

KINGDOM OF THAILAND  
MINISTRY OF TRANSPORT AND COMMUNICATIONS  
DEPARTMENT OF LAND TRANSPORT

THE STUDY ON GREATER BANGKOK TRUCK  
TERMINAL IN THE KINGDOM OF THAILAND  
FINAL REPORT

VOLUME 3  
INVESTORS' GUIDE



SEPTEMBER 1992

JAPAN INTERNATIONAL COOPERATION AGENCY

SSF
CR(3)
92-094(3/5)





JICA LIBRARY



1100810(9)

24268



**KINGDOM OF THAILAND  
MINISTRY OF TRANSPORT AND COMMUNICATIONS  
DEPARTMENT OF LAND TRANSPORT**

**THE STUDY ON GREATER BANGKOK TRUCK  
TERMINAL IN THE KINGDOM OF THAILAND**

**FINAL REPORT**

**VOLUME 3  
INVESTORS' GUIDE**

**SEPTEMBER 1992**

**JAPAN INTERNATIONAL COOPERATION AGENCY**

国際協力事業団

24268

**THE STUDY  
ON  
GREATER BANGKOK TRUCK TERMINAL  
IN  
THE KINGDOM OF THAILAND**

**INVESTORS' GUIDE**

**CONTENTS OF TABLE**

- A. Introduction
- B. Concept of Truck Terminal as a Physical Distribution Facility Study
- C. Estimation of Cargo Volume and Selection for Pilot Feasibility
- D. Project Outline of Pilot Feasibility Study
- E. Economic and Financial Analyses
- F. Implementation Enforcement





## A. Introduction

Table IG 2.1 Urban Issues to be Considered

1.	Formation of Sub-core style Urban Structure
a)	Redevelopment of CBD
b)	Arrangements of Sub-core area
c)	Others
2.	Providing Relevant Transportation Facilities
a)	Construction of mass transit
b)	Immediate construction of outer ring road
c)	Construction of systematic city streets
d)	Others
3.	Rationalization of Physical Distribution System
a)	Improvement of truck transportation efficiency
b)	Providing physical distribution relevant facilities.

1. Bangkok Metropolitan region (BMR) is the pivotal region in the Kingdom. BMR occupies 16 % of population and 4% of GDP in the Kingdom of Thailand now. The concentration of population and economy will continue, though the concentration is slowing down.

Because of this concentration, the truck terminal network is necessary to ease urban problems. The followings are the urban issues to be considered:

2. It is necessary to provide three truck terminals such as at North, East and West by each directing in BMR judging from current and future physical distribution conditions.
3. Three truck terminals: North, East and West will be necessary in the city of Bangkok to form a initial transportation network in Thailand. They shall be operated simultaneously for efficient services. Simultaneous services will create the transportation network-cargoes are relayed from one terminal to another and vice versa. The network will reduce the volume of unloaded trucks. BMR and other regions will be connected, and the connection will result in creating the vital network necessary for healthy economic development in the Kingdom of Thailand.



