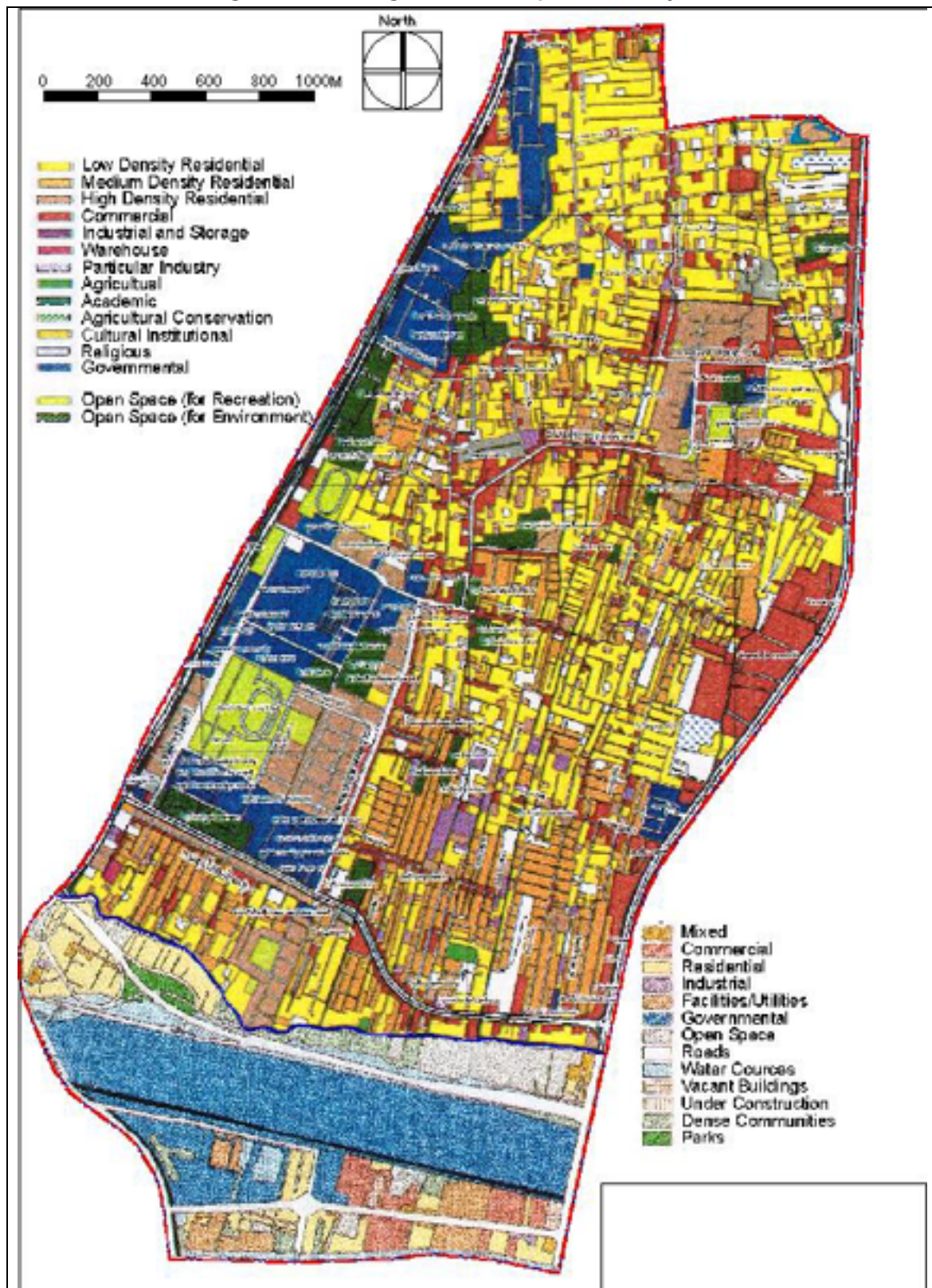


Figure 13: Existing Land Use Map of the Study Area

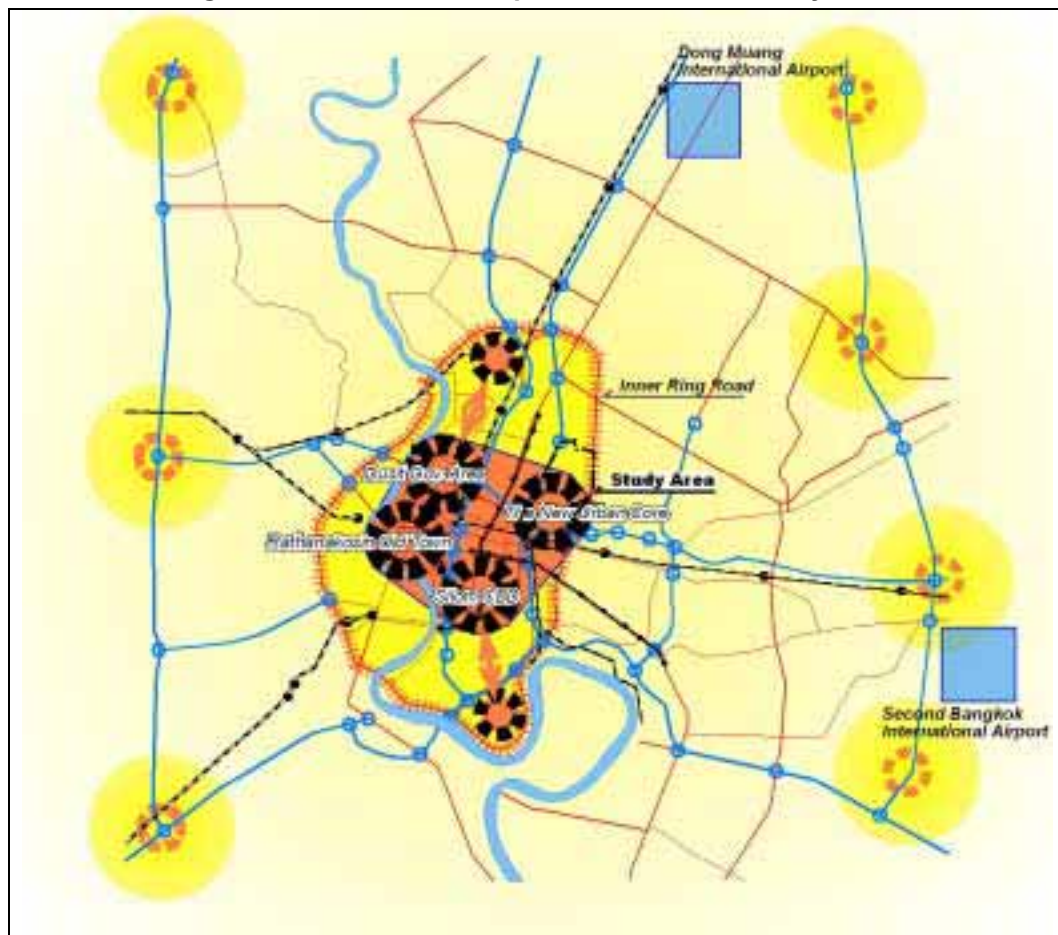


2.2 Position and Expected Role of the Study Area in Wider Context

The Study Area is located in close proximity to the existing cores of Bangkok, while the Area is accessible without relying on the two major urban transport axes from the north-east region that has recently developed as residential district. Also, access from the two international airports is excellent.

Consequently, the Study Area is located at a strategically important area and having a high development potential to perform as the fourth urban core of Bangkok. It could therefore play a central role in forming an ideal urban structure of future Bangkok.

Figure 14: Position and Expected Role of the Study Area



2.3 Redevelopment Direction of the Study Area

(1) Land Use

Principal policy of land use in future will be as follows:

- Northern half will be maintained/upgraded as a high-grade residential district; and
- Southern half will be developed as the fourth urban core of Bangkok where land use intensity will be much enhanced.

The urban functions to be introduced in this area will be:

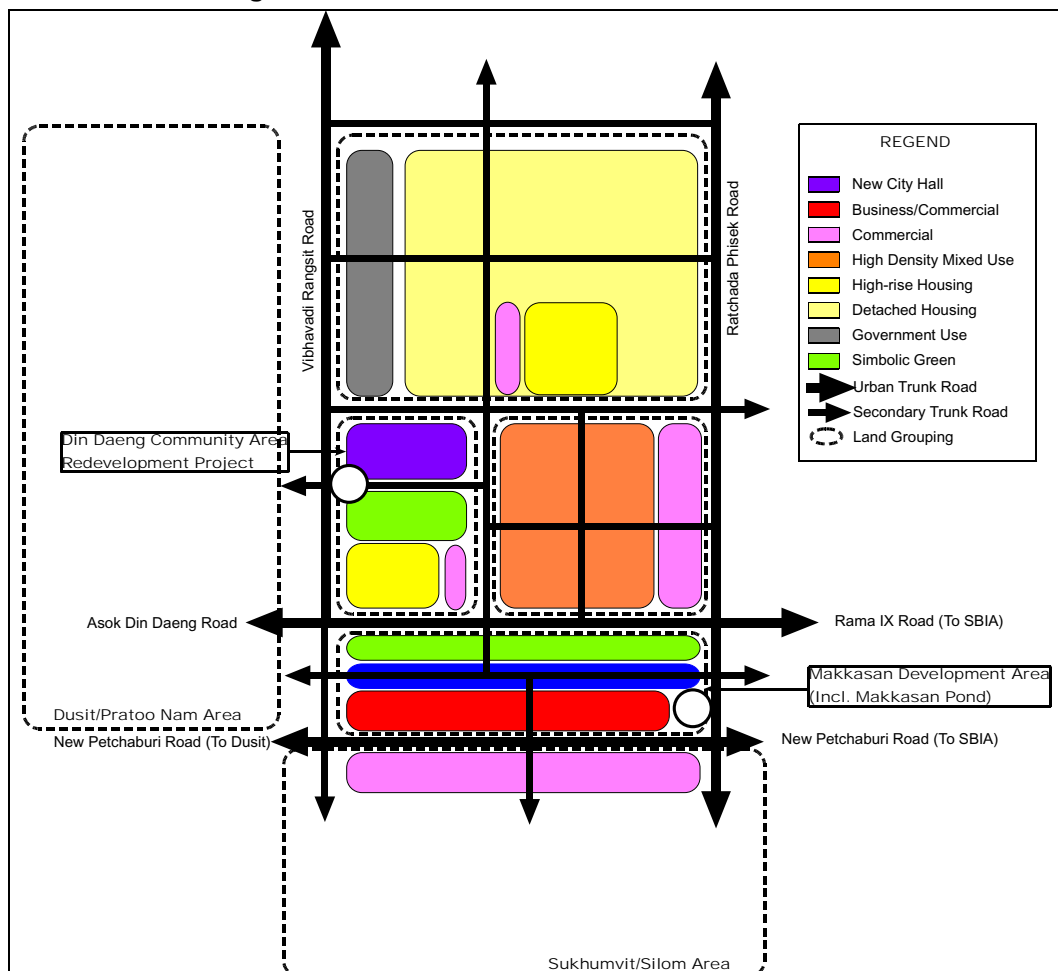
- International gateway (city air terminal, hotels etc.);
- Business-base function (international financing, external trade and insurance, international convention, and associated industries);
- Civic center (New city hall of BMA, symbolic space etc.); and
- Inner city housing (renewal of NHA housing complexes, condominiums developed by private sector etc.).

