centers is expected to remain high, those in outer areas would still be low. Future populations can be accommodated in much smaller urban areas where needed urban infrastructures can be provided in the most effective manner;
- (ii) A sprawling urban area requires cars and other private transport modes. Car-reliant areas not only damage the environment, but are also an expensive outcome of ineffective land-use control.

(iii) Modern cities need competitive urban centers which facilitate high levels of business and commercial activities. In comparison, the existing urban area in Danang does not have a clearly defined central business district (CBD). For the future Danang City, there would be a need for modern urban centers with appropriate hierarchy to provide a competitive environment for various business and commercial activities, a concept that is lacking in the plan.

Figure 5.3.3 Current Construction Plan for Danang City



Source: DOC

Table 5.3.2 Land Use Areas of Scenario 2 Construction Plan

No.	Zone Name	Color	Area (km ²)
1	Existing Public Center	■	8.4
2	Industrial Zones	■	14.8
3	Existing Residential Area	■	60.7
4	Urbanized Area	■	13.6
5	Rural Area	■	9.0
6	Da Nang Student Village	■	1.6
7	Military Area	■	1.5
8	Airport Area	■	9.1
9	Plant Area	■	53.9
10	Cemetery Area	■	1.1
11	Tourist Area	■	9.9
12	Inland Water Body	■	14.0
Total			197.6

Source: Calculated by DaCRISS Study Team based on the Construction Plan.

Table 5.3.3 Estimated Population for Scenario 2: Current Construction Plan

Districts	Actual						Future			
	Population (000)		Growth Rate (%/yr)		Population Density (no/ha)		2025			
	2000	2007	2000—2005	2005—2007	Gross ¹	Net ²	Assumed Growth Rate (%/yr)	Pop. (000)	Density (no/ha)	
									Gross ¹	Net ²
1. Hai Chau	184	195	0.8	1.0	92	181	0.3	204	97	189
2. Thanh Khe	154	167	1.5	0.3	180	213	0.2	174	188	225
3. Son Tra	103	120	2.8	0.7	20	67	1.9	168	28	89
4. Ngu Hanh Son	46	54	2.9	1.2	15	20	9.9	297	81	110
5. Cam Le	60	68	1.4	3.1	21	28	8.4	290	87	120
6. Lien Chieu	66	95	6.6	2.5	11	24	4.3	204	25	51
7. Hoa Vang	105	107	0.1	0.7	2	12	2.4	163	2	17
Total	716	807	1.9	1.2	8	34	3.5	1,500	16	62

Source: GSO.

¹ Total land area excluding Hoang Sa Islands.² Net area refers to urban areas and other areas suitable for various types of development. It is calculated based on a suitability analysis which excludes areas vulnerable to erosion, rivers and lakes, forest land, transportation land, cemeteries, military land, and areas that need special protection such as natural habitats, coral reefs, etc.**(4) Scenario 3: Accelerated Growth Strategy**

5.36 Scenario 3 is the result of a plan to fast-track the development of the CFEZ and Danang City. It shows the future city as world-class, competitive, and environment-friendly with a distinct image and appealing characteristics. The key concepts which are expected to be adopted to achieve this scenario are as follows:

- (a) **Development of a Sustainable City:** This concept cannot be underscored enough and needs interpretation that fits the city. In order to meet the economic, social, and environmental criteria that determine sustainability, the following basic planning principles have to be adopted:
- (b) **Compact Urban Area:** The urban area will be compact, meaning the population density will be medium (100–150 persons/ha) to high (200–250 persons/ha) with mixed land use. This is typical to the existing urban areas in Vietnamese cities and elsewhere in Asia, contributing to the convenience of carrying out socio-economic activities as well as to the high level of mobility and accessibility.
- (c) **Public Transport-Oriented Development:** Large urban areas will not free themselves from traffic congestion unless they are developed based on public transport systems that include urban rail, BRT, buses, taxis, and other types of high-occupancy vehicles. In addition, public transport services must be competitive enough to contend with private transport. For this, not only should the quality of public transport services be improved; urban areas must also develop in a way that would make public transport convenient to access and use. Urban development must thus be integrated with public transport systems to facilitate shorter door-to-door movements of people.
- (d) **Competitive Public Transport System:** Public transport systems must be attractive in terms of safety, comfort, punctuality, availability, speed, and affordability in order for the people to use them.
- (e) **Good Living Environment:** Urban residents require adequate housing and living amenities. Social networks that have developed in the existing communities must be nurtured, while the design of new communities should promote community ties.

- (f) **Competitive Urban Centers:** The people and investors undertake various economic, social, cultural, and other activities in cities. With this in mind, the plan must promote the creation of hierarchical urban centers that would facilitate people's accessibility to needed services effectively.
- (g) **Coherent and Attractive Urban Design and Landscape:** A well-known city usually has a distinguishing image that has been cultivated over the years and is accepted by society. Since Danang City already has a varied landscape, what must be done is to link its natural, cultural, and other sites or landmarks together in a way that would appeal to residents and visitors alike.
- (h) **Preserved Environment and Disaster-Ready City:** Before any development in the city can be undertaken, the natural environment must be considered and preserved, underscoring the need to assess the development suitability of the area scientifically. Based on this study's findings, the area in the city that is suitable for development is currently only about 26% of the total city area or 250 km². At the same time, efforts should be made to make the city disaster-ready.

Table 5.3.4 Estimated Population Distribution for Scenario 3: Accelerated Growth Strategy

District	Actual						Future			
	Population (000)		Growth Rate (%/yr)		Population Density (no/ha)		2025			
	2000	2007	00-05	05-07	Gross ¹⁾	Net ²⁾	Assumed Growth Rate (%/yr)	Pop. (000)	Density (no/ha)	
									Gross ¹⁾	Net ²⁾
1. Hai Chau	184	195	0.8	1.0	92	206	0.4	209	99	188
2. Thanh Khe	154	167	1.5	0.3	180	249	0.7	188	203	234
3. Son Tra	103	120	2.8	0.7	20	81	3.8	235	39	84
4. Ngu Hanh Son	46	54	2.9	1.2	15	19	11.3	370	101	111
5. Cam Le	60	68	1.4	3.1	21	28	7.9	270	81	98
6. Lien Chieu	66	95	6.6	2.5	11	24	7.7	363	44	74
7. Hoa Vang	105	107	0.1	0.7	2	12	8.7	481	7	57
Total	716	807	1.9	1.2	8	34	5.5	2,117	22	85

Source: GSO.

¹⁾ Total land area excluding Hoang Sa Islands.

²⁾ Net area refers to urban areas and other areas suitable for various types of development. It is calculated based on a suitability analysis which excludes areas vulnerable to erosion, rivers and lakes, forest land, transportation land, cemeteries, military land, and areas that need special protection such as natural habitats, coral reefs, etc.

2) Proposed Growth Strategy

5.37 The alternative scenarios have been rapidly assessed from the viewpoint of Danang City's sustainable development, wherein:

- (i) Urban growth avoids sprawl and promotes effective land use;
- (ii) Economic sustainability refers to competitiveness, including industry mix, investment attractiveness, impact on the region, and others;
- (iii) Social sustainability refers to livability, including employment, access to services, equity, and others; and
- (iv) Environmental sustainability considers pollution levels, preservation of the ecosystem, disaster preparedness, and others.