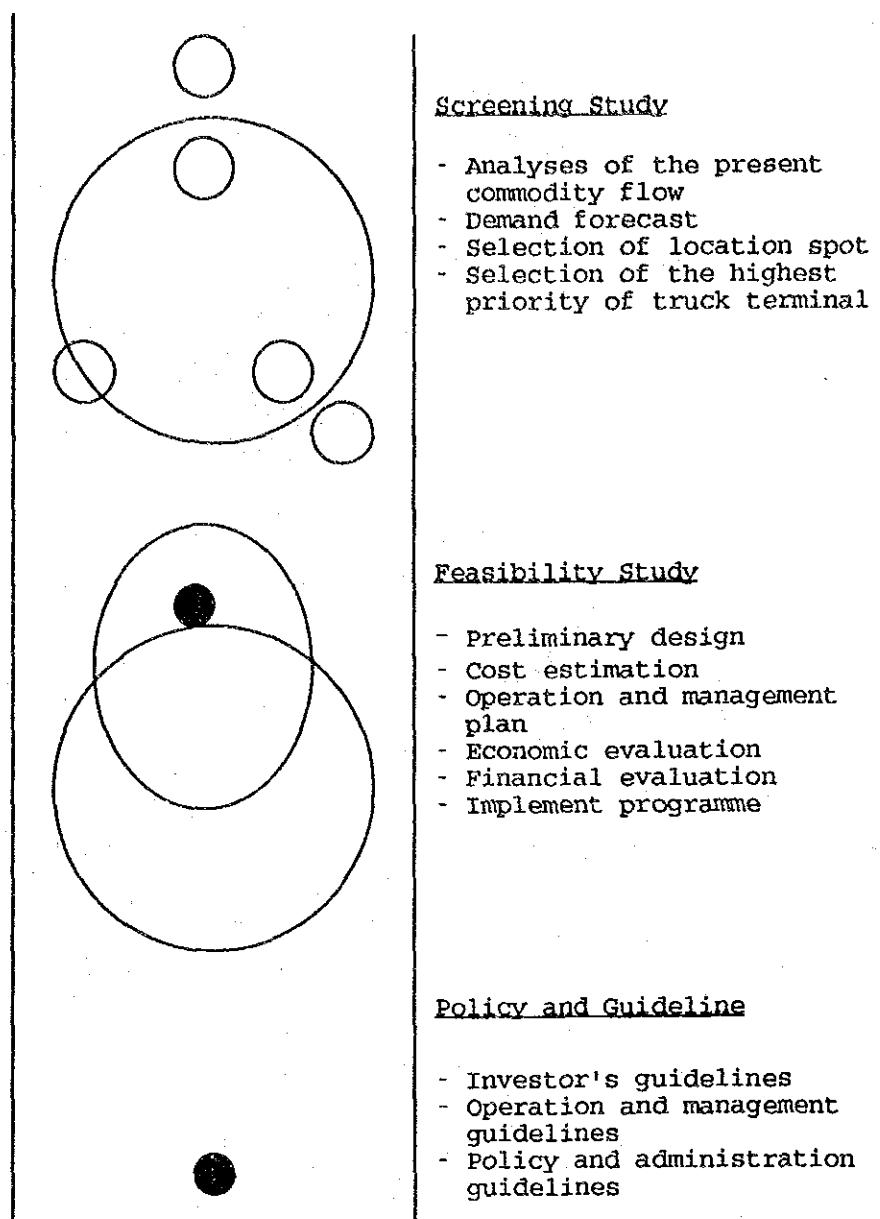


Figure IG 2.1

Overall Structure of the Study

1. The study started from December 1991 and is scheduled to complete in September 1992.
2. The study is implemented by seven members of Japan International Cooperation Agency (JICA) with cooperation of Technical and Research Division of Land Transport Department, the Kingdom of Thailand.
3. All costs are financed by Japan International Cooperation Agency (JICA).



B. Concept of Truck Terminal as a Physical Distribution Facility

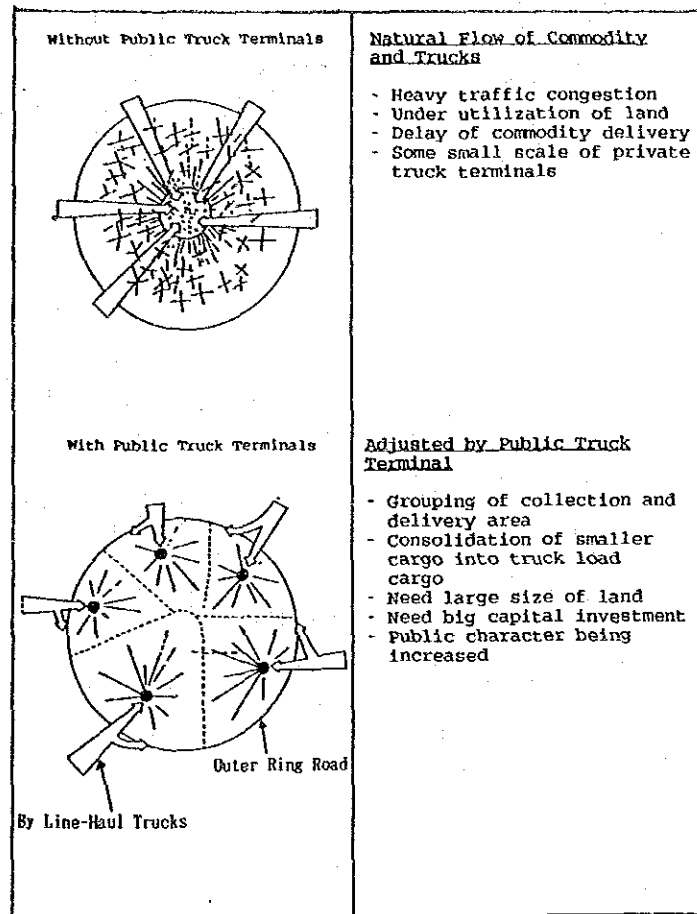
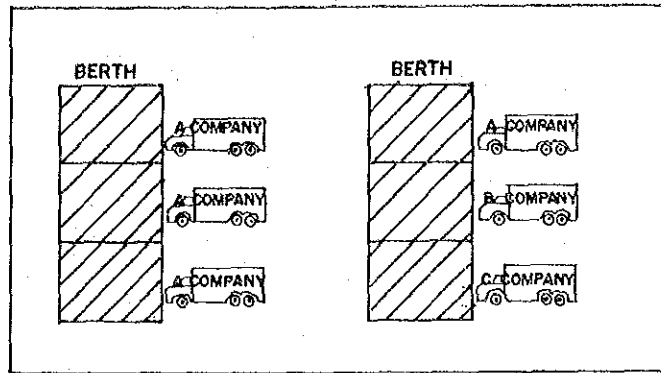