In order to introduce these urban functions, it will necessarily require initiative of a large-scale redevelopment project. There are three potential sites for large-scale development, namely; Makkasan SRT Marshalling Yard; Din Daeng Community Area; and Huai Kwan NHA Housing Complex. Among them the Din Daeng Community Redevelopment Project is the most matured one in terms of the depth of the past study, and simplicity of the implementation body. Given the timing factor discussed above, the distribution pattern of the core urban functions is assumed as shown in Table 05 and Figure 15.

Table 05: Distribution of Core Functions

Area	Urban Function	Facility Type
Din Daeng Community Area	<ul style="list-style-type: none"> Civic Center for the Citizens of BMA Area Urban Recreation Urban Central Residence 	<ul style="list-style-type: none"> BMA's New City Hall Educational facilities (existing) Health facilities (existing) Thai Japan Youth Center (Existing) Symbolic open space Public Housing (Renewal)
Makkasan Area	<ul style="list-style-type: none"> International Gateway and Associated Business Center Urban Recreation 	<ul style="list-style-type: none"> City air terminal Office buildings Convention center Water front park
Huai Kwang Area	<ul style="list-style-type: none"> Urban Central Residence Community Center for the northern half of the Study Area 	<ul style="list-style-type: none"> Public housing (renewal) Shopping center

Figure 15: Distribution Pattern of Core Functions



(2) Transport System Planning

Principal development policy for transport system will be as follows:

Establishment of mass transit oriented system (with pedestrians' walkways):

To make full use of the subway, Blue Line, which will be opened soon, establishment of pedestrians' walkway and feeder transport systems is crucial.

Distinct hierarchical road network:

Secondary trunk road network will be established in around one km grid in the residential district in northern half, and in around 500m grid in the commercial/business district in southern half.

(3) Water Front Improvement

In order to improve environment around Makkasan Pond, storm water drainage, waste water disposal, surface water treatment systems will have to be improved by the following measures:

Storm water drainage:

- Raising pavement elevations of flood-prone alleys; and
- Enlarging capacity of existing drain pumps.

Waste water disposal:

- Promotion of adequate use and maintenance of septic tanks; and
- Integration of drain pipes to the Central Wastewater Treatment Plant.

Purifying canal water:

- Feeding water from Chao Phraya River for uninterrupted circulation of canal water; and
- Linking canals with Makkasan Pond to enable water circulation into Khlong Sam Saen.

(4) Park and Greenery

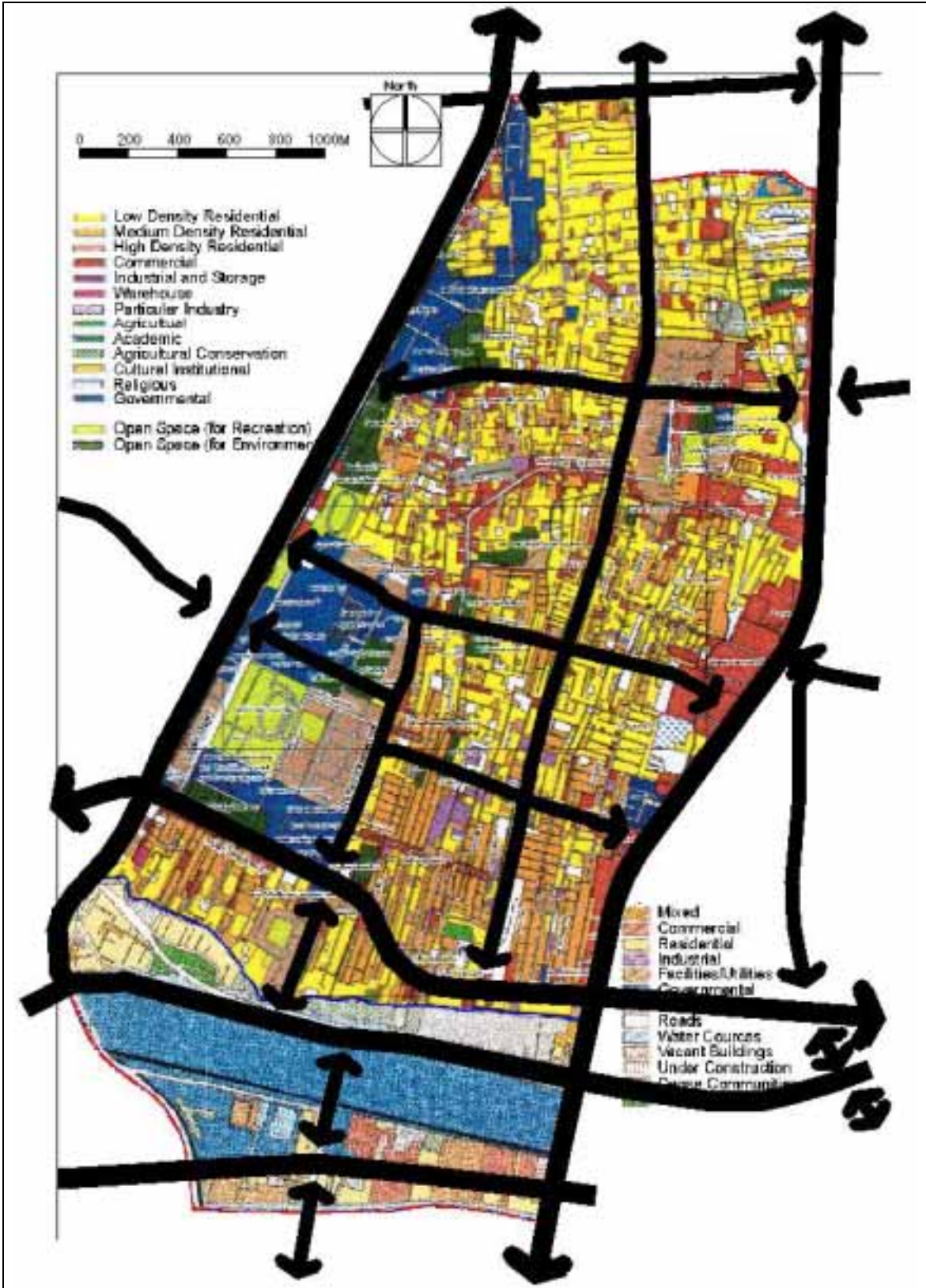
Parks and open space need to be provided by adopting the following measures:

- Preservation of Thai-Japan Youth Center;

Final Report (Summary)

- Conversion of idle lands to public parks (by purchase of such lands);
- Tree planting on banks along the canals (with cooperation from the landowners, application of incentive measures such as tax exemption);
- Creation of water front park around Makkasan Pond;
- Tree planting along roads; and
- Creation of a stream by recycling effluent water from the Central Wastewater Treatment Plant.

Figure 16: Transport System Development Plan in the Study Area



3 PRIORITY AREA REDEVELOPMENT MASTER PLAN (DIN DAENG COMMUNITY AREA: 100HA)

3.1 BACKGROUND AND REVIEW OF EXISTING MASTER PLAN

(1) Background of Existing NHA Master Plan

In 1992, NHA and BMA were in accord to improve and renew Din Daeng Community Area where lands are mainly occupied by these two agencies. During 1996 to 1997, NHA and BMA jointly studied the concept for the urban renewal of Din Daeng Community Area. The BMA Deputy Governor approved the cooperation approach of NHA and BMA, and a Working Committee was established accordingly by both agencies.

In 1999, NHA worked out a preliminary master plan focusing on the renewal of Din Daeng Housing Complex, and held several meetings with other agencies constituting the Working Committee including OCMLT, SRT, etc. The study called for minimum budget of 20,000 million baht, and therefore, the participation of private investors was found to be necessary for minimizing public investment.

Consequently, a reliable feasibility study by consultants was required to comply with the Royal Act on Private Participation in State Affairs (B.E. 2535) and requirements by NESDB. The Working Committee decided to entrust a consultant team (Creative Development Co., A-7 Corporation, SJA. 3D Co.) to formulate a master plan.

(2) Outline of Existing NHA Master Plan

NHA formed the following requirements for the master plan.

1) Objectives of the Project

The objectives of the project are to set up a pilot project using the concept of urban renewal by utilizing the land development potential at the local level. The project also aims to provide quality of urban lives for existing and new residents, and employment opportunities for community residents.

2) Direction of Development

In the district level, the project should have more parks, open spaces, and a traffic plan, accommodated with anticipated more traffic by the redevelopment and a main station in the underground rapid rail mass transit system. The local road network should be well connected to the city level system with access to the underground station.

At the super block level, the project should be well coordinated with SRT's Makkasan Development Project, which is located at the south of the Din Daeng Community Area (DC Area).

2) Spatial Development Plan and Housing Development

The land use plan was formulated to achieve the following five items. The land use consists of seven spatial zones as presented in Figure 17.

- Land for mixed use to match the advantageous location;
- Effective network of infrastructure;
- More parks, open spaces and green areas to enhance the community environment;
- Careful approach to minimize impact on the existing residents; and
- Provision of other necessary items to facilitate BMA's new City Hall and other Government works and services.

The master plan proposed two types of housing unit plans (33m², and 41.25m²), providing 7,242 units for existing residents (33m² type: 3,019 units, 41.25m² type: 4,193 units), and 6,330 units for new residents (41.25m² type).

Figure 17: Master Plan of Din Daeng Community Development by NHA



3) Implementation Plan

The master plan proposed construction phasing plan to be executed with 10 years. The expenses were estimated at 26,433 million baht, with an initial investment of 2,556 million baht for the first phase.

NHA has identified the following three alternative implementation organizations.

- NHA or the government as a sole investor,
- private sector as a sole investor, or
- co-investment by NHA and the private sector.

4) Community Participation

NHA has conducted five seminars in order to explain the concepts of the project, and to receive comments and opinions from existing residents, and related organizations.

The result of the community leader seminars showed that most participants seemed to agree with the project, though they expressed the following requests for participation.

- Provision of up-dated information, such as distributing leaflets, setting up an

information center, and holding a seminar with more attendants;

- Positive cooperation with community leaders;
- Contribution to planning;
- Closer coordination on relocation and compensation planning, such as cooperation with community leaders; and
- Closer discussion on setting of new rent.

Table 06: Workshops held by NHA

Workshops	Time	Participants
During Master Planning		
1st Workshop	August 5, 1999	Ninety five community leaders in Din Daeng 2.
2nd Workshop	January 26, 2000	Two hundred delegates from relevant local and central government organizations.
3rd Workshop	January 29, 2000	Eighty six community leaders in Din Daeng 1.
After Finalization of Master Plan		
4th Workshop	February, 2001	
5th Workshop	March, 2001	

(3) Cabinet Approval

At a cabinet meeting held on 7th November 2000, the master plan was approved with several conditions to be secured. The cabinet approved the concept of the project, but requested further study as a condition for approval of implementation including community participation, provision of social welfare facilities, and participation of private the sectors, as presented in the following box.