5.38 The results of the rapid assessment of the above alternative scenarios are summarized in Table 5.3.5. As is shown in the table, the potential urban area in the city is large enough to accommodate a population of 2.1 million.

Table 5.3.5 Rapid Assessment of Alternative Spatial Growth Scenarios

Item		Scenario 1: Base Case	Scenario 2: Current Construction Plan	Scenario 3: Accelerated Growth Strategy
Profile	Population (000)	1,213 (2025)	1,500 (2025)	2,117 (2025)
	Net Area ¹ (ha)	20,572	24,028	25,043
	Net Density (persons/ha)	59	62	85
Sustain-ability	Economic: <ul style="list-style-type: none"> • Industry mix • Investment attractiveness • Impact on the region 	Low: <ul style="list-style-type: none"> • Ineffective land use • Decreased investment attractiveness • Little positive impact on the region 	Moderate: <ul style="list-style-type: none"> • Urban sprawl • Lack of competitive urban center • Integrated with urban areas of adjoining provinces 	High: <ul style="list-style-type: none"> • Modern compact CBD and sub centers • Strategic locations for new industries • Stronger integration with adjoining provinces
	Social: <ul style="list-style-type: none"> • Equity • Employment • Access to services 	Low: <ul style="list-style-type: none"> • Limited employment opportunities • Continued outmigration 	Moderate: <ul style="list-style-type: none"> • Difficult to provide public transport services 	Moderate to High: <ul style="list-style-type: none"> • Stronger human resources • Improved accessibility to services • Stronger communities
	Environmental: <ul style="list-style-type: none"> • Pollution levels • Preserved ecosystems • Disaster preparedness 	Low: <ul style="list-style-type: none"> • Spread of pollution • Adverse impact on ecosystem • Higher vulnerability to disasters 	Moderate to High: <ul style="list-style-type: none"> • Environment is preserved/ considered 	Moderate to High: <ul style="list-style-type: none"> • Pollution-free • Preserved ecosystem • Improved amenity

Source: DaCRISS Study Team.

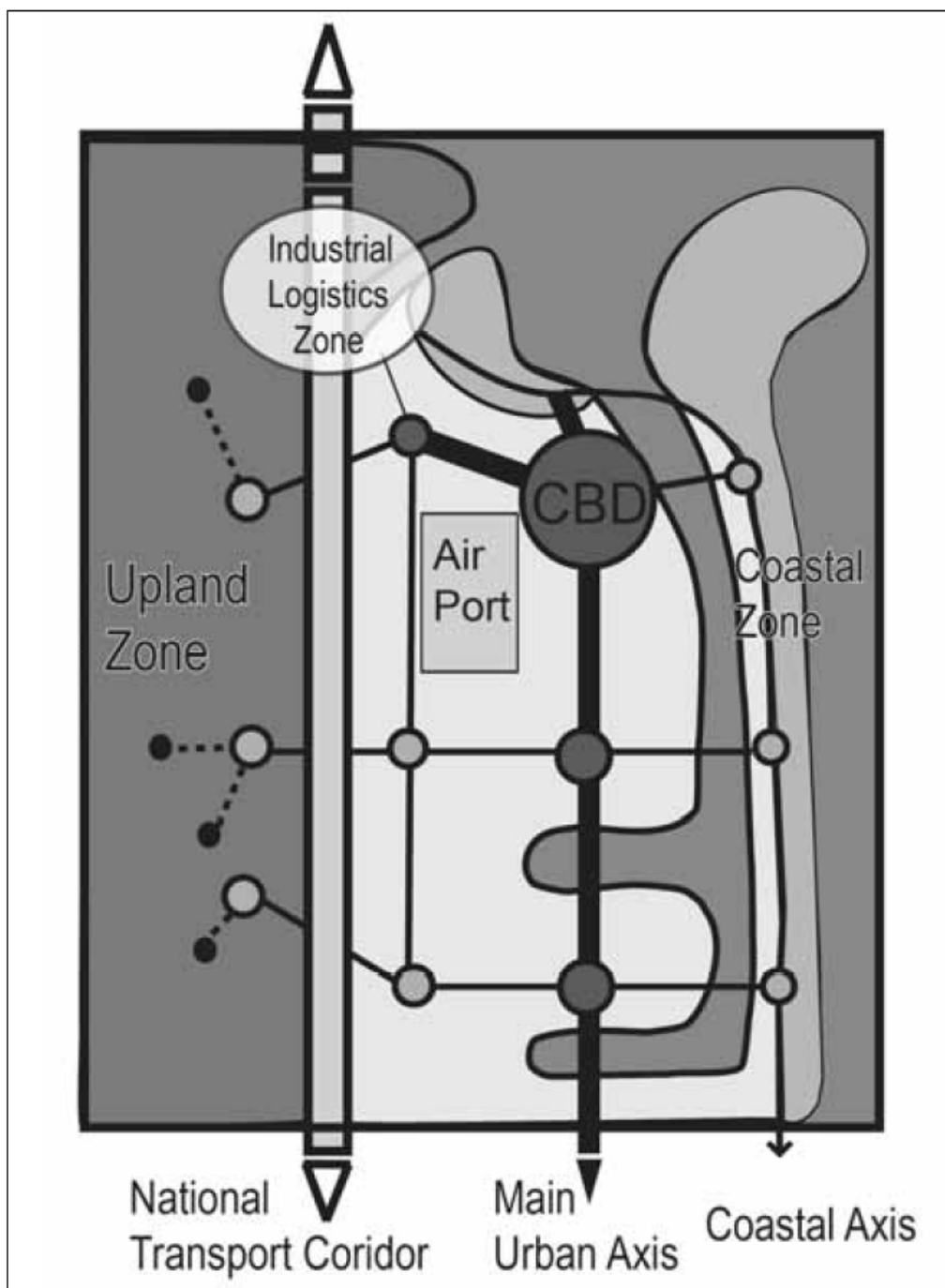
¹ Net area refers to urban areas and other areas suitable for various types of development. It is calculated based on a suitability analysis which excludes areas vulnerable to erosion, rivers and lakes, forest land, transportation land, cemeteries, military land, and areas that need special protection such as natural habitats, coral reefs, etc.

5.39 A key factor in sustainable urban development planning is the determination of the appropriate criteria for compactness of an urban area without damaging its environmental sustainability. Most of the traditional urban areas in Vietnamese cities are densely populated with highly mixed land use. They normally have vibrant city centers offering diverse and convenient urban activities as well as creating an attractive image of the cities. These city centers contribute to the economy of the cities by providing high employment opportunities. Because of the compactness of urban areas, people's mobility and accessibility to services and goods are ensured. In short, the traditional Vietnamese urban area is a model of a sustainable city.

5.40 During the last decades, however, urban areas have expanded rapidly. A significant characteristic of this type of development—whether or not it is planned or unplanned—is the lack of, or disappearing, compactness of the urban area. New urban areas are thinly populated without guarantee of adequate services or employment. It is also difficult to develop effective and efficient public transportation services, as well as other infrastructure services in a cost-effective manner.

5.41 Since Danang City's outer areas have started to urbanize, it is now very critical that the city should determine what kind of urban form it must pursue to realize a sustainable environment city. DaCRISS recommends the development of transit-oriented urban areas that are integrated with medium- to high-density land-use development.