Figure IG 2.2 The Idea of Public Truck Terminal

1. The delivery areas are grouped by zones.
2. Number and size of zones vary according to the size of a city.
3. The operational pattern of a truck terminal is:
  - a) pick-up and delivery services
  - b) freight handling on platforms according to the destination, and
  - c) operation of line-haul trucks.



1. PRIVATE TRUCK TERMINAL



2. PUBLIC TRUCK TERMINAL

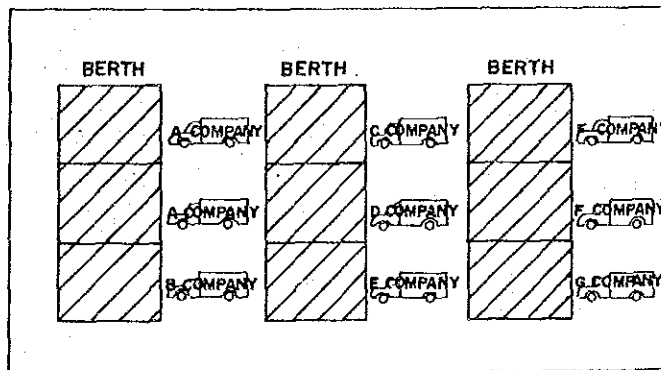


Figure IG 23 The difference Between Private and Public Truck Terminal

1. The difference between private and public truck terminals does not fall on the ownership of facilities but on the usage of facilities, especially, the usage of berths.
2. Any truck terminal which is used by two or more transport companies, or which is not used for the purpose of its own truck transport business should be called "public truck terminal."