Ref: Cabinet Approval Document

Cabinet Meeting Decision

1. Approval of the Master Plan for Land Development and Urban Renewal in Din Daeng Community as proposed by the Ministry of Interior.
2. Approval of the supporting fund for expenses needed for preparation for not over 793 Million Baht within the period of 10 years. The 250 Million Baht for initial stage shall be allocated from the budget of the fiscal year 2002 and 2003.
3. MOF, MOSTE, NESDB and the Budget Bureau were assigned to study for further details, and find out the appropriate plan that conform with the related laws for investment planning, investment method, and joint-venture with the private sector including the support for construction of residential building, in order to compensate the right of old residents, removal fees during construction period, and environmental impact.
4. Study to improve the National Housing Act so that NHA can be more efficient in developing and managing the large scale communities, including the adjustment of NHA's duty in the operation and management of residential buildings and improving environment of the congested and deteriorated communities of the low-income people. Giving NHA a full authority to operate and manage the cleaning system of each community and assigned the Ministry of Interior and NHA, to proceed the improvement of the National Housing Act as soon as possible.
5. NHA shall determine the criteria and complete the following procedures before initiating the project implementation:
 - 5.1 Prepare a clear plan for removal, construction of building and temporary residence by considering the impact on households, schools and income sources of old residents.
 - 5.2 Study and confirm the number of residents by making the name list and announce at each community for them to check for the correctness.
 - 5.3 Determine the compensation for rental privilege and temporary removal fee for old residents during the project operation with fairness according to economic situation.
 - 5.4 Determine the privilege of old residents to return to the project as first priority with rental fee lower than normal fee that will charge from new resident. The Special rental fee will consider from the average income of old residents.
 - 5.5 Determine the area for public center i.e. library, community center, old age health center, nursery, sport and recreation center with appropriate ratio compared with total residents.
 - 5.6 Determine the suitable and appropriate area for community shops in each residential building and specific area by giving the privilege to the residents in making more income with special rental fee and without liquidation.
 - 5.7 Allocate the area in the commercial area with number of building by giving the privilege to the residents with special rental fee and without liquidation.
 - 5.8 Study for possibility of joint venture by private sector for land development for commercial use by giving the opportunity to old residents to purchase the shares of private sector.
 - 5.9 NHA should explain, making the understanding and conduct a-public hearing among the old residents to be used as guideline for operation according to 5.1 - 5.8 and proceed according to the comments from MOSTE, NESDB and Budget Bureau before project implement.

3.2 EXISTING CONDITION OF DIN DAENG COMMUNITY AREA

(1) Land Use and Tenure

The land of the entire DC Area of 102.9ha, belongs to the government. Most part of the area is used by the government institutions, amounting to 64.4%. Remaining part, equivalent to 35.6%, is used by non-government organizations, including NHA. BMA shares the largest area (51.5%), followed by NHA (31.8%).

Currently, there are eight kinds of land use, of which residential (31.5%) and office (24.4%) shares more than half of the DC Area. The land used for roads is limited to 7.8%.

The floor area ratio (FAR) in the whole area is 82.8% in gross and 92.0% in net. Regarding the residential section, the FAR ranges middle to high, as 151.2% in residential areas, and 289.8% in mixed use area of commercial and residential.

There are 30,011 residents in DC Area. All of them reside in NHA's Din Daeng Housing Complex. The daytime population amounted to 32,279 persons (the interview survey by NHA.), including 25,325 employees and 6,954 students. BMA has the largest share of 82%.

The population density is estimated to be 695.5 persons/ha in the entire area, while it is 927.7 persons/ha in the housing section.

In addition to daytime and nighttime population, the Thai-Japan Youth Center records around 1.7 million visitors, annually.

Table 07: Land Users in DC Area

User	Land Use	Land Area	
		(m2)	(%)
Building Site			
NHA	Residential	273,121	26.5%
	Residential & Commercial	50,377	4.9%
	Office	3,996	0.4%
	Total	327,494	31.8%
BMA	Office	225,056	21.9%
	Sport Facilities	131,263	12.8%
	School	37,140	3.6%
	WWTP	32,412	3.2%
	Gas Station & Workshop	4,863	0.5%
	Total	430,734	41.9%
	Ministry of Labor	Office	36,526
Public Service		10,619	1.0%
Total		47,145	4.6%
Ministry of Education	School	67,062	6.5%
Ministry of Public Health	Hospital	52,385	5.1%
Office of Prime Minister	Police Station	1,360	0.1%
Other	Mosque	3,377	0.3%
Total		929,557	90.4%
Public Space			
BMA	Park	18,651	1.8%
	Road	80,509	7.8%
Total		99,160	9.6%
Total		1,028,717	100.0%

Source: JICA Study Team

Figure 18: Land User Distribution in the DC Area

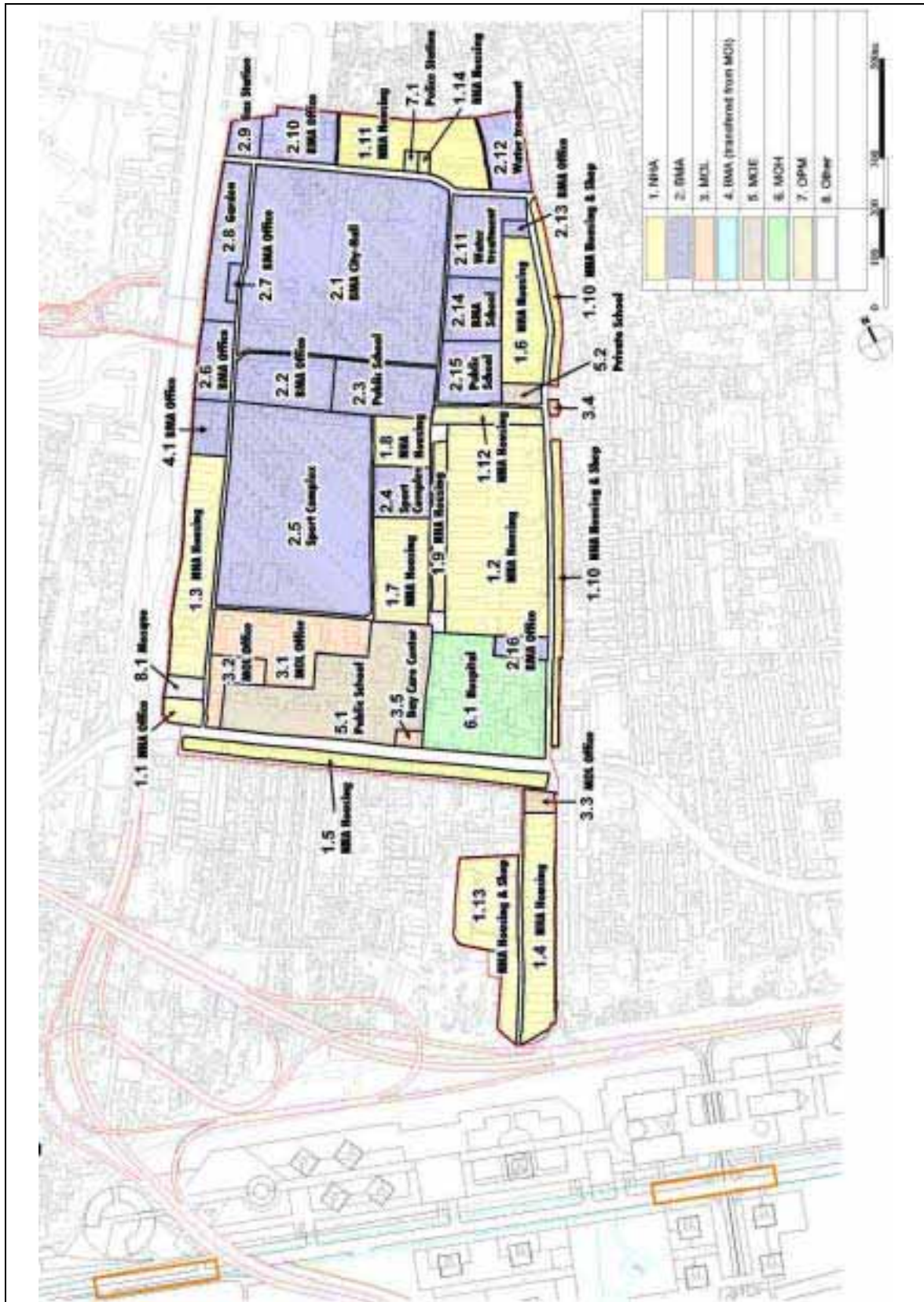


Table 08: Population in DC Area

Categories	Organization	Population	Block No.
1. Residents	NHA Housings*1	30,011 persons	1.2~14
2. Daytime Population			
2.1 Employees (25,325 employees)			
(NHA, 748 employees)	Office	58 employees	1.1
	Shophouses in NHA housing area*2	690 persons	1.10, 13&14
(BMA, 20,656 employees)	City Hall & District Office	14,804 employees	2.1
	Mechanical Division	370 employees	2.2
	Thai Youth Center	106 employees	2.5
	Sports Complex	108 employees	2.4
	Wichakhon School	154 employees	2.3
	DTCP	1,042 employees	2.6
	Rabies Division	130 employees	2.7
	Park	9 employees	2.8
	Mechanical Workshop	743 employees	2.9
	Const. Center	1,474 employees	2.10
	Sewage Treatment Plant	112 employees	2.11&12
	Health Source Center	60 employees	2.13
	Witchutit	153 employees	2.15
	Analysis & Research	74 employees	2.16
	Office*3	1,317 employees	4.1
(MOL, 3,013 employees)*4	Office	2,256 employees	3.1, 3 & 4
	Care Center	650 employees	3.2
	Day Care Center	107 employees	3.5
(MOE)	Pibulprachasan School	163 employees	5.1
(MOPH)	Hospital	511 employees	6.1
(OPM)	Police Station	224 employees	7.1
(Other)*5	Mosque	10 employees	8.1
2.2 Students (6,954 students)			
(BMA)	Wichakhon School	1,206 students	2.3
	Vocational Center	1,643 employees	2.14
	Wichutit School	1,659 students	2.15
(MOE)	Pibulprachasan School	2,191 students	5.1
	Samakeebumrun School	255 students	5.2
Total of Daytime Population		32,279 persons	
3. Visitors (Thai Youth Center)		4,631 persons (daily average)	2.3 & 4

Source: Interview survey by NHA

Note: *1 The number of residents is estimated from the social survey by the Study as presented in 6.1 (2).

*2 The number of employees of shophouses is estimated as 230 shophouses (actual) × 3 staffs/shophouse (assumption)

*3 The number of employees at block 4.1 is assumption, based on 5.0 m²/employee similar to the BMA City Hall at Block 2.1.

*4 The number of employees at each Block of MOL is assumed to distribute 3,013 employees of total by proportion of floor areas at each Block.

*5 The number of employees at mosque is assumption.

(2) Designated Land Use

According to the Second Bangkok General Plan, the DC Area is designated to fall into four kinds of land uses as tabulated below. Among them, i) high density residential, and ii) government offices, cover a large area of around 80ha (78.4%).