Figure 5.3.4 Conceptual Spatial Structure of Scenario 3



Source: DaCRISS Study Team.

5.4 Basic Urban Structure and Urban Function

1) Planning Concept and Orientation

5.42 Primary objective of spatial planning is to promote development of competitive, livable and environmentally sustainable urban areas. For this, main planning principles adopted in DaCRISS are briefly as follows:

- (i) **Environmental Sustainability:** This is ensured by adopting environmental zoning worked out in Chapter 5.2.
- (ii) **Competitiveness:** This is promoted through integrated development of efficient activity centers with capable urban transportation system and improved infrastructure. Modern CBDs are developed, industrial parks / zones are upgraded, new activity centres such as university complex, tourism zones are also developed in the most effective manner.
- (iii) **Livability:** This is achieved through improved management of landuse by controlling locations of polluting industries and activities in residential and mixed use areas, and providing needed infrastructure services at community levels.

5.43 As Danang City has been growing and is expected to grow further, the growth management of urbanization process is very much important. For this, three basic interventions are necessary:

- (i) **Growth boundary:** In order to avoid sprawl of urban areas, designating a growth boundary is considered necessary and effective as it is practices in many other countries.
- (ii) **Guided development through integration of key transport network development and urban development:** Planning permission and development permit must be strategically provided for investors based on urban plan in a way that planned compact and efficient urban area can be realized with proper cost sharing between the city and investors.
- (iii) **Enforcement of landuse:** Development process must also be monitored and necessary enforcement must be exercised to realize development of desired urban areas.

5.44 Other considerations in the spatial planning include the following:

- (i) Urban areas will be organized in a compact form with medium to high density population and socio-economic activities wherein mobility and accessibility are supported with three mass-transit lines and integrated bus and other public transport system. The mass-transit lines of which adequate system will be farther studied will form backbone of the urban system along which main activities centers will be developed.
- (ii) The main urban areas will be extended towards the south and eventually integrated with those of Hoi An areas and other urban clusters in Quang Nam province.
- (iii) Industrial activities as well as new land-scale developments will be accommodated along strategic transportation system such as expressways and railways including high-speed railway. Integration with sea ports and airports will also be duly considered. Effective integration of the inter-city transport system with industrial parks and large-scale complex development as well as urban system is important for

Danang City to function as a competitive center in the CFEZ region.

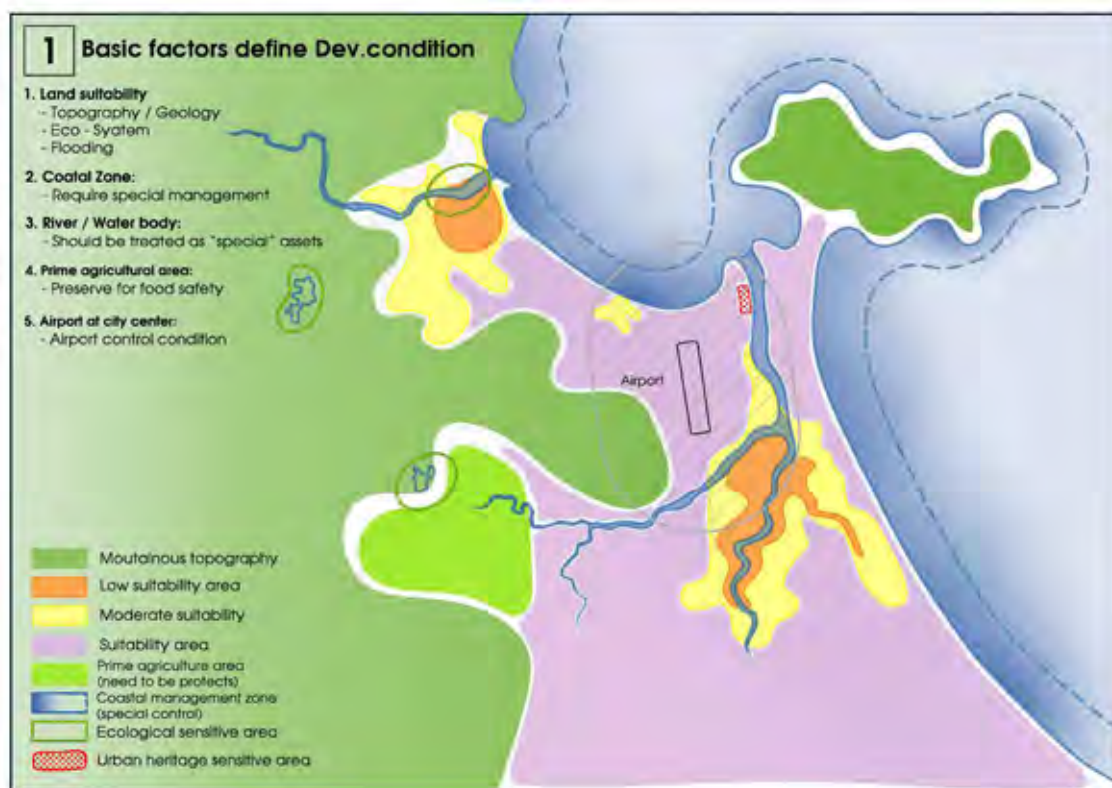
- (iv) Medium to high density urban areas will be designed in a way that adequate mixture of high-rise to low-rise housings/ buildings with diversified use and purposes as well as sufficient open space and greenery.

2) Spatial Structure Concept

(1) Broad Zoning

5.45 This provides primary environmental consideration before developments take place. The area will be broadly classified into (i) Ecological Preservation Zone on mountain / forest areas, (ii) Marine / River Zone including seashore and riverbanks, and (iii) Urban Development Zone where different types of development are undertaken (see Figure 5.4.1).

Figure 5.4.1 Broad Zoning for Conservation and Development



Source: DaCRISS Study Team

(2) Green and Open Space Network

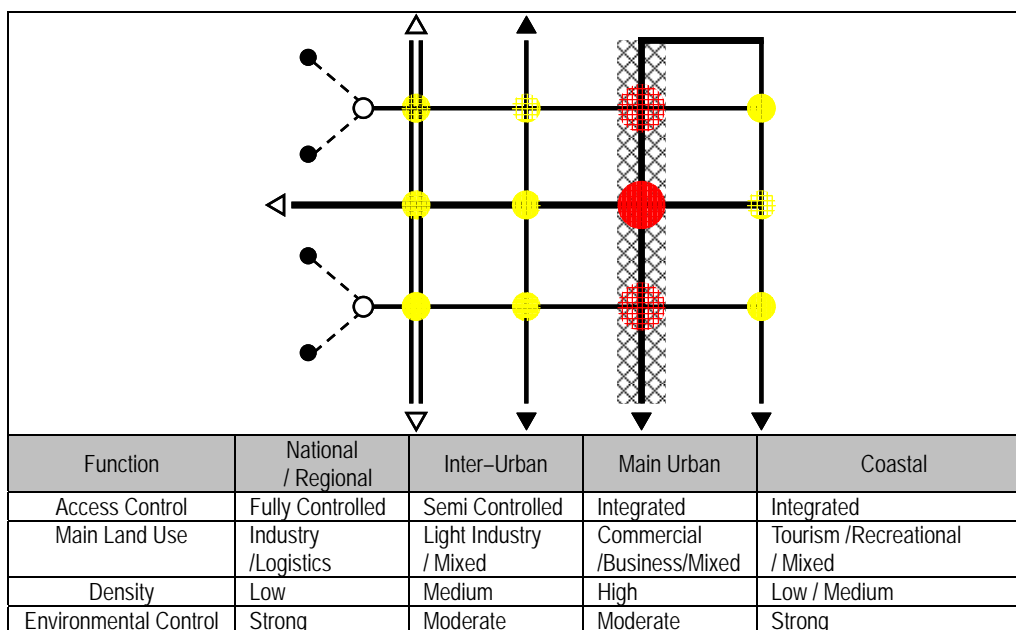
5.46 Existence of rich natural environmental resource comprising forests, mountains and hills, greenery, water bodies including rivers, lakes and seas, and beaches can provide an ideal network of greenery and open space which enhance uniqueness and identical image of the city, create rich landscape and provide ideal space for tourism and recreation for both residents and visitors if only they are adequately maintained.