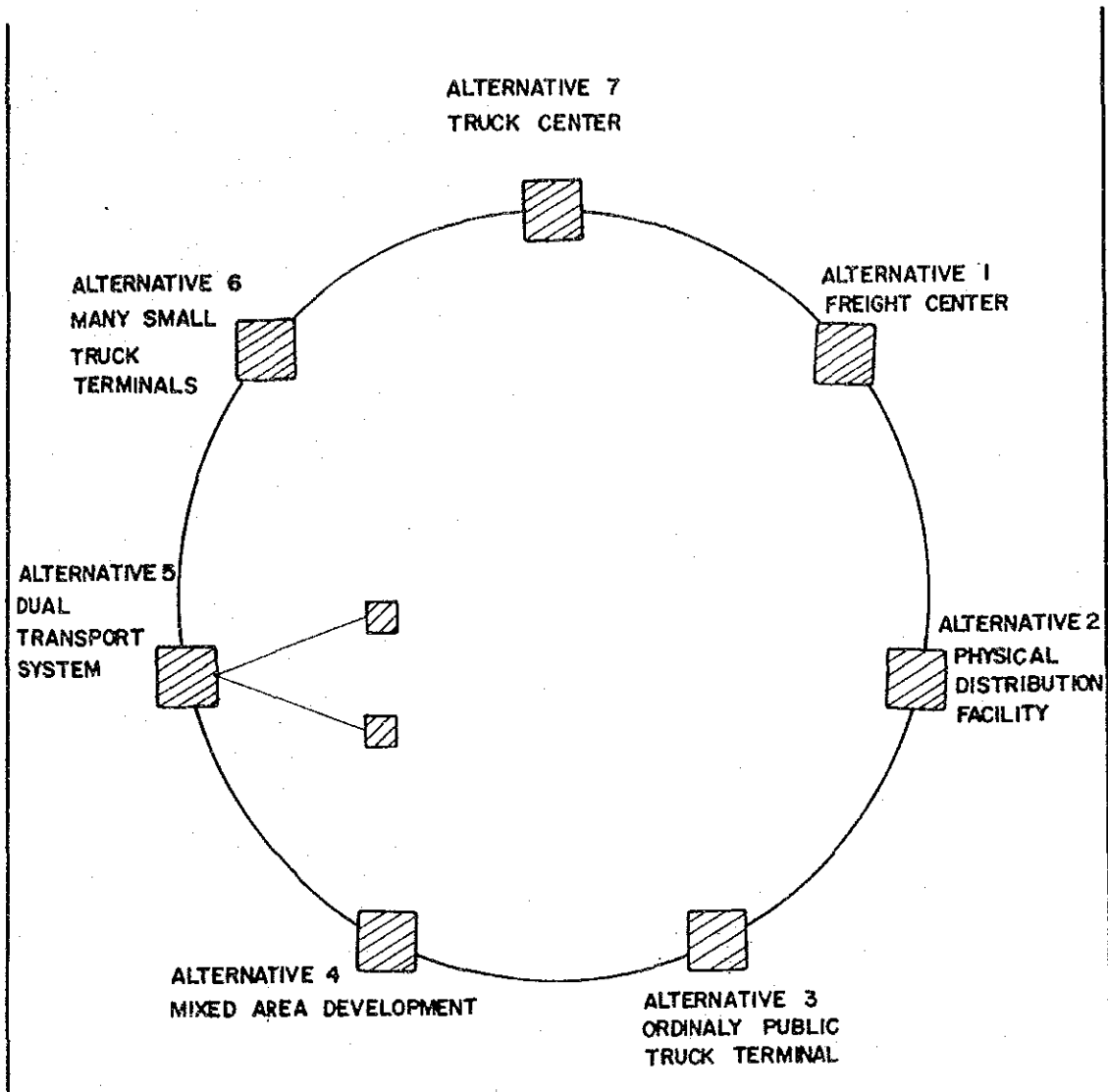


Figure IG 2.4 Alternatives of Physical Distribution Facility Pattern.

1. Physical distribution is the flow of goods: that is, transporting, storing, handling and packing. This chain of activities can be divided into two major working segments: "**Line Part**" which corresponds to the transportation means, and "**Nodal Part**" which connects these means of transport. This nodal point is called "**physical Distribution Facilities.**"
2. There are several types of physical distribution facilities as summarized above.



Table IG 2.2 Comparison of Physical Distribution Facility Patter

	Items for Comparison	Alternatives				
		1 Freight Center	2 P.D. Zone	3 O.P.I Terminal	4 M.L. Development	5 D.T System
1	Possibility of Land Acquisition	1	2	3	3	1
2	Modernization of physical distribution system	2	3	2	3	1
3	Contribution of urban renewal	3	3	2	1	2
4	Relief of traffic congestion	2	2	2	1	3
5	Securing of the public interest	3	2	2	0	2
6	Possibility of capital raising	1	2	3	3	1
7	Degree of Management difficulty	2	1	3	2	1
	Total score	14	15	17	12	11
	Order	3	2	1	4	5

0: not good  
 1: fair  
 2: good  
 3: very good

1. Each alternative has merits and demerits.
2. Ordinary public truck terminal (Alternatives 3) gets the highest scores.
3. Items such as possibility of land acquisition, possibility of capital raising and degree of management skill received high scores because of its size and compactness.
4. For the long run alternative 2 has higher priority.