Table 09: Designated Land Use by the Second Bangkok General Plan

Land Use	Land Area	
	(m ²)	(%)
High density residential zone	345,456	34.0%
Open space, recreation area, and environmental conservation area	158,928	15.6%
Educational institutes	60,400	5.9%
Government offices, infrastructure, and others	451,216	44.4%
Total	1,016,000	100.0%

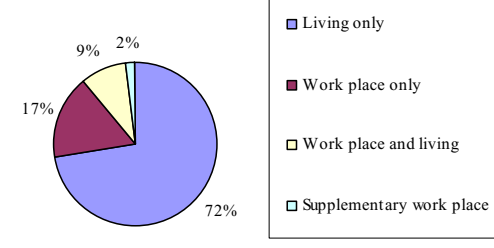
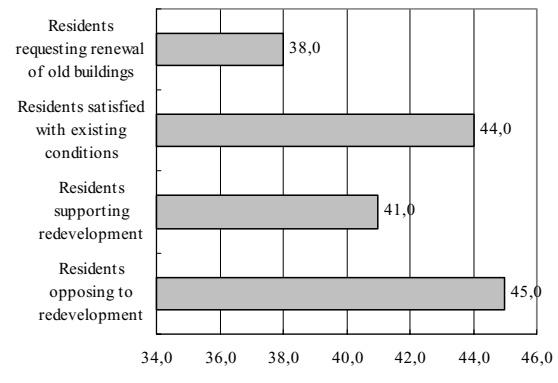
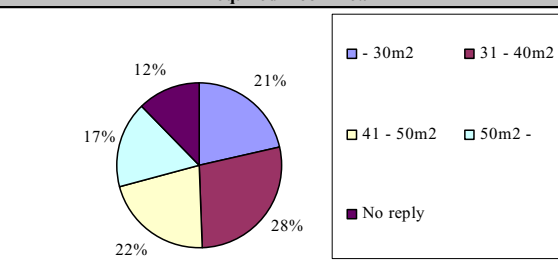
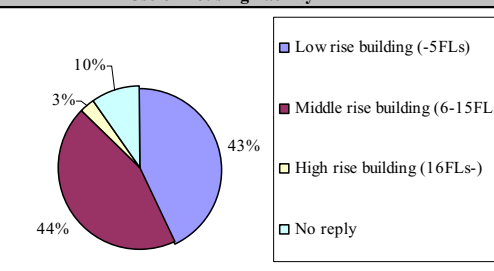
Source: NHA

(3) Life Style of Existing Residents

The social survey by the Study confirmed the conditions of building use by residents and demanding for the new housing units as itemized below.

- Residents satisfied with the existing facilities are around 40%. They want to improve the housing facilities and the living environment.
- Residents using housing units only for living amount to 72%, while 28% use of work space only and supplement work space.
- Housing units of 31-40m² are preferred by 28% of the residents, while 21.6% prefer 41-50m².
- More than 85% of residents hope the number of floors to be less than 15.
- Expected units have tow or three bedrooms and one or two bathrooms.
- Fifty-seven percent of residents prefer unit bath type and around 80% prefer with tub.
- A kitchen separated from the living room is preferred by 88% of the residents.

Table 10: Life Style of the Existing Residents

Satisfaction to Existing Living Environment		Expected Number of Floors																																																																																																															
Residents requesting renewal of old buildings	38,0																																																																																																																
Residents satisfied with existing conditions	44,0	<table border="1"> <thead> <tr> <th>Items</th> <th>Share</th> </tr> </thead> <tbody> <tr> <td>Living only</td> <td>72,1 %</td> </tr> <tr> <td>Work place only</td> <td>16,8 %</td> </tr> <tr> <td>Work place and living</td> <td>9,3 %</td> </tr> <tr> <td>Supplementary work place</td> <td>1,8 %</td> </tr> <tr> <td>Total</td> <td>100,0 %</td> </tr> </tbody> </table>		Items	Share	Living only	72,1 %	Work place only	16,8 %	Work place and living	9,3 %	Supplementary work place	1,8 %	Total	100,0 %																																																																																																		
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Source: Social survey by JICA Study Team

3.3 REDEVELOPMENT MASTER PLAN

(1) Major Items to be Revised from the Existing Master Plan

The redevelopment master plan revised the planning conditions as listed below, while it follows fundamental conditions of the existing master plan which has been approved by the cabinet.

1) Identification of Target Population

- Identification of target population,
- Identification of realistic development size,
- Identification of potential sector for participation to the Project,
- Identification of specific land use components, and
- Clarification of land distribution.

2) Optimization of Physical Planning and Design

- Identification of viable grade of buildings,
- Identification of number of returning residents,
- Housing design to match needs of the existing residents,
- Modification of future road network, and
- Appropriate planning of infrastructure.

3) Generation of Practical Implementation Plan

- Formulation of implementation plan minimizing impacts to existing residents,
- Generation of realistic relocation plan, and
- Contribution to improvement of livelihood.

(2) Functional Components

Functions to be introduced in the DC Area are set up as listed below.

- New BMA city hall and associated symbolic space: The city hall is placed at the new symbolic facility in BMA
- Commercial facilities: Private sector participation is an indispensable condition to implement the project in NHA's low cost housings. Applicable sector is the large retail industry, according to the real estate market trend.
- Housing facilities: Provision of housing units will include the units for low-income households by utilizing existing housing units. New housing units

will be provided for existing residents with middle income .

(3) Development Framework

Population of the DC Area in 2011 is estimated at 29,800 persons for residential and 56,200 persons during daytime. Visitors for Thai-Japan Youth Center is assumed 4,631 persons, while 59,900 persons for commercial facilities.

The number of people is based on the quantity of proposed housing units (8,761 units) and an average family member of 3.4 persons/household. Increase of employees is due to additional office by the new BMA City Hall.

Apart from those, commercial floor demand is estimated at 183,000m² in total, consisting of 156,000m² for modern commercial facility, and 27,000m² for medium and small scale commercial facility. The demand for office space is estimated at 405,000m².

Table 11: Development Framework (2011)

Item	Quantity	Unit	Notes
Population	29,800	person	3.4 persons/household
Households	8,761	household	
Employees	56,200	person	
Visitors	59,900	person	Thai-Japan Youth Center

Source: JICA Study Team

(4) Land Use Plan

In laying down land use, lands for the central governments are located similarly to existing conditions. Large-scale commercial zone was put along Pracha Songkhro road. A bus terminal is located adjacent for the underground station (Orange Line).

The floor area ratio after the project will increase from 83% to 169%, though the building coverage ratio is kept similar at 25%.

The share of public space is improved from 9.6% to 23.1%, as a result of contribution by the related organizations. Especially, the land for roads becomes twice larger than the existing share.

Table 12: Land Use in DC Area at Full Development

Land Use	Land Area (M2)		Building Area (M2)	BAR (%)	Floor Area (M2)	FAR (%)
1. Total of Building Site	790,877	76.9%	255,335	32.3%	1,741,000	220%
1.1 Residential (Car Parking 含む)	120,346	11.7%	42,418	35.2%	305,797 39,120	254%
1.2 Office (Car Parking 含む)	192,895	18.8%	41,164	21.3%	562,028 116,011	291%
1.3 Commercial and Residential 1) Commercial Floor 2) Residential Floor 3) Public Service 4) Car Parking	142,918	13.9%	83,133	58.2%	714,523 230,789 316,127 28,559 139,048	500%
1.4 Sport Facilities	124,733	12.1%	20,533	16.5%	38,998	31%
1.5 Public Service	172,410	16.8%	37,519	21.8%	88,779	51%
1.6 Public Service	9,840	1.0%	5,136	52.2%	19,316	196%
1.7 School	111,391	10.8%	22,088	19.8%	48,409	43%
1.8 Hospital	51,179	5.0%	10,295	20.1%	21,054	41%
1.9 Workshop and Sewage Treatment Plant	34,198	3.3%	30,005	87.7%	30,005	88%
1.10 Other	3,377	0.3%	563	16.7%	870	26%
2. Public Space	237,840	23.1%	-	-	-	-
2.1 Park	45,332	4.4%	-	-	-	-
2.2 Public facilities	25,070	2.4%	-	-	-	-
2.3 Road	167,438	16.3%	-	-	-	-
Total	1,028,717	100.0%	255,335	24.8%	1,741,000	169%

Figure 19: Land Use Plan in DC Area at Full Development



(5) Building Facilities

The total floor area after project completion is planned to 1,741,000m². Criteria for planning of major buildings are mentioned below.

- Total residential floor area is approximately 580,000 m² to accommodate 8,761 housing units;
- Commercial floor area is 230,800 m², equivalent to 82% of forecasted floor demand;
- Additional office floor area is 358,600m², while additional floor demand is assumed to be 405,000 m²;
- Public service facilities are provided with 47,875 m² for local community rejuvenation center, welfare centers, primary school (expansion), vocational center (renewal), and medical care facilities; and
- Total land allocation for transport is 2.5 ha for mass transit system such as Orange Line, station plaza, and bus terminal.

Table 13: Building Facility by Blocks

Use	Total
Residential	582,804
Commercial	230,789
Office	446,017
Public Service	28,559
School	48,409
Sport Facilities	38,998
Hospital	21,054
Workshop & STP	30,005
Other	870
Car Parking	294,179
Total Floor Area	1,721,684
Building Area	255,335
Land Area	861,279
BAR	30%
FAR	200%

Figure 20: Building Layout at Full Development



Figure 21: Perspective View after the Redevelopment



3.4 IMPLEMENTATION PLAN

(1) Construction Phasing Plan

Following the existing master plan, the construction phasing plan is formulated to consist of four phases by a 10-years period, extending from 2002 to 2011.