(3) Basic Structure of Transport Network

5.47 The principles in developing urban transport network is to cater the transport infrastructure and services for various needs and functions to be satisfied, and those are described as follows (see Figure 5.4.2):

- (a) **Inter-city Freight Transport Network:** Ports will play an important role in inter-city transport of goods to and from Danang City. A large volume of cargoes will be transported between two ports (Tien Sa and Lien Chieu) and industrial zones in Danang City and neighboring provinces in the Central Vietnam. In order to accommodate a large volume of truck traffic, primary road network for freight transport is carefully studied. In this case, the following conditions should be taken into consideration:
- (i) To efficiently link several hubs of freight transport such as ports and industrial zones with inter-city road network such as North-South Expressway and National Highway 1A bypass.
 - (ii) To avoid large volume of truck traffic to enter urban centers, newly developed areas in the south and the east coast resort area.
- (b) **Inter-city Passenger Transport Network:** The existing Danang Station of the railway and the provincial bus terminal will be relocated in the vicinity of the New Danang Station of North-South High-speed Railway (NSHSR) in the south of Lien Chieu District where will emerge one of the future sub-centers of Danang City. This will provide easy transfer for passengers. Danang International Airport will remain at the present location and should be upgraded of its terminal capacity. Terminal facilities for passenger ships will be developed at the west bank of Han River. In order to provide good access to those passenger terminals, convenient public transport services including Urban Mass Rapid Transit (UMRT) and urban bus system should be provided.
- (c) **Primary Road Network:** Primary road network serves mainly for intra-city traffic with relatively long travel distance, e.g. trips between districts and between urban centers. Scale and characteristics of urban development are taken into consideration of network planning. It is also expected that examination of transport network will require an adjustment of urban development scenario and framework.
- (d) **Secondary Road Network:** Secondary road network will supplement primary road network and serve for intra-district traffic with relatively short travel distance. Density of urban development is taken into consideration of network planning. In this report, secondary road network is not formulated yet. It will be examined by area after primary road network is fixed.
- (e) **Mass Transit Corridor:** In order to provide an efficient transport service between major area and points where large volume of traffic demand is generated and attracted, i.e. existing and new urban centers, district centers, railway stations, airport, new development areas designated in the urban development scenario and to avoid excessive investment on road development, Urban Mass Rapid Transit (UMRT) network serving for major corridors has been proposed.

Figure 5.4.2 Structure of Transportation Network, Land Use and Environmental Control



Source: DaCRISS Study Team

(4) Urban Centers: Three main urban centres and a number of suburban centres will be developed.

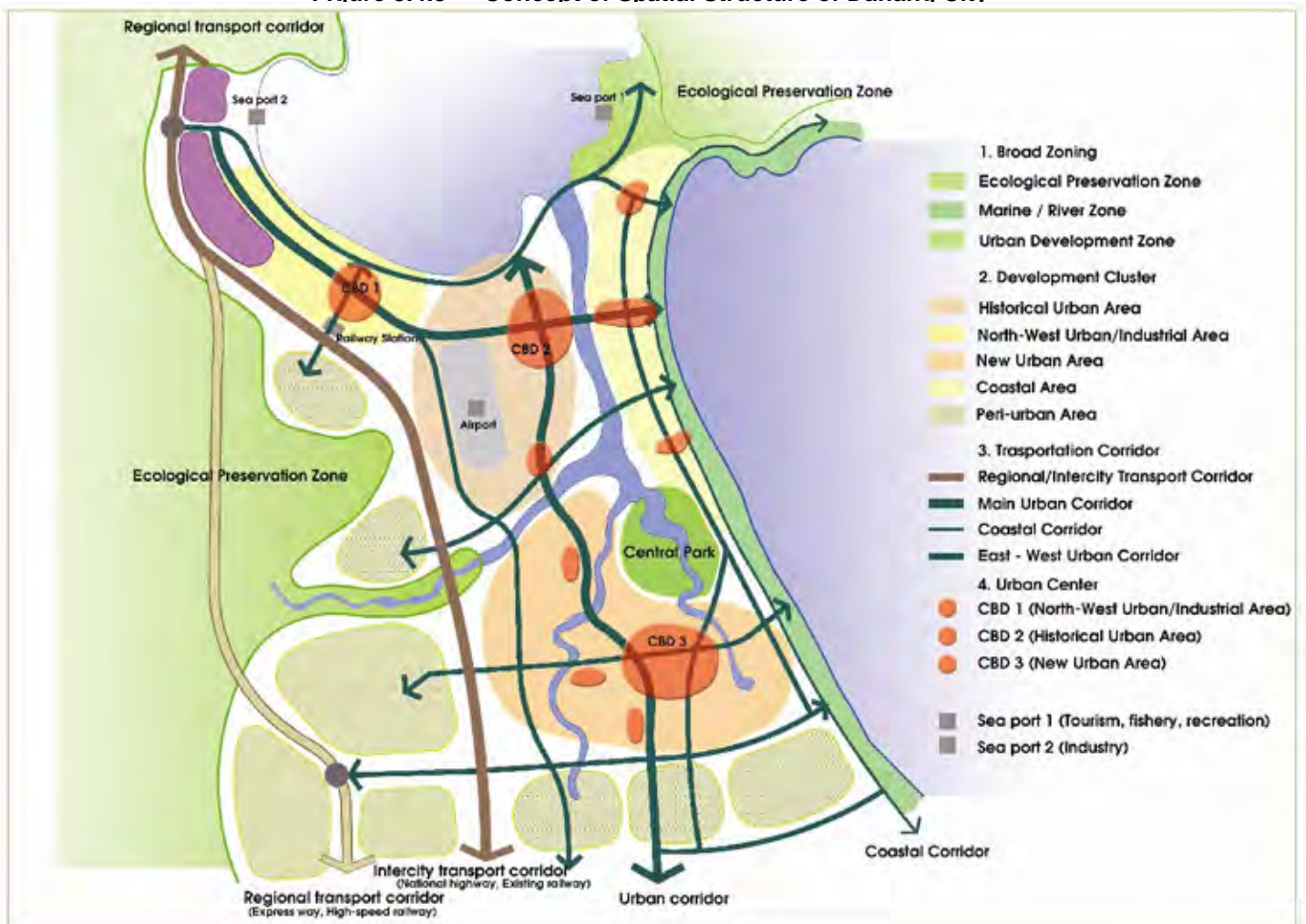
- (i) In the North–West Cluster, the CBD 1 provides space for new administration centres and local economic and social services.
- (ii) CBD 2, The existing urban centre will also be gradually renovated in a way that the areas maintain historical value of townscape and traditional socio – economic activities which will be mixed with modern developments. For this urban landscape and design must be duly considered to create attractive image of the city. High – rise building as well as design of buildings and facilities must also be guided with adequate principles.
- (iii) CBD 3 will be developed in the southern cluster where future development is expected to concentrate. It is advisable the new urban centre will be developed at internationally competitive level in terms of function and design to accommodate modern high – rise buildings for offices, commercial facilities, hotels, convention centres, and so on. Together with university and high – level medicare facilities and prime resort facilities, this centre is expected to become an attractive destination not only in Vietnam but also Asian region.