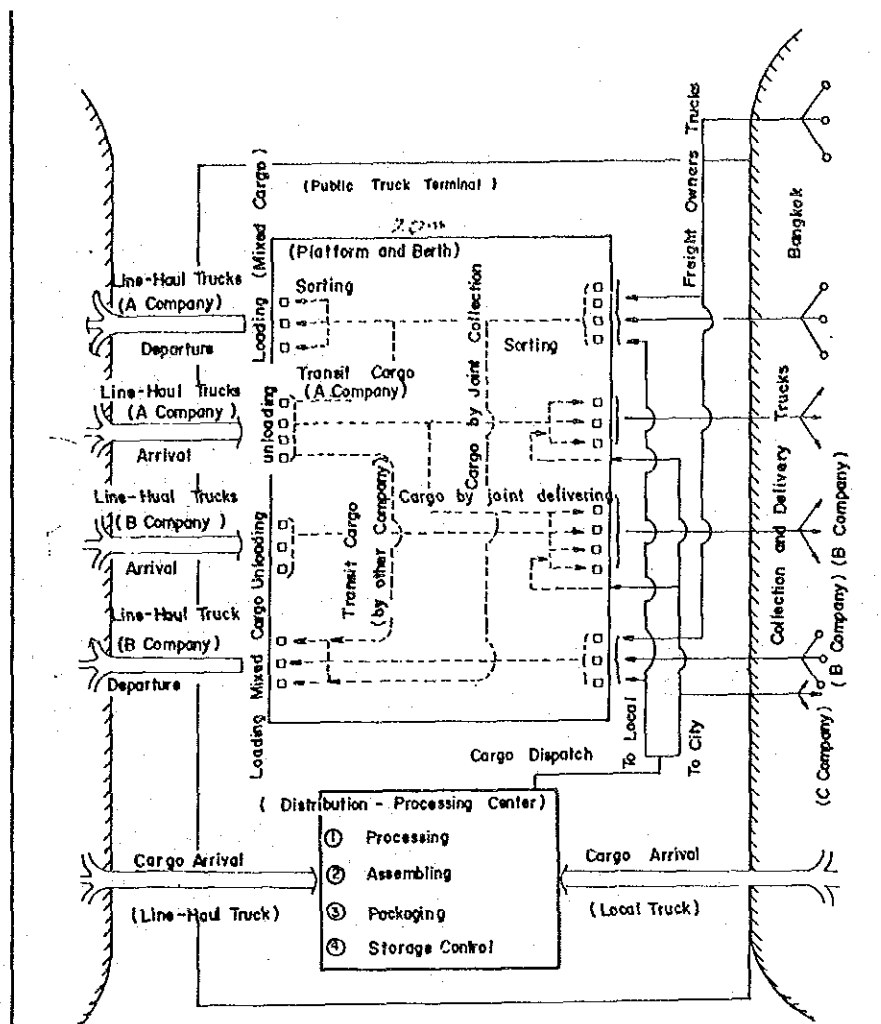


Figure IG 2.5 Freight Movement in Public Truck Terminal

1. Arrival: Large-sized trucks arrive at the terminal in the morning with cargoes loaded.
2. Cargo-handling work: at the cargo-handling platform, the work starts as soon as large-sized trucks arrive.
3. Transshipment: Early in the morning transshipment to small-sized delivery vehicles is finished. Delivery vehicles distribute cargo in the morning and collect cargo in the afternoon. The collected cargoes are sorted at the cargo handling platform.
4. Departure: The large sized trucks arrived in the morning depart for destination between 5 to 9 o'clock in the evening.