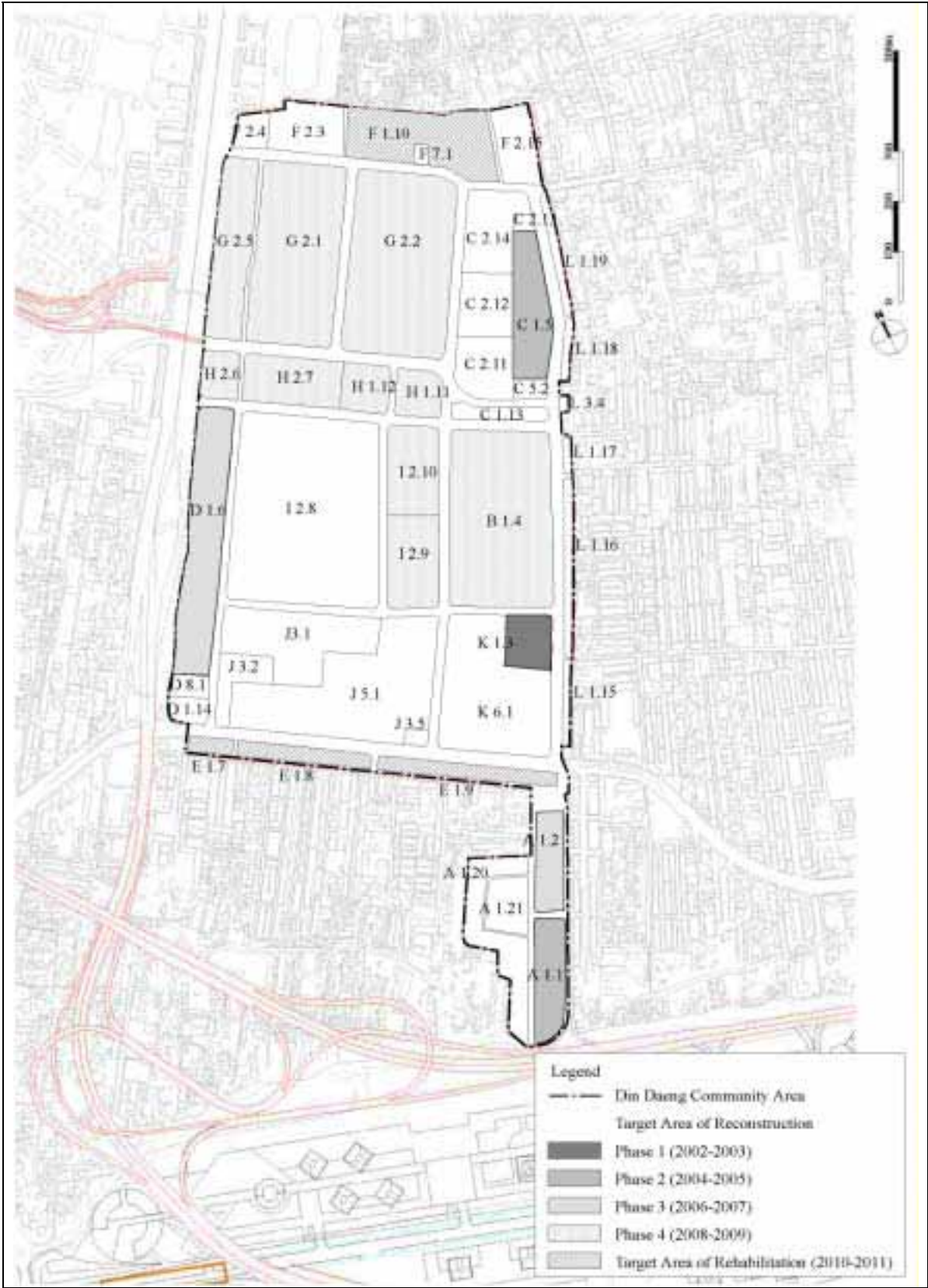
- Phase 1: Block K1.3;
- Phase 2: Block A1.1 and C1.5;
- Phase 3: Block A1.2 and Zone D; and
- Phase 4: Block B1.4, I2.9, and I2.10 together with Zone G and H in Phase 4.

Through the social survey, it was confirmed that share of returning residents highly reaches at 85%, and 51% of the existing residents oppose to the project, due to their anxiousness for changes of the living environment after the Project. Therefore the first phase is crucial to smoothly implement the succeeding phases and to achieve the consensus of the existing residents for the redevelopment.

Figure 22: Phase-wise Development Plan

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
A1 NHA		moving out about 15% residents	relocation	demolition	construction					
A2 NHA		moving out about 15% residents		relocation	demolition	construction				
B' NHA	construction						relocation			
B Private	moving out about 15% residents			relocation		relocation	demolition	construction		
C NHA	moving out about 15% residents	relocation	demolition	construction						
D NHA	moving out about 15% residents			relocation	demolition	construction				
E NHA	moving out about 15% residents			relocation					next phase	
F NHA	moving out about 15% residents						relocation		next phase	
G Public Facilities							demolition	construction		
H Public Facilities							demolition	construction		
I Public Facilities						relocation	demolition	construction		

Figure 23: Construction Phasing Plan



(2) Relocation Plan

1) Proportion of Returning and Moving-out Residents

Among the 6,818 households which are subjected to the housing renewal scheme, 1,023 households (15%) are considered to be moving-out to other places. The social survey found out that 47% of the existing residents presented attitude on “non-returning”, including “moving to other NHA”. However the shares of “moving-out residents” has been determined to be 15%, consisting of 8% for the absentee and 7% for the vacant units, as NHA intends to secure sufficient housing units for returning residents.

Among the returning residents of 5,795 households, 4,261 households (62.5%) will be categorized as ordinary returning residents, while the rest will be 1,621 households (22.5%) as low income population, who earn less than 9,200 baht/month. The classification for the low income households is adopted the criteria in the slum improvement by NHA.

The relocation plan has been formulated upon the following conditions.

- Ordinary income returnees will have priority to be allocated in reconstructed housing units, while low income returnees are allocated in the renovated housing units.

2) Compensation and Rents

The moving-out expense for the returning and moving-out residents is set at 250,000 baht. Apart from it, the compensation fee is set at 10,000 baht for the moving-out residents. Compensation money for the moving-out residents is equivalent to the majority opinion at the workshop with the existing residents, though the moving expense is referred to the compensation for residents of slum improvement program.

Several options will be provided by NHA such that residents moving to other NHA housing have preferential treatment such as discounted housing rent. In this case, the compensation will be duly adjusted.

Housing rents for returning residents has been determined to be 20% of household income, which is considered as affordable house rent. According to the social survey, average household income of the ordinary income group is 15,000

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baht/month. Correspondingly the housing rent is set at 1,500 baht for ordinary income households and 1,500 baht for ordinary income households.

On the other hand, house rent for the new residents is set at 5,600 baht, as the current market rate around DC Area is about 140 baht/m²/month.

House rents for ordinary income returnees and new residents will be raised step-wise by 15% every three years.

Figure 24: Rotation Plan of Residents



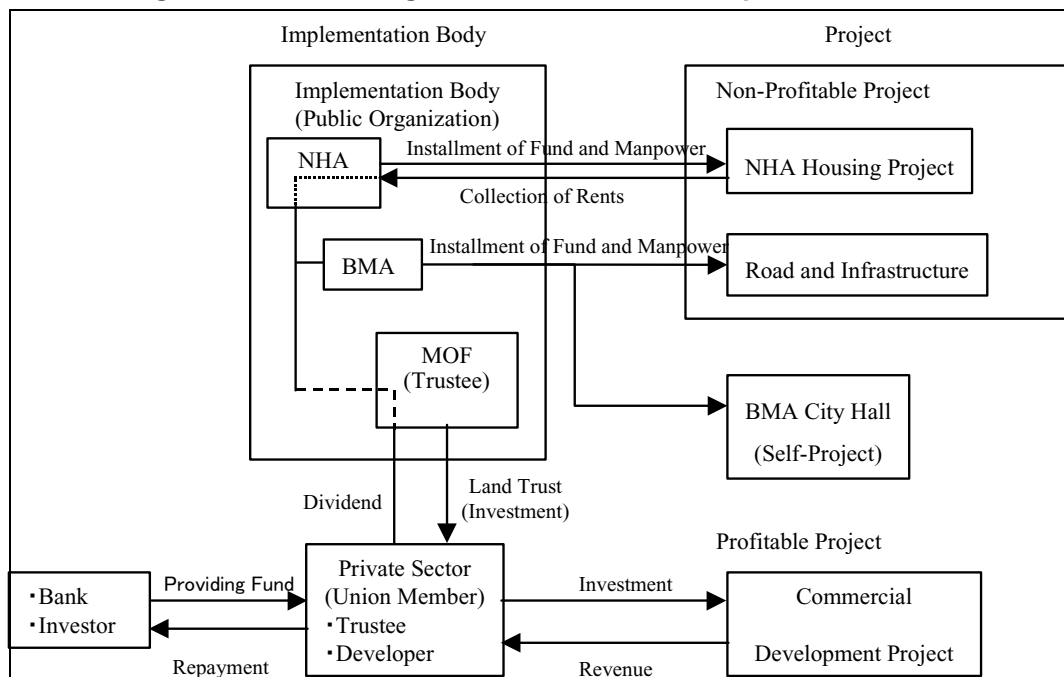
(3) Implementation Organization

Basic concept for the implementation organization is to return profits from commercial development to non-profitable sections, such as housing developments. The Study has examined the organizations for planning, implementation, and operation stages.

Participation of the private sector is a crucial requirement to secure the financial stability of the project in the long term, which is non-profitable in the short term.

It is necessary that a unique public organization provides loan funds to ensure low interest for the long term. The public organization will grant or re-rent to the implementation organization. The repayment for the loan will be allocated by the revenue from the commercial development. General organization structure is shown in the following figure.

Figure 25: General Organization Structure for Implementation



1) Project Planning Stage

A project planning council will be set up by the related public organizations, including NHA, BMA, MOF, and TD. The council takes in charge of planning and executing the project. Concurrently, a liaison and coordinating committee

and a work party will be organized to formulate land use plan, establish scales of housing facilities, urban infrastructure, and to coordinate project cost sharing between the stakeholders.

Furthermore, NHA and BMA will organize a project team in their own organizations. The project team will involve consultants and private businesses as listed below.

- Consultants: urban redevelopment consultant, real estate consultants, engineering consultants, financial consultants, and legal consultants.
- Private businesses: financial institutions, construction companies, real estate companies, and key-tenants.

2) Project Execution Stage

Construction of the new BMA City Hall and the profitable sections, such as commercial facilities and housing for middle or high income households, will be undertaken by BMA and the private sectors, respectively. There are three alternatives of the executing organizations as listed below.

- By a Stake Holders' Cooperative: A project execution body will be organized by the stake holders in a form of a cooperative. Upon completion of the construction, the cooperative will be disbanded and transfer all facilities to the related parties.
- By a new organization (new company): This is a joint operation among the members of the Council and the private developers. After the construction stage, the new company will transfer the facilities to the operation and maintenance bodies.
- By Joint Enterprise under City Planning: Incorporating the project into the specific plan in BMA in order to secure its implementation from the legal side.

Advantage and disadvantages of each organization is presented in the following table.

Table 14: Advantages and Disadvantages of Alternative Organizations for Execution

Alternatives	Advantages	Disadvantages
Stake Holders' Cooperative	<ul style="list-style-type: none"> • Comprehensive development will be possible. • Cost for establishing the cooperative will not be large. • Redundant expenses for personnel and administration could be saved as the cooperative is disbanded upon completion of construction. 	<ul style="list-style-type: none"> • Transfer of know-how gained in the project could not be effected to other similar undertakings. • There will be required to put security for getting fund for the project.
New organization (New Company)	<ul style="list-style-type: none"> • Comprehensive development will be possible. • Transfer of know-how gained in the project could be effected to other similar undertakings. • Financial responsibility will be clear cut as the company will obtain the fund independently. • It is possible to mobilize private financing initiative. 	<ul style="list-style-type: none"> • Cost for establishing the company will be a little costly. • The company will have to be certain in profitability in long term perspective.
Joint Enterprise under City Planning	<ul style="list-style-type: none"> • No cost is required for establishing new organization such as cooperative or new company as above. • Responsibility of the project execution bodies for each component can be clearly defined. 	<ul style="list-style-type: none"> • There is some uncertainty in achieving a comprehensive execution. • Time schedule control of the project component is crucial for successful implementation. • There will be required a reliable mechanism of financing each component to be executed in good timing.

3) Operation and Maintenance Phase

Public organizations will operate and maintain public facilities, and non-profitable facilities, though the profitable facilities are operated by the private organizations.

- Housing for low-income population: NHA should be the operation and maintenance body.
- Public and welfare facilities: Infrastructure such as roads, parks, transport square, water supply and wastewater, drainage systems, power supply system should be operated and maintained by the administration office of each facility and system.
- Commercial facilities: The land for the commercial development should be administered by the Treasury Department (land owner), while the

commercial facilities constructed, operated, and maintained by private sectors.