(5) Urban Expansion toward Quang Nam Province: A likely situation which is expected to take place is farther expansion of urban areas toward Quang Nam Province. Development towards the south has been seen along main roads. This is particularly important to integrate Danang and Hoi An areas.

(6) Spatial Structure Concept

5.48 On the basis of the considerations made in the above, concept of spatial structure is prepared (see Figure 5.4.3).

Figure 5.4.3 Concept of Spatial Structure of Danang City

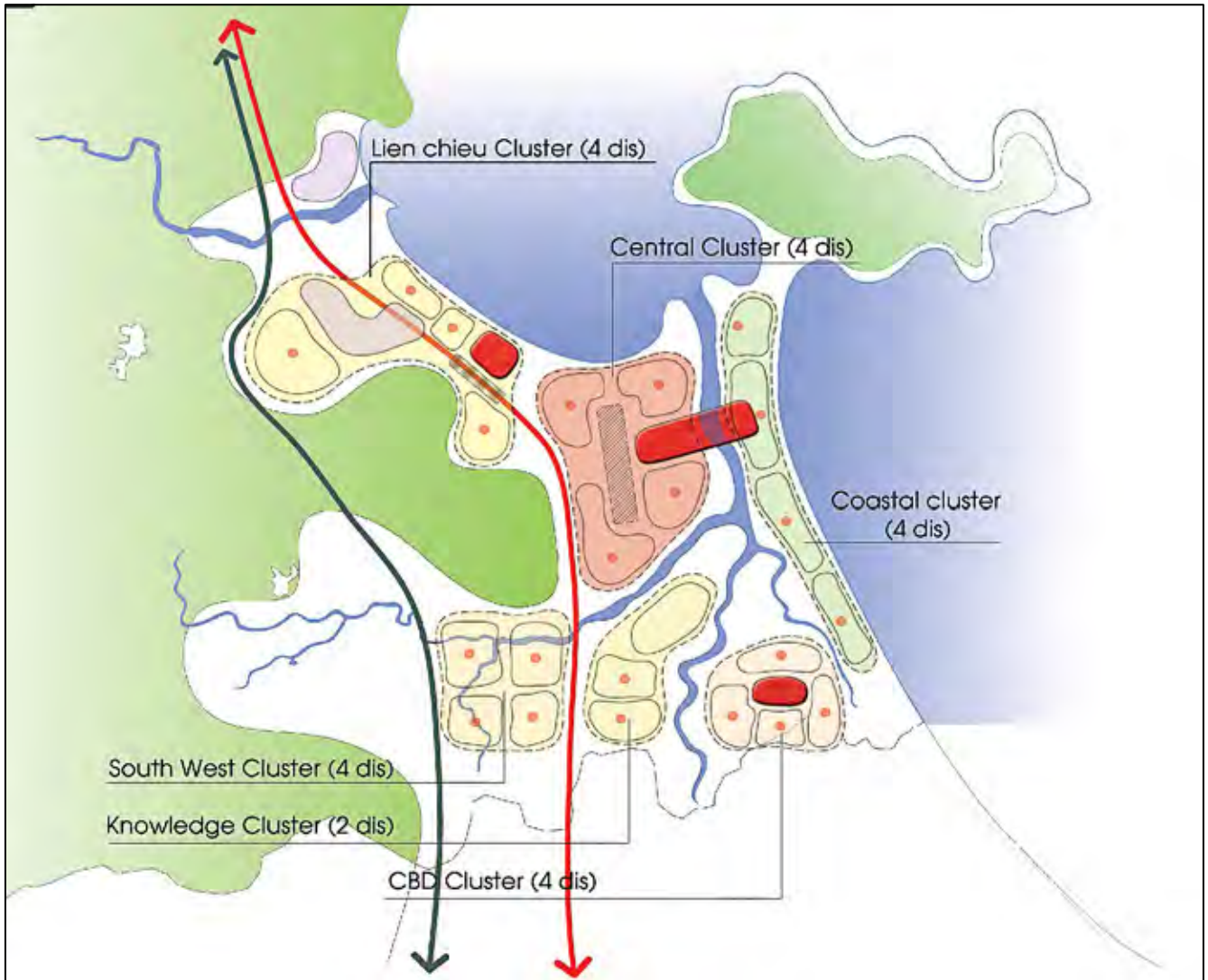


Source: DaCRISS Study Team.

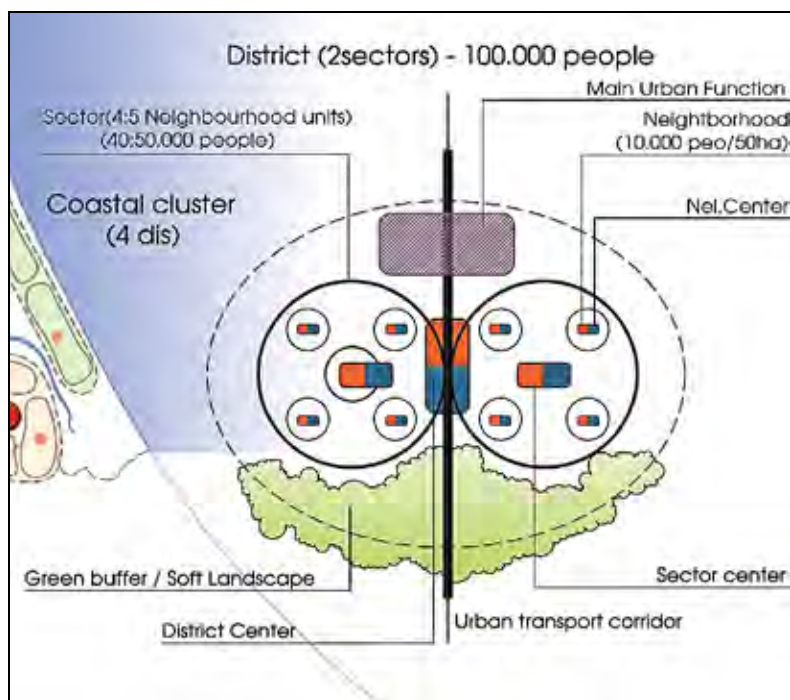
3) Development Clusters

5.49 Urban Development Zone will be composed of a total of five types of clusters including (i) Historical Urban Area, or currently developed urban areas, which is rather for redevelopment than for new developments, (ii) North–West Urban / Industrial Area which is composed of existing urban areas and new urban areas, (iii) New Urban Area spread in the south of the city to accommodate new development in the most efficient and effective manner. (iv) Coastal Area including seashore and its direct hinterland areas, and (v) Peri – urban areas including different types of land uses such as urban agriculture, low density environmental friendly activities, future urban expansion, and so on.