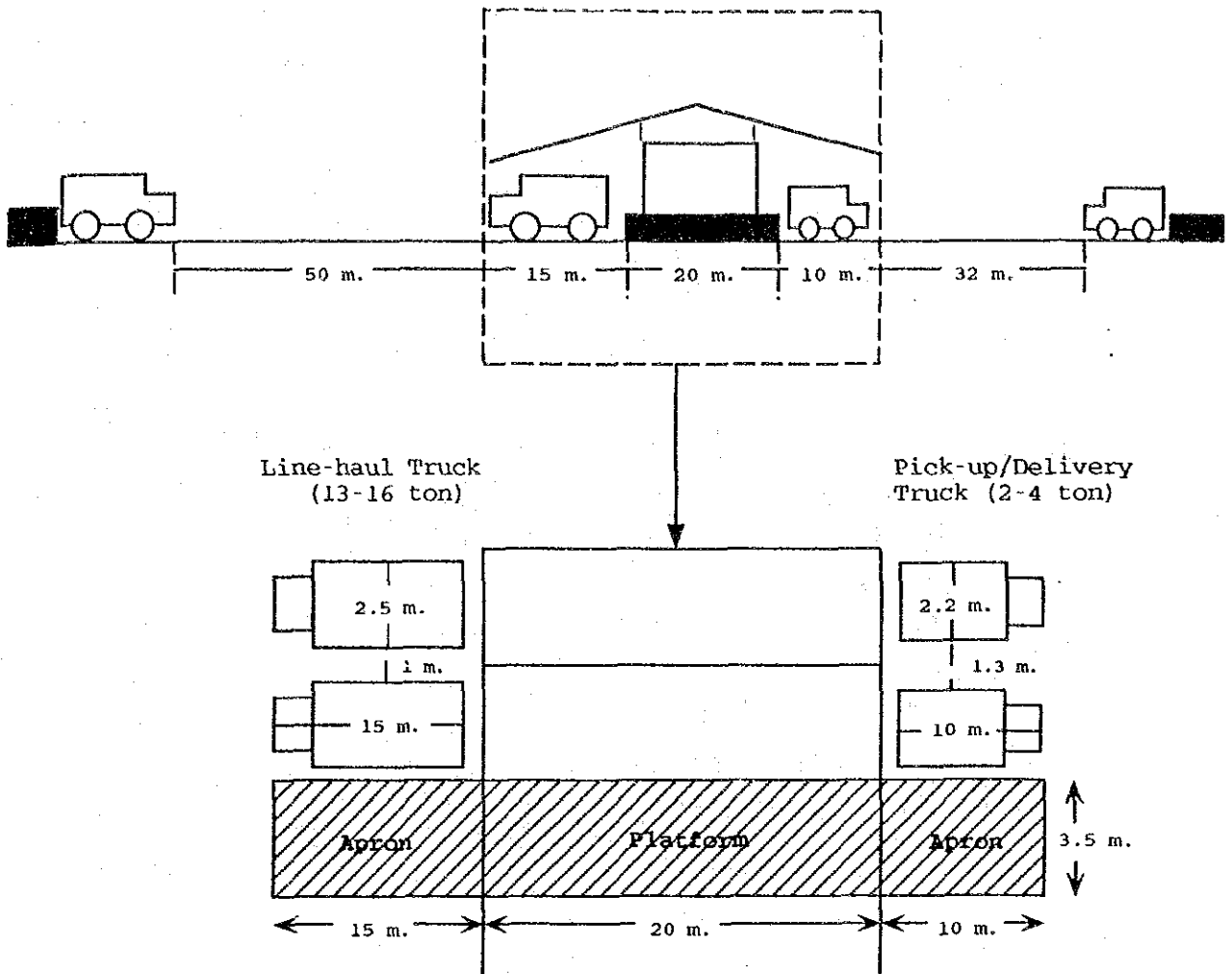


Figure IG 2.6 Definition of Berth

1. One berth for rental area is 157 m<sup>2</sup> (3.5x(15+20+10)).
2. Handling capacity of cargoes at one berth is approximately 20 ton/day