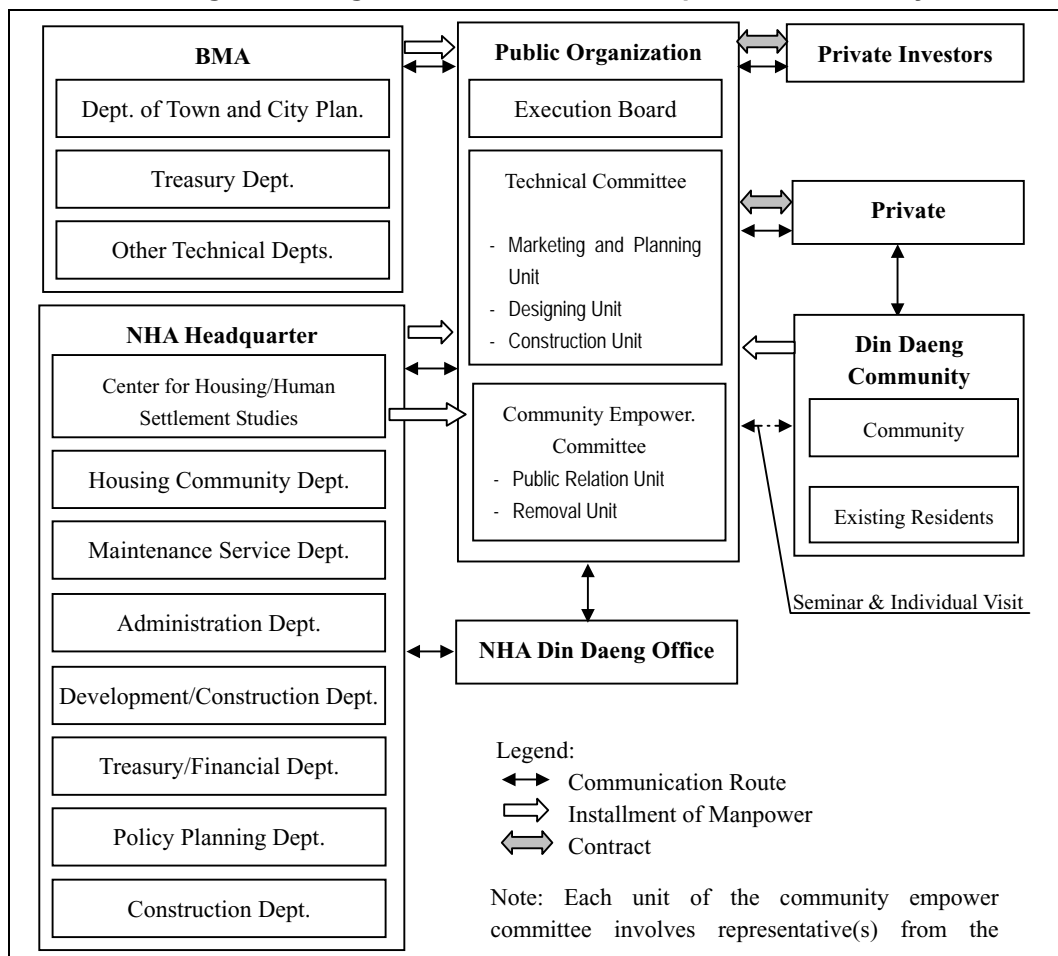
4) Community Empowerment

In order for the smooth implementation of the Project, the implementation body is required to establish a special organization to strengthen the community. Referring the opinions of the community leaders, fundamental functions of the community empowerment organization include the following:

- To distribute correct and up-to-date information about the project; and
- To coordinate public relation campaigns including publishing leaflets, holding a seminar, and arranging public meetings.
- To negotiate with existing residents.

The community empowerment organization will include the public relation unit, removal unit, and promotion unit, as shown in the following figure.

Figure 26: Organization Structure to Cope with Community



3.5 PROJECT EVALUATION

(1) Financial Evaluation

The financial analysis has been examined upon the conditions that the executing agency develops the facilities except the commercial facilities in Block B1.4, which is constructed and operated by the private sectors, to whom the commercial development will be entrusted on land trust contract. In this case (Base Case), FIRR is estimated 6.6 % in a 30 year period, and 9.8% in a 50 year period.

Fluctuating the fundamental conditions, such as hike of house rent, provision of own fund, profit from the commercial development, increasing of inflation, and increasing of moving-out residents, the sensitivity analysis has been conducted in six alternative cases to Base Case.

As results, it was revealed that financial profile is turned to the plus within a 30 year period. Participation of private sector in commercial development is crucial to compensate the low profitability of the residential development section.

Although heavily dependent on the private sector in this regard, risk can be held in case that the revenue from the commercial development would reduce by 30% (Case 3).

Table 15: Sensitivity Analysis of the Base Case and Alternative Five Cases

Case	IRR		Modified Conditions from Base Case
	30 years	50 years	
Base Case	6.6%	9.8%	
Case 1	5.7%	9.2%	Without rent hike for housing units.
Case 2	4.9%	8.9%	Without any own fund.
Case 3	1.5%	6.9%	Decrease revenue of commercial development by 40%.
Case 4	2.2%	7.7%	Increase inflation from 5% to 10%.
Case 5	6.3%	9.6%	Increase the share of moving-out residents from 15% to 50%.
Case 6	-11.9%	3.4%	Adopting all modified conditions form Case 1 to Case 5.

(2) Economic Evaluation

Economic analysis has been examined by estimating Economic Internal Rate of Return (EIRR), Net Present Value (NPV), and Benefit Cost Ratio (B/C) in comparison with “with-project” and “without-project” cases with the following conditions.

- Economic useful life of the Plan (project life): 50 years
- Standard Conversion Factor (SCF): 0.94
- Construction Conversion Factor (CCF): 0.88
- Discount rate is set at 12% per annum.
- Transfer payments such as compensation, taxes, and interests: Excluded.

As a result, EIRR was estimated at 12.9%. Fluctuating construction costs, and profit from the commercial development, the EIRR would drop to 12%, but is still within acceptable level.

Table 16: Economic Evaluation Indicators

Case	ERR (%)	NPV (mil. Baht)	B/C	Modified Conditions from Base Case
Base Case	12.9	579	1.08	
Case 1	Not affected, as construction cost estimation includes an allowance as much as by 10% for safety factor.			Increase of construction costs by 10%.
Case 2	12	-	-	Decrease of profit from the commercial floor by 10%.

(3) Effectiveness of the Redevelopment

The redevelopment in the DC Area shall contribute to improve urban structure in BMA, living environment, and to up-grade living standards in social aspects.

On the other hand, in economic and financial aspects, project appraisal indicators as FIRR and EIRR are relatively low compared with other development projects. However those are inevitable characteristics for the redevelopment to improve the existing urban environment unlike the ordinary projects developing a new thing. Particularly, this Project involves non-profitable components of housing units for low income households, compensation to existing residents, and demolition of existing buildings.

Therefore the Project could be justified from the financial as well as socio-economic point of views. Those conditions are similar with the urban redevelopment projects in Japan as well as other countries.

Compared with the similar cases in Japan, it can be claimed that the above indicators of the Project are favorably. It is necessary to timely implement the Project, otherwise the delay of the Project will negatively affect the entire urban structure in BMA.

(4) Initial Environmental Examination

As the results of the initial environmental examination, nine examination items require mitigation in the construction phase and six in the operation phase among thirteen items. In the construction phase, typical items which needs attention is relocation of existing residents, though the other eight items can be treated similarly with other ordinal projects.

In the operation phase, all of the six items relate to operation and maintenance of public facilities. Those can be secured by the related organizations.

Table 17: Result of Initial Environmental Examination

Items of Examination	Necessity of Mitigation Measure	Remarks
1) Topography, Geology, Seismology and Groundwater	None	
2) Storm Water and Wastewater	Yes	CP: Provision of temporary settling basin and septic tank.
3) Solid Waste	Yes	CP: Collection and disposal of waste from demolition and construction materials. OP: Campaign for reduction of waste and separation of waste
4) Air Quality	Yes	CP: Suppression of fugitive dust
5) Noise Level	Yes	CP: Suppression of noise by fence and wet piling. OP: Reduction of the traffic congestion.
6) Hydrology/Drainage System/Flood Control	Yes	CP: Provision of waste disposal spots in the construction sites OP: Regular checking of drain channels
7) Land Use	None	
8) Transportation	Yes	CP: Provision of regulating signs and warning signs. OP: Provision of traffic signal
9) Utility	None	
10) Socioeconomic	Yes	CP: Relocation of residents
11) Historical and Archaeology	None	
12) Recreation Area	Yes	CP & OP: Maintaining of recreational area
13) Public Health	Yes	CP: Employing the security and accident prevention measures OP: Provision of public health facilities and medical personnels.

Note: CP - Construction Phase, OP - Operation Phase

4. CASE STUDY PLAN

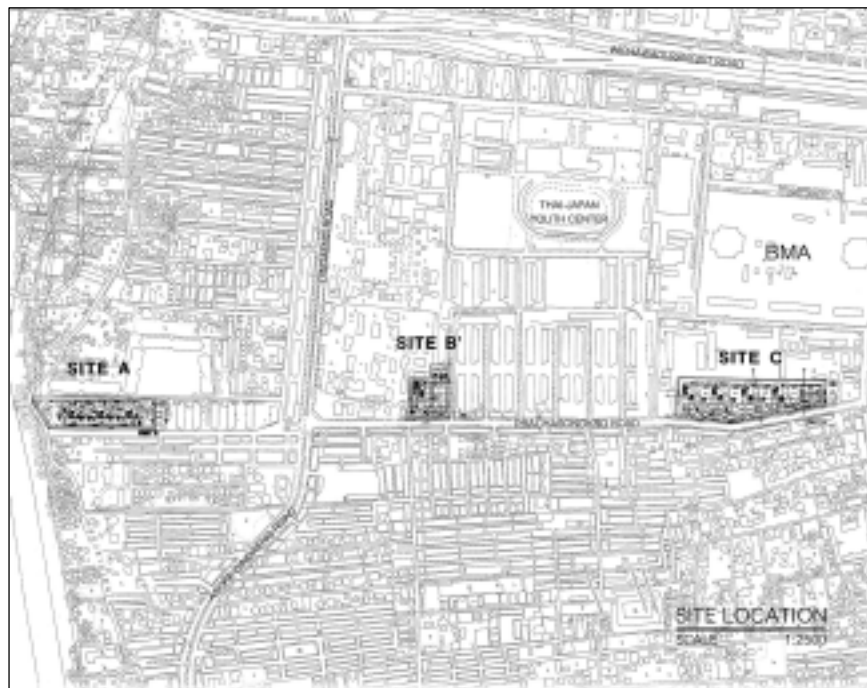
4.1 Outline of the Case Study

The Case Study Plan is the first phase of the DC Development Plan which is executed as a pilot project for the succeeding phases of the Plan to demonstrate appropriateness of the entire enterprise. Contents of the Case Study Plan are comprised of renewal of a part of the NHA Din Daeng Housing Complex. Renewal will be executed in three sites in the Din Daeng Community Area, namely Sites A, B' and C. The Study carried out detail design of all buildings and associated facilities and an environmental impact assessment.