Figure 5.4.4 Cluster Development Concept



Source: DaCRISS Study Team.

Figure 5.4.5 Concept of Cluster

Source: DaCRISS Study Team.

4) Implication with Danang International Airport

5.50 The location and function of the Danang Airport will affect the future urban development in many ways. At present, its proximity to the city center gives Danang's a comparative advantage over other cities. The airport also offers good opportunities for attracting a higher number of visitors because it serves as a gateway to three World Heritage Sites, beautiful beaches, and rich flora and fauna that are within the airport's influence area. Moreover, the airport has room for further physical expansion to accommodate larger volumes of air traffic. On the other hand, inasmuch as the airport's location provides visitors with good accessibility to the CBD, its location is also a weakness since if and when air traffic increases, noise levels are also expected to rise.

5.51 Considering the pros and cons of the existing airport, it is the view of the Study Team that the role and location of the Danang airport is very critical in its overall city development strategies, as follows:

- (i) The seeming remoteness of Danang City from major cities not only Hanoi and Ho Chi Minh City but also other cities in Asia and the world is proving to be a handicap, obstructing its development and that of CFEZ. While strengthening the connectivity of Danang City with the two other economic zones requires expressway and high-speed railway connection, both takes a long time and undoubtedly huge investments to be realized. Meanwhile, air transportation is fast and the most cost-effective. However, the remoteness between Danang and other major cities somehow is compensated by the airport's proximity to the city center;
- (ii) Having a competitive airport is the most strategic and quickest solution to connect Danang and the CFEZ directly with the world as well as with the NFEZ and SFEZ. For this, the existing airport must be improved and strengthened to match other international airports that attract direct flights to/from major cities in the region and the world. Opportunities open up when tourism development and promotion strategies are

implemented in the CFEZ hand in hand with airport improvement in a coordinated manner. Direct connections to other major cities also bring increased MICE (meetings, incentives, conventions, and exhibitions) opportunities. Again, the distance between Danang and other major cities can be compensated by the relative ease and speed with which one can reach Danang's City center;

- (iii) Further integration of the airport function and facilities with those of the urban areas especially the CBD is important in making the airport an integral part of the urban system physically, functionally and aesthetically. For example, the terminal building can be made into a recreational/commercial center with efficient transit systems such as premium bus, LRT, monorail, etc. to connect the airport to business/ commercial facilities in the CBD and to resort complexes. Making Danang an Airport City can also be a vision of the city; and
- (iv) While ICAO regulations require international airports to have unrestricted air space to ensure safe aircraft operation, a preliminary study showed that many buildings with a height of more than 53 m will eventually rise in the airport's vicinity due to limited developable land elsewhere (see Figure 5.4.6).

5.52 Although the scale and function of Danang International Airport are to be determined at the national level, opinions of the Study Team are as follows:

- (i) Viewpoint of access by domestic and international visitors, the airport provides superb access to both Quang Nam and Hue which can become even better when expressways and high-speed railway are completed. This strategic advantage must be maintained in the future. However, in order to sustain this concept, Danang City must overcome disadvantageous impacts of the airport such as: increasing noise of aircrafts and height restriction to buildings which needs attentions from urban planning and development viewpoints.
- (ii) Increasing level of noise due to increasing number of aircrafts may become a concern of the people. While technological progress contribute to lessen aircraft noise level, it is also important to reorganize gradually landuse in the affected areas, and provide necessary countermeasures.
- (iii) For safe operation of aircrafts, there is an international code which restricts the heights of building within specified range of the areas from the aircraft operation route. As is discussed in the report, according to this code, many parts of existing urban areas are restricted to build facilities within 45 meter height (53m including elevation). This level of height considered adequate for future development of the city because of the following reasons:
 - Excessive construction of high-rise buildings in the city centre will worsen traffic congestions as is already being seen in HCMC. It is strongly recommended that this code must be used as a basis to control the building height of existing city centre.
 - Building height control is also important from urban design and landscape of the city centre including cultural zone located along Han River. Standardized and possibly unified building height will create harmonized urban landscape which will enhance not only cultural but also economic values.
 - It is therefore proposed in DaCRISS to develop a new CBD in the south which is closely integrated with the existing CBD with UMRT and encourage the

development of high-rise buildings in concentrated manner.

Figure 5.4.6 Height Restrictions in the Vicinity of Danang Airport



Note: Building height is based on the information from responsible representatives of each building.

5.5 Existing Urban Development Projects

5.53 Table 5.5.1 shows the list of approved projects by the Danang People's Committee. The Study Team has duly considered these projects in the process of plan formulation.

Table 5.5.1 List of Approved Projects by Danang People's Committee (November 2009)

No.	Name of Project
HAI CHAU DISTRICT	
HC-1	Area at the south of 3/2 street
HC-2	Thuan Phuoc resettlement zone
HC-3	Thuan Phuoc D block (in resettlement zone)
HC-4	Area of Tran Quy Cap - Le Loi - Dong Da
HC-5	Riparian land from Cham museum to Song Thu Co.
HC-6	Commercial and trading line in front of Airport station
HC-7	Tay Nam Hoa Cuong residential zone
HC-8	Tuyen Son residential zone (between 2/9 street and Nui Thanh street)
HC-9	International passenger station of DN airport (including the access road)
HC-10	No.2 residential zone on Nguyen Tri Phuong street
HC-11	No.3 Tuyen Son residential zone
HC-12	The residential zone at Tuyen Son bridge's intersection
HC-13	The residential zone at the south of Phan Dang Luu street
HC-14	The urban area of Dam Rong lake in Thuan Phuoc
HC-15	Dam Rong lake residential zone
THANH KHE DISTRICT	
TK-1	Thanh Loc Dan resettlement zone
TK-2	265B residential zone on Tran Cao Van street
TK-3	No.1%&2 residential zone, in Thac Gian pond - Land for constructing apartment block - Traffic land (Do Quang lengthened street)
TK-4	The resettlement zone in Xuan Ha ward (Film capacitor production Co. of Danang Electronic device & technology development Co.)
TK-5	Constructing infrastructure for Thanh Khe Tay resettlement zone
TK-6	Project of the factory for treating solid waste into compost fertilizer
TK-7	Improving environment of Phu Loc river
TK-8	Ha Huy Tap lengthened street (Xuan Ha A residential zone)
TK-9	Nam Xuan Hoa A residential zone
TK-10	No.1 Phan Lang residential zone
TK-11	No.3 Thanh Loc Dan residential zone
TK-12	Huynh Ngoc Hue residential zone (the old milling factory)
TK-13	Block C - Thanh Loc Dan residential zone
TK-14	No.2 Phan Lang residential zone (phase 2)
TK-15	No.2 Phan Lang residential zone (phase 2)
TK-16	The residential zone of Danang car mechanical plant
TK-17	The residential zone at the top of Nguyen Van Linh street
TK-18	The project for relocate and reorganize the manufacturing of 29/3 textile-garment company
TK-19	The project for rehabilitate Valley View workshop
TK-20	The project for reclaim 4.342 m2 of land next to 29/3 company to the west
TK-21	Infrastructure of 30m line on Nguyen Tat Thanh street
SON TRA DISTRICT	
ST-1	No.4 residential zone
ST-2	Area at the end of Bach Dang Dong street