C. Estimation of Cargo Volume and Selections for Pilot Feasibility Study

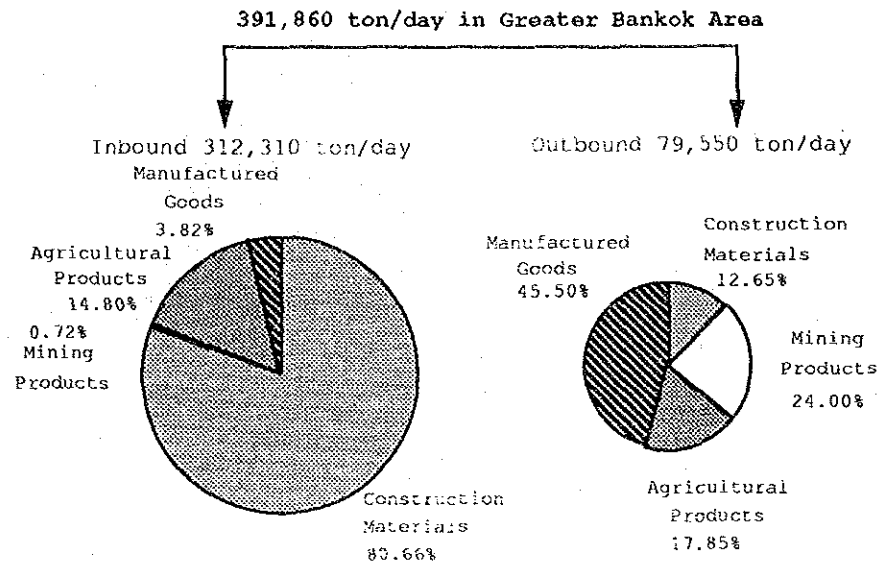


Figure 8 Cargo Components for Truck Terminal Use (2000)

1. Inbound cargo to Bangkok amount to 312,310 ton/day, and outbound cargo amount to 79,500 ton/day.
2. Inbound cargo is 4 times more than outbound.
3. Main commodities to be handles at truck terminal will be mainly manufactured goods and agricultural products
4. Construction material will be very little.
5. The case of 24 hours ban against heavy truck in the Central Business District



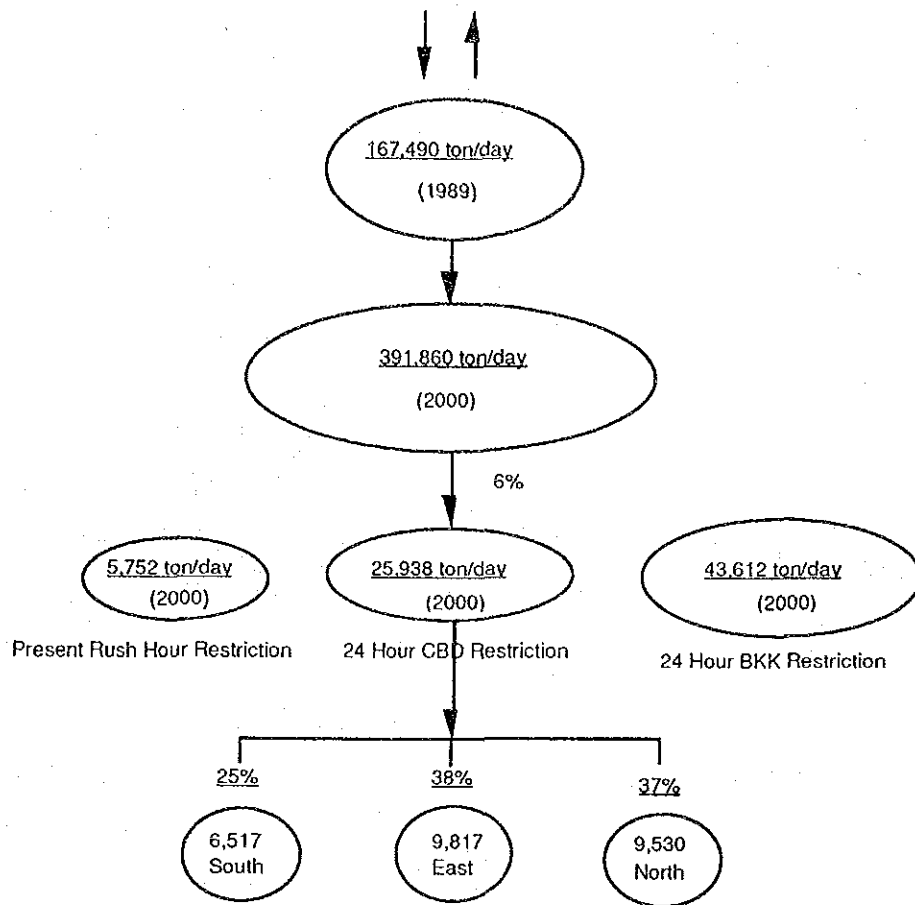


Figure IG 2.8 Cargo Flow in Bangkok and Estimated Volume for Truck Terminal Use

1. Cargo volume to and from Bangkok is expected to 2.3 times from 167,490 ton/day in 1989 to 391,860 ton/day in year 2000.
2. Its 24 hour restriction is enforced on large size truck in CBD, cargo of 25,938 ton/day will use truck terminal 9,530 ton/day, 37 % of the total volume will use North Truck Terminal.
3. The estimate are based on (a) LTD commodity distribution analysis, (b) Road side traffic count survey and (c) Truck company interview survey.