Table 18: Outline of Case Study Plan

	Site-A (Block A 1.1)	Site-B' (Block K 1.3)	Site-C (Block C 1.5)	Total
Land area	14,584	8,418	23,524	46,526
Number of building	6	1	8	
Number of Stories	5	5	5	
Number of residential unit	1,210	200	1,380	
Total floor area (m ²)	21,900	3,650	25,400	

Figure 27: Sites for Case Study Plan



4.2 Facility Planning

(1) Principal Direction

Improvement of living environment:

In line with the objectives of the DC Development Plan of improving living environment, efforts will be made to provide as much as possible safety features to the facilities, adequate use of natural elements, barrier-free design for the aged and the handicapped, spaces to strengthen residents' community, places to afford opportunity for employment and education, and provisions for upgrading residential unit toward the future.

Reduction of operation/maintenance costs:

Measures will be proposed to reduce operation/maintenance costs from the view point of life cycle cost.

Deference to existing life style:

Due consideration will be paid to the existing elements in the building in an effort to enable the residents to maintain their life-style in the renewed residences as well. Specifically, location of the wet room (bath room), observation of the traditional custom of so called "Fusui", removable partition wall to allow future modification of residential unit, semi-public space in the corridor, provisions for cooking equipment in balcony, partition wall to separate balcony are some of the provisions in this regard.

Facility to strengthen community activity:

For the purpose of promoting peoples' encounter or community activities, such public facilities as community center, clinic, sports center, herb yard, vocational training center, water-front park will be planned.

(2) Residential Unit Design

Provisions provided in the residential unit will be the following:

- Standard residential unit will be 41m² in floor area.
- Two types of floor plans will be provided, one having the wet room

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(bathroom, kitchen) on balcony side and the other on corridor side.

- To meet the unique way of life of the residents, drying space, washing machine installation space, natural ventilation, pent roof, security devices etc. will be planned.
- In order to ease the maintenance, water conducting pipes will be buried in non-structural element of the building with removable covers.

Figure 28: Standard Residential Unit Plans



Table 19: Land Use Plan in Site-A

		Area (m ²)	Ratio (%)
1. Building	High rise apartment Commercial	5,958.00	40.8
2. Road	Fire engine maneuvering road Parking access road	2,178.00	14.9
3. Landscaped area	Green Garden, Stream, Plaza	6,388.00	43.8
4. Others	Bare land		
5. Total Land Area		8,418.00	100

Figure 29: Lower Floor Plans of Residential Building in Site-A

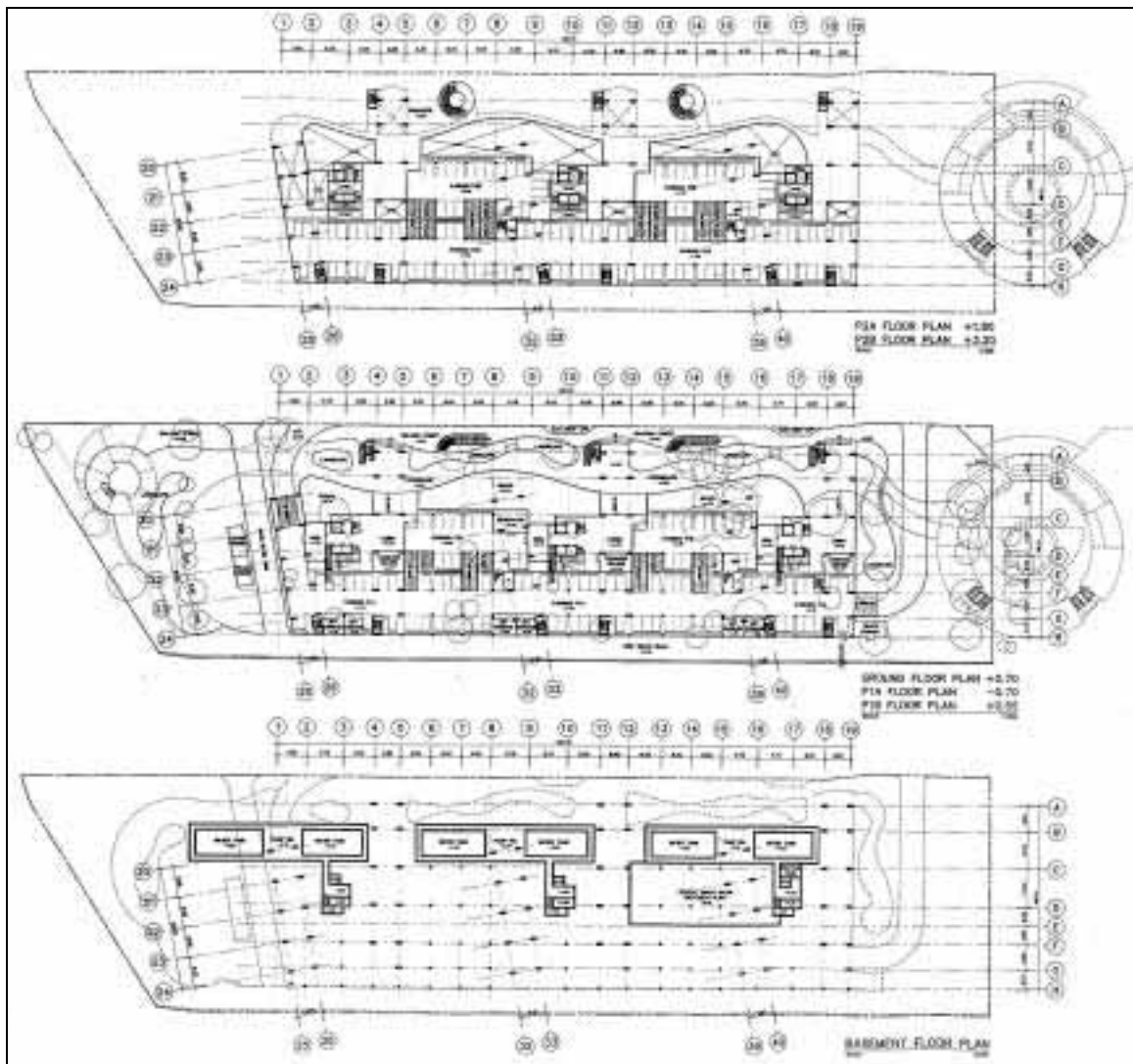


Table 20: Land Use Plan in Site-B'

		Area (m ²)	Ratio (%)
1.Residential/commercial area	High rise apartment Commercial and Parking	3,996.50	47.5
2.Road	Fire engine maneuvering road Parking access road	1,146.00	13.6
3.Landscaped area	Green Garden, Stream, Plaza	3,259.50	38.7
4.Others	Spirit house	16.00	0.2
Total Land Area		8,418.00	100

Figure 30: Lower Floor Plans of Residential Building in Site-B'

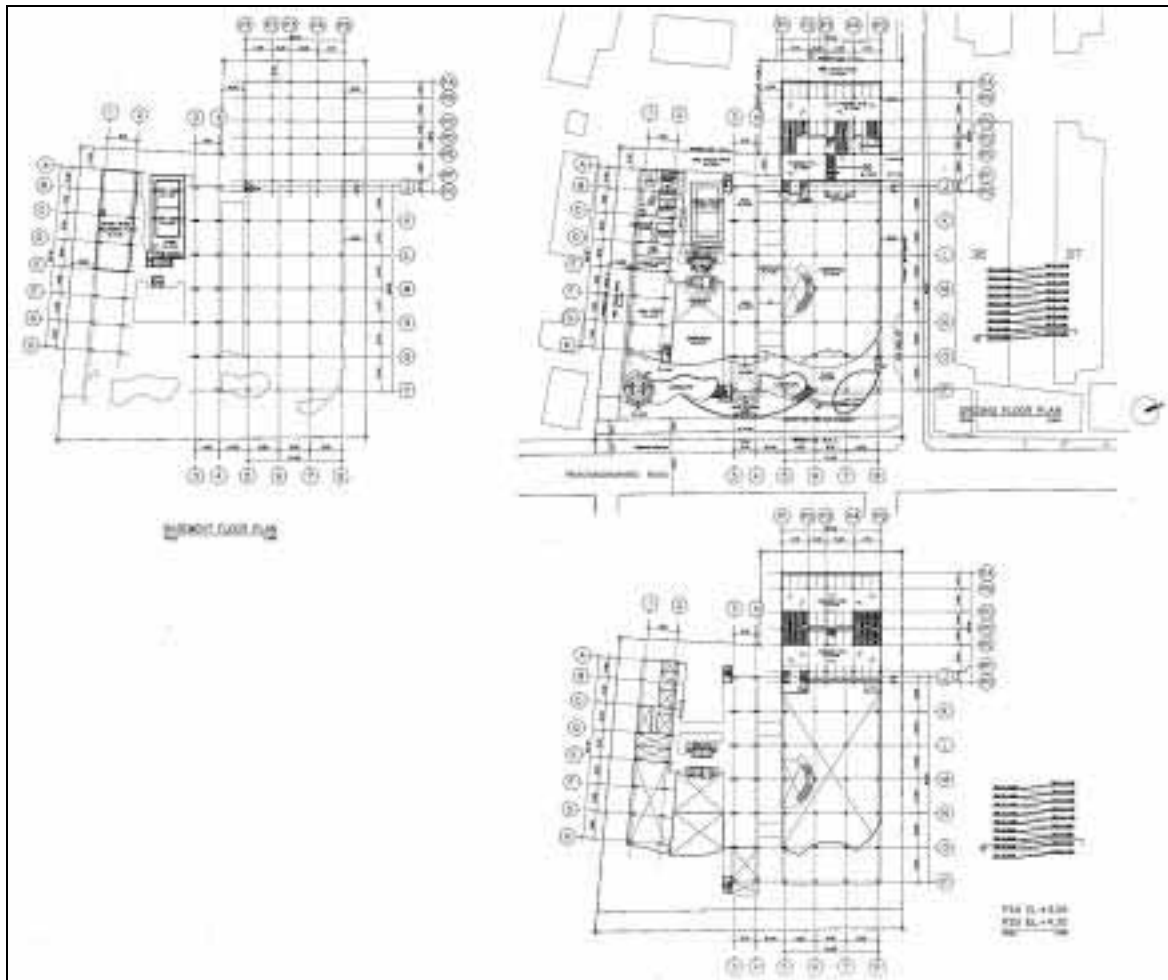
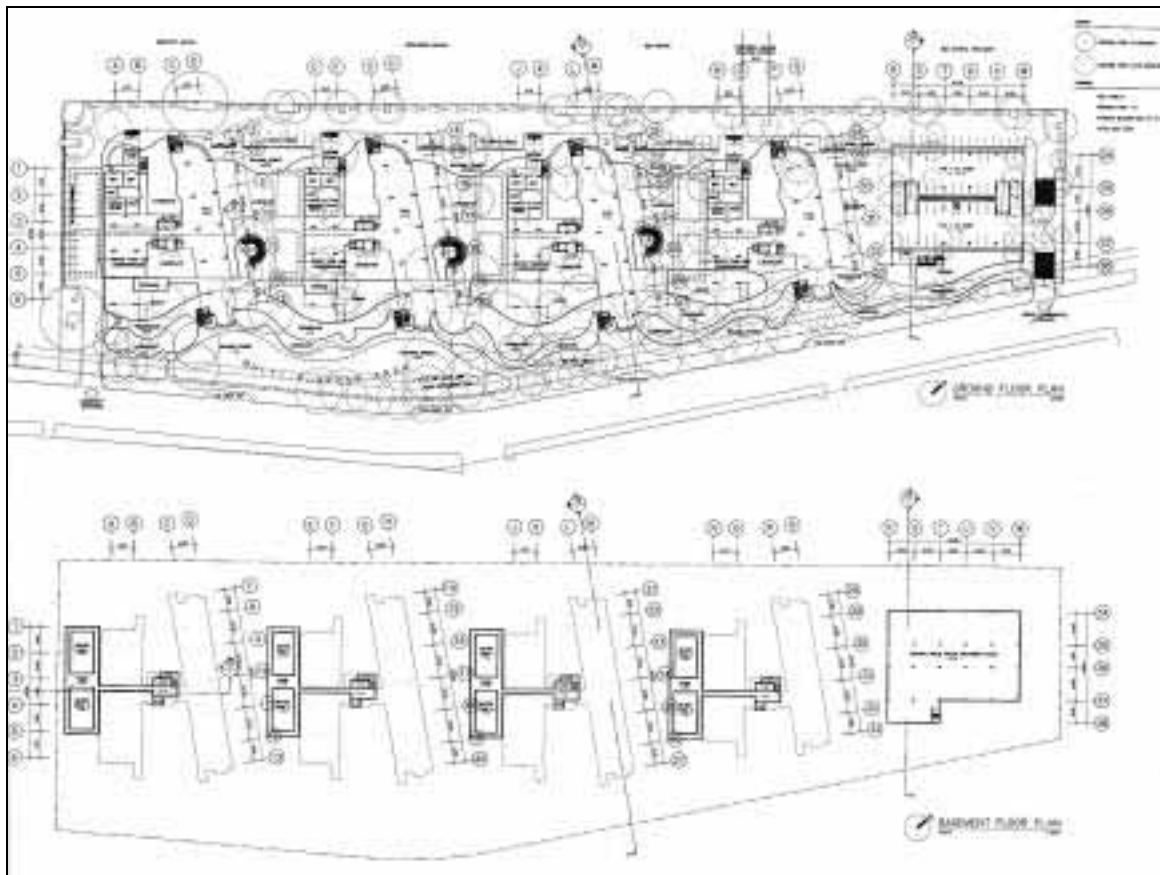