No.	Name of Project
ST-3	No.5 residential zone
ST-4	An My residential zone
ST-5	No.4 An Cu residential zone
ST-6	No.2 An Trung cultural - sport residential zone
ST-7	No.2 An Cu expanded residential zone
ST-8	No.3 An Cu expanded residential zone
ST-9	No.1 An Nhon resettlement area
ST-10	KTQD line from Song Han bridge to the beach
ST-11	No.2 Nai Hien Dong residential zone
ST-12	Bach Dang Dong commercial super market
ST-13	The street to administrative center of Son Tra district
ST-14	East-south area of An Don industrial zone
ST-15	Nguyen Van Linh to Son Tra - Dien Ngoc
ST-16	Man Thai market urban area
ST-17	No.2 Man Thai expanded residential zone
ST-18	Nguyen Van Thoai expanded residential zone
ST-19	Residential zone at the north of Phan Ba Phien street
ST-20	10,5m street connects Phan Ba Phien's northern residential zone with Tho Quang expanded residential zone (2,28ha)
ST-21	No.5 An Cu residential zone - Period 1 (2ha) - phase 1 - Period 2 (8ha) - phase 1 - Phase 2 + Son Tra - Dien Ngoc line with 30m part (14ha) - Phase 3 (5ha)
ST-22	Dai Dia Bao residential zone (30ha)
ST-23	Nai Hien Dong fishing village's residential zone (14ha)
ST-24	Danang aquicultural services industrial park
ST-25	No.3 Tho Quang residential zone
ST-26	No.2 Tho Quang resettlement zone
ST-27	An Don resettlement zone
ST-28	The line behind of Yet Kieu street's façade
ST-29	No.3 Man Thai resettlement zone
ST-30	Staff collective quarter of No.680 naval army corps & No.83 naval regiment
ST-31	Residential area at the beginning of Son Tra Dien Ngoc road (69 ha)
ST-32	Suoi Da resettlement area
ST-33	Resettlement area at the East of Yet Kieu road (8.5ha)
ST-34	Residential area at the beginning of extended Son Tra Dien Ngoc road (8.5ha)
ST-35	Commercial, service, tourism line from Nguyen Phan Vinh to Le Van Thu road (5.1 ha)
ST-36	Lot A 1.6, Vinh Man Quang residential area (8.6ha)
ST-37	Bau Gia Phuoc residential area (2.7ha)
ST-38	The logistics zone for the local port
NGU HANH SON DISTRICT	
NHS-1	Resettlement zone at the east of factories No.38 and No.387
NHS-2	No.375 division
NHS-3	House development project (with 576 apartments)
NHS-4	Apartment block at the south of Tran Thi Ly bridge
NHS-5	T18 residential zone
NHS-6	KTQD area on Le Van Hien - Tran Dai Nghia street, including 8 areas: a. The area at Tuyen Son bridgehead b. Household appliances stock pile (the resettlement zone of Le Van Hien street enlargement) c. Area of Devitrified stone factory and bicycle production factory d. Area of Vinaford Co.

No.	Name of Project
	e. The southern area of Rural development & Agriculture bank of Ngu Hanh Son district f. Vinamilk factory g. Urban area of Hoa Hai and expanded Hoa Hai h. Area of Hoa Hai old market
NHS-7	Residential zone at the south of Rehabilitation & sanatorium hospital (Central region - Danang marine transportation Co.)
NHS-8	Constructing Hoa Quy resettlement zone
NHS-9	New residential zone in Bac My An ward (to the north of Phan Tu street)
NHS-10	Residential zone from Phan Tu street to Ho Xuan Huong street
NHS-11	Residential zone at to the north of Danang rubber processing factory
NHS-12	Residential group 19 in Khue My
NHS-13	Residential zone at the north of East - South carport
NHS-14	Residential zone at the south of East - South carport
NHS-15	Hoa Hai 1-3 residential zone (phase 1)
NHS-16	Resettlement zone near the western side of Danang FPT urban area
NHS-17	Dong Tra low-income residential zone
NHS-18	Danang university village - resettlement zone
NHS-19	Residential area in the north of Phaolo monastery (3.2ha)
NHS-20	Track along Son Tra-Dien Ngoc road (the section passing Nam Phan Tu resettlement area) (3.3ha)
NHS-21	Villa area along the wall of Nuoc Man airport (5.6ha)
NHS-22	The resettlement area along Son Tra-Dien Ngoc road, the section passing Ben Thanh-Non Nuoc hotel, Hoa Hai ward (14.4ha)
NHS-23	Dong Hai resettlement area (80ha)
NHS-24	Tan Tra resettlement area (70.2ha)
NHS-25	Residential area for Nuoc Nuoc marble village (32.2ha)
NHS-26	The Northern area of Nuoc Man airport (1ha)
NHS-27	No.4 area - Tuyen Son
NHS-28	House group of Bac My An southern expanded residential zone
NHS-29	No.2 Hoa Hai residential zone
NHS-30	Son Thuy residential zone
NHS-31	Hoa Hai market urban area
NHS-32	Hoa Hai market expanded urban area
NHS-33	Administrative center of Ngu Hanh Son district
NHS-34	H4 area of Hoa Hai
NHS-35	H5 area of Hoa Hai
NHS-36	The area at the south of Hoa Hai expanded residential zone
NHS-37	Ba Tung resettlement area (phase 1)
NHS-38	Ba Tung resettlement area (phase 2)
NHS-39	Non Nuoc marble mountains handicrafts village
NHS-40	The resettlement area at the west south of Non Nuoc marble mountains handicrafts village
NHS-41	No.4 area at the south of Tuyen Son bridge
NHS-42	No.2 Khai Tay resettlement area
NHS-43	Man Quang resettlement area
NHS-44	The resettlement area to the north of belt-road at the south of the city
CAM LE DISTRICT	
CL-1	No.2 Hoa Phat residential zone
CL-2	No.3 Hoa Phat residential zone
CL-3	No.4 Hoa Phat residential zone
CL-4	Hoa Tho residential zone
CL-5	No.5 Hoa Phat residential zone (phase 1)
CL-6	No.5 Hoa Phat residential zone (phase 2)