Table IG 2.3 Conversion Factor of Truck Terminal Use

a) Outbound Commodity from Whole Kingdom

Type of Commodity	Composition ratio (%) 1989	Suitability	Suitable Facilities	Use Ratio of the Truck Terminals
1. CONSTRUCTION MATERIALS	100.0%			4.2%
2) SAND & GRAVEL	4.7%	NO		
3) CEMENT & PRODUCT	44.6%	YES(4.8%)	Terminal	
4) STEEL	42.5%	YES(4.8%)	Terminal	
5) OTHER CONSTRUCTION	8.2%	NO		
2. MINING PRODUCTS	100.0%	NO		0.0%
8) PETROLEUM PRODUCTS	98.3%	NO		
9) MINERALS	1.7%	NO		
3. AGRICULTURAL PRODUCTS	100.0%			22.2%
1) RICE	4.5%	NO		
6) TIMBER	11.3%	NO		
7) FIREWOOD	1.0%	YES(100.0%)	Terminal	
10) VEGETABLE & FRUIT	4.7%	NO		
11) TAPIOCA	0.6%	NO		
12) MAIZE	0.5%	NO		
13) SUGAR	0.4%	NO		
14) BEANS	0.3%	NO		
15) JUTE & PRODUCTS	0.6%	YES(100.0%)	Terminal	
16) BEVERAGES	13.8%	YES(100.0%)	Terminal	
17) PROCESSED FOODS	4.1%	YES(100.0%)	Terminal	
18) ANIMALS	0.7%	NO		
19) FISH	1.4%	NO		
20) FERTILIZER & ANIMAL FEED	56.0%	YES(4.8%)		
4. MANUFACTURED GOODS	100.0%			84.9%
21) PERSONAL EFFECTS	7.2%	YES(100.0%)	Terminal	
22) OTHER MANUFACTURES	77.2%	YES(100.0%)	Terminal	
23) ALLOTHERS	15.5%	YES(2.8%)	Terminal	

a) Inbound Commodity from Whole Kingdom

Type of Commodity	Composition ratio (%) 1989	Suitability	Suitable Facilities	Use Ratio of the Truck Terminals
1. CONSTRUCTION MATERIALS	100.0%			3.4%
2) SAND & GRAVEL	90.7%	NO		
3) CEMENT & PRODUCT	6.7%	YES(4.8%)	Terminal	
4) STEEL	0.8%	YES(2.8%)	Terminal	
5) OTHER CONSTRUCTION	1.9%	NO		
2. MINING PRODUCTS	100.0%	NO		0.0%
8) PETROLEUM PRODUCTS	26.1%	NO		
9) MINERALS	73.9%	NO		
3. AGRICULTURAL PRODUCTS	100.0%			12.8%
1) RICE	37.7%	NO		
6) TIMBER	9.1%	NO		
7) FIREWOOD	2.0%	YES(100.0%)	Terminal	
10) VEGETABLE & FRUIT	3.9%	NO		
11) TAPIOCA	5.6%	NO		
12) MAIZE	4.1%	NO		
13) SUGAR	13.7%	NO		
14) BEANS	1.6%	NO		
15) JUTE & PRODUCTS	0.7%	YES(100.0%)	Terminal	
16) BEVERAGES	1.0%	YES(100.0%)	Terminal	
17) PROCESSED FOODS	8.8%	YES(100.0%)	Terminal	
18) ANIMALS	2.0%	NO		
19) FISH	4.5%	NO		
20) FERTILIZER & ANIMAL FEED	5.4%	YES(4.8%)		
4. MANUFACTURED GOODS	100.0%			57.9%
21) PERSONAL EFFECTS	30.6%	YES(100.0%)	Terminal	
22) OTHER MANUFACTURES	26.1%	YES(100.0%)	Terminal	
23) ALLOTHERS	43.4%	YES(2.8%)	Terminal	

1. The casse of 24 hours ban against heavy truck in the Central