Table 21: Land Use Plan in Site-C

		Area (m ²)	Ratio (%)
1.Residential/commercial area	High rise apartment Commercial and Parking	6,690.00	28.4
2.Road	Fire engine maneuvering road Parking access road	2,532.00	10.8
3.Landscaped area	Green Garden, Stream, Plaza	12,707.00	54.0
4.Others	Parking (Outside)	1,595.00	6.8
Total Land Area		23,524.00	100

Figure 31: Lower Floor Plans of Residential Building in Site-C



4.3 Financial Evaluation and Financing Plan

(1) Construction Costs

Construction costs for the buildings and associated facilities are roughly estimated as given below:

Table 22: Construction Cost Estimates by Site

Items	Descriptions	Site-A	Site-B'	Site-C
1	Structural Work	286,914,000	154,474,000	474,449,000
2	Architectural Work	130,381,000	61,202,000	220,372,000
3	Electrical Work	101,800,000	56,000,000	178,000,000
4	Sanitary Work	104,970,000	54,410,000	180,000,000
5	Air Condition Work	9,000,000	4,000,000	8,000,000
6	Lift	30,000,000	10,000,000	40,000,000
7	Landscape Work	15,375,000	8,531,000	21,492,000
	Total	678,440,000	348,617,000	1,122,313,000

(2) Financial Evaluation

A base case was set down on the most practical conditions; all fund covered by loans, interest rate 5.0% per annum and repayment period 30 years. As a result of financial return calculations, it was found out that the loans could not be repaid fully within a project life 30 years, a little longer project life will have to be set down.

Sensitivity analyses were incidentally carried out varying the financial factors, 1) mobilization of interest-free fund, 2) lower-interest loan, 3) less-revenue from the commercial facility, and 4) rent hike. The result is summarized as given below.

Table 23: Summary of Financial Analysis

	Site A	Site B'	Site C	Modified Factors
Case A (base)	-2.24	7.36	0.64	100% loan Interest rate: 5.0%, Housing rent: 1,500 baht/month, hiking 15%/3yrs Commercial rent: 550 baht/m ² /Month Parking rent: 1,500 baht/bay/month Street vender: 1,000 baht/unit/month
Case B	-3.42	6.06	-0.52	Interest rate 7.0%
Case C	-3.4	1.47	-2.87	Commercial rent 275 baht/m ² /month
Case D	-14.68	-0.40	-3.64	Interest rate 7.0%, rent hike 15%/10 yrs
Case E*	14.31	-6.25	-6.09	Interest rate 7.0%, commercial 275 baht/m ² /month, rent hike 15%/10 yrs.

* Loaned portion differs by site: Site A 70%, Site B' 90%, Site C 50%

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As a conclusion, the Case Study Plan would not stand on healthy footing which is inevitable due the low house rents and small scale of commercial space. In order to attain a sound financial profile, at least 30% of own fund (interest-free) is indispensable. It should be pointed out that to evaluate the financial status of the Case Study Plan independently is not fair because of the peculiar conditions attached to it. It should be evaluated from the context of the entire DC Development Plan, moreover the significance of the Case Study Plan should be recognized in its role as prime mover (pilot project) to smoothen a way towards the succeeding phases of the DC Development Plan.

5. RECOMMENDATIONS ON FUTURE URBAN REDEVELOPMENT UNDERTAKING IN BANGKOK

Following are the recommendations proposed by the Study for improvement of the urban environment in Bangkok based on the experience and lessons learnt in the course the planning and design works on Bangkok, the Study Area, the DC Area, and the Case Study Area.

5.1 Issues and Recommendations on Legal Settings and Its Application

(1) Effective Use of Specific Plan

The city planning system in Thailand is constituted of 1) General Plan and 2) Specific Plan. A broad vision is to be presented by the former, while specific regulative measures are to be provided in the latter. Although the General Plan was formulated in 1997, no Specific Plan has been presented yet. This fact seems to be impeding development of the secondary trunk road networks.

The Specific Plan could be a device to achieve certain transformation of urban structure by installing special regulations accompanied with incentive measures, e.g. to attain a change in land use over the private lands in long term basis. Fact of the matter in Thailand is that this system is rather taken as a means to execute a specific project in stead of an area-wide transformation purpose.

It is imperative to back up a project by the city planning with a purpose to transform a road system with a regulative-and-incentive mechanism. To this end, it is advisable to make better use of the existing system, Specific Plan, rather than introducing another system, by enlarging its scope of function and with focus in on specific infrastructures of significant scale and importance.

(2) Introduction of Building Code Suitable for Large Land Lot Development

The present building code and regulations are more or less oriented to individual buildings. Therefore there seem to be some regulations which are not suitable for applying to group of buildings in a large land lot. For instance, if application for the building permit is made by the project owner only for which construction is imminent among the buildings, compliance with the regulations in every respect is naturally called for. This practice would make efficient planning of a composite project impracticable if executed

phase-wisely, such as in planning certain common facility collectively to serve the whole group of buildings. Another example is that the requirement of maneuvering space for fire engine around the buildings would obviously results in an unreasonably large facility rather than shaping with a group of buildings.

BMA in fact is applying these regulations flexibly on case by case basis upon the discussions with the individual project owners. However, the project owner could not be certain if preferential treatment would be exercised in advance. Introduction of a notion of large land lot development into the building code/regulations would no doubt dispel undue concern for the private developers on the large land lot.

(3) Introduction of Methods for Large Area-wide Development

Under the present laws and regulations on the land, there seems to be some difficulty in planning a large-scale development project by consolidating several lands. This is acutely felt in such a case where a patch of public land such as road is lying across the lands. For altering use of the said public land, it must be subjected to approval of the Cabinet no matter how minuscule it may be. This kind of situation seems to discourage the enterprises for improving urban environment in a densely built-up areas by consolidating numerous small parcels of lands for an efficient large scale facilities.

To counter the situation, a system to relieve specific areas for large-scale development is desired, and a red-tape-free way should be provided for private sector to undertake the project. To this end, an authorizing procedure in the city planning system will have to be put into effect. In these cases, it is recommended to introduce preferential measures such as relaxation of land transfer tax, subsidy or tax exemption for the lands which are ceded from the land owners to install public facilities like roads, along with application of building codes in suitable manner for large scale development undertakings as discussed above.

5.2 Issues and Recommendations on Organizational Settings

(1) Strengthening City Planning Body

Based on the fact that it was only in 1997 when BMA worked out a formulation of General Plan, it is judged that BMA is very active in planning as it is now proceeding the master planning on districts' level. Since it has become apparent that a national level back up is indispensable for realizing effective use of Specific Plan mechanism, collaboration between local and national offices is crucial. Establishment of a regular discussion might be helpful by forming working groups with the Department of Town and Country Planning (DTCP).

In the meantime, to promote district level city planning, it would be necessary to fine tune the efforts to such sensitive business as conversion/adjustment of stakeholders' right and involving participation of local community, which would no doubt call for reinforcement of the present human resources and organizational structure. As it is likely that the importance of district level city planning increases in the future, it is very important to enhance city planning capability of district offices by providing staff who can compromise the city planning philosophy with the rights or demands of the residents.

(2) Utilization of Urban Development Know-how Accumulated in NHA

In line with the decentralization policy, the role of BMA for urban management will be enlarged in both planning and implementation. However it will be a considerable burden for BMA to increase allotment of its resource to the urban management sector alone. To cope with various urgent needs to be initiated by the public sector, it is realistic for BMA to fully utilize resources and know-how accumulated in other agencies for some time to come.

Having achieved a considerable number of housing projects, NHA can be a key player for implementation of urban planning goals. Moreover, there are many housing complexes in BMA that were built and are being operated by NHA. As the building facilities in these housing complexes are becoming old, they need to be reconstructed within a certain period of time. This can be translated as valuable assets for urban management in Bangkok as they can be fully utilized as the cores for improvement of built-up areas.

Currently, a drastic restructuring is going on in Thailand *vis-a-vis* the public sector organizational structure, and NHA is likely to be affiliated to a new ministry which is planned to serve for social and human development needs in the country. This implies that the involvement of NHA in the field of urban management might be rather reduced.

Referring to the case of Japan, it might not be beneficial for Thailand, if the accumulated know-how in NHA would not be utilized for implementation of urban planning policies. In Japan, the Urban Development Corporation (UDC), which was originally established to provide housing, has accumulated considerable project implementation know-how within the organizational body. The experience of UDC has been fully utilized for implementation of urban planning policies in many cities including Tokyo.

Given the above, it is recommended that a certain number of current NHA staff, who have the best experience of urban development/redevelopment projects, be clearly recognized as an expert group for implementation of urban planning. The group should be authorized and given responsibility for the said task, regardless of which organization it belongs to after the government restructuring program.