No.	Name of Project
CL-7	Phuoc Tuong residential zone
CL-8	No.3 expanded residential zone
CL-9	Hoa Tho expanded residential zone (4,5ha)
CL-10	Khue Trung - Do Xu - Hoa Cuong residential zone (63ha)
CL-11	Phong Bac - Hoa Tho residential zone (56ha)
CL-12	Hoa Cam and Hoa Cam expanded industrial park
CL-13	No.3 Phong Bac residential zone
CL-14	No.1 Truong Chinh residential zone
CL-15	Residential zone at the west of Truong Chinh street
CL-16	An Hoa - Khe Trung residential zone
CL-17	KTQD line at riparian land of Cam Le river (at the south of Binh Thai residential zone)
CL-18	Binh Hoa residential zone
CL-19	Extending CHC 35R-17L-CHK QT (including signal light installation at the southern end of airport)
CL-20	Afloat island
CL-21	No.4 Phong Bac residential zone
CL-22	Hoa Cam production and storage area
CL-23	No.3 expanded residential zone
CL-24	No.5 residential zone on Nguyen Tri Phuong street
CL-25	Dong Phuoc residential zone
CL-26	The residential zone at the south of the airport
CL-27	No.6 residential zone on Nguyen Tri Phuong street
CL-28	Tuberculosis prevention station
CL-29	The residential zone at the south of Cam Le bridge
CL-30	50m line - CMT8 street
CL-31	E block - at the south of Cam Le bridge (phase 1) - 65,1ha
CL-32	E block - at the south of Cam Le bridge (phase 1) - 49,45ha
CL-33	F block (phase 1) - residential zone at the south of Cam Le bridge
CL-34	F block (phase 2) - residential zone at the south of Cam Le bridge
CL-35	Block B - residential zone at the south of Cam Le bridge (phase 1 & 2)
CL-36	Block D - residential zone at the south of Cam Le bridge (phase 1 & 2)
CL-37	Block F - residential zone at the south of Cam Le bridge (phase 1 & 2)
CL-38	Extended Hoa Khanh industrial park (phase 1)
CL-39	Tuyen Son - Tuy Loan riparian street
CL-40	Block C - residential zone at the south of Cam Le bridge
CL-41	Constructing Nguyen Tri Phuong bridge
CL-42	Constructing Tung Lam and Khue Dong bridges
CL-43	Constructing Nguyen Tri Phuong street - the first part
LIEN CHIEU DISTRICT	
LC-1	Trung Nghia residential zone
LC-2	No.2 Hoa Hiep residential zone
LC-3	Hoa My expanded residential zone
LC-4	Nam O market city block (8,7ha)
LC-5	No.1 urban area at the north of railway station
LC-6	No.2 Hoa Minh resettlement zone
LC-7	No.3 Hoa Minh resettlement zone
LC-8	A block - Xuan Thieu
LC-9	B block - Xuan Thieu
LC-10	J258 residential zone, C block Xuan Thieu Nam O

No.	Name of Project
LC-11	Axis 1 - Tay Bac
LC-12	Axis 2 - Tay Bac
LC-13	No.1 area - West North new urban area
LC-14	No.2 area - West North new urban area
LC-15	No.3 area - West North new urban area
LC-16	No.4 area - West North new urban area
LC-17	No.5 area - West North new urban area
LC-18	No.6 area - West North new urban area
LC-19	Sport & Gym complex (near No.6 area - West North new urban area)
LC-20	No.3 Hoa Hiep resettlement zone
LC-21	Resettlement zone of Sport and Gym training school
LC-22	Hoa Minh residential zone (near Bubbha statue)
LC-23	Specific plan with scale 1:500 of KTQD line along Hoang Van Thai street (the part through regulation lake)
LC-24	3B Quang Thanh residential zone
LC-25	Hoa Hiep expanded resettlement zone
LC-26	The street to Phuoc Ly industrial cluster
LC-27	Hoa Hiep Bac resettlement zone
LC-28	Hoa Hiep resettlement zone
LC-29	3B Quang Thanh residential zone
LC-30	3B Quang Thanh resettlement zone
LC-31	Southern area of Hai Van tunnel
LC-32	Land use plan of DT602 street
LC-33	Hoa Khanh industrial urban area
LC-34	Line dividing land plots along DT602 street, near Hoa Khanh expanded industrial park
LC-35	80m line at the west south area of Hoa Hiep
LC-36	Nam O tourist zone
LC-37	Constructing infrastructure for Hoa Minh - Hoa Khanh & Lien Chieu resettlement zones
LC-38	Residential zone of Quang Thang brick & tile factory
LC-39	No.1, 2, 3 residential zone on Nguyen Huy Tuong street
LC-40	No.1 Khanh Son residential zone
LC-41	Resettlement area, warehouse and manufacturing establishment behind new railway station
LC-42	Warehouse and manufacturing establishment behind new railway station
LC-43	Residential area in the South of Hoang Van Thai road
LC-44	Lien Chieu Industrial park
LC-45	Industrial urban area (Hoa Khanh extended IZ-phase 2)
LC-46	Thuy Tu tourism urban area (401.6422 ha) 1. Phase 1 (53.6ha) (2005-2007)
LC-47	Residential zone at the south of Bau Mac lake
LC-48	Soccer training center
LC-49	Culture and Sport Center of Lien Chieu district (phase 1)
LC-50	The residential zone at Hoa Khanh market (phase 2)
LC-51	The residential zone at the south of administrative area of Lien Chieu district
LC-52	Production base & storage at the root of Dai La mountain pass
LC-53	The residential zone at the west of Nguyen Huy Tuong street
LC-54	No.1 Hoa Minh resettlement zone
LC-55	Phuoc Ly industrial cluster
LC-56	Phuoc Ly resettlement zone
LC-57	Phuoc Ly regulation lake
LC-58	Nguyen Tat Thanh south lengthened area

No.	Name of Project
LC-59	Land use plan with scale 1:2000 along Hoang Van Thai street
LC-60	KTQD line - the bypass to the south of Hai Van tunnel
LC-61	Thanh Loc Dan - Hoa Minh expanded resettlement zone
HOA VANG DISTRICT	
HV-1	Hoa Nhon residential zone (phase 1: 2ha)
HV-2	No.2 Hoa Lien resettlement zone
HV-3	No.1 residential zone - DT605 street - The line near DT605 street (phase 1) - KTQD line's infrastructure (phase 2) - The left line's infrastructure of No.1 residential zone on DT605 street (phase 3)
HV-4	No.2 residential zone - DT605 street
HV-5	Land use plan with scale 1:500 along DT605 street
HV-6	Land use plan with scale 1:2000 along Hoa Phong - Hoa Phu street
HV-7	Thanh Vinh expanded industrial cluster
HV-8	Hoa Son resettlement zone
HV-9	Hoa Lien resettlement zone
HV-10	The residential zone along 14B national highway
HV-11	KTQD line along 1A National highway
HV-12	KTQD line along DT602 street a. The part from Hoa Son gaol on bypass to the south of Hai Van tunnel - Infrastructure of No.6 residential zone - Infrastructure of No.7 residential zone - Left area b. The part from bypass to the south of Hai Van tunnel to intersection which is accessway to Mo stream - No.1, 2, 3, 4, 5 areas - The left areas
HV-13	KTQD line along 1A National highway
HV-14	No.1 resettlement zone on DT602 street
HV-15	No.3 resettlement zone on DT602 street
HV-16	No.5 resettlement zone on DT602 street
HV-17	No.7 resettlement zone on DT602 street
HV-18	Tung Son resettlement zone on DT602 street
HV-19	Hoa Ninh nursery garden - Phase 1 (5.6ha) - Phase 2 (5.4ha) - Phase 3 (10.ha)
HV-20	The residential zone at the south of Cam Le bridge - block A (phase 1)
HV-21	The residential zone at the south of Cam Le bridge - block A (phase 2)
HV-22	No.2 resettlement area on DT602 street
HV-23	Phu Thuong resettlement zone
HV-24	Phuoc Hung resettlement zone
HV-25	Land use plan with scale 1:2000 along Bac Thuy Tu - Pho Nam street
HV-26	Constructing bridge and roads at the south of the city (belt road at the south)

Source: Urban Planning Institute, Danang City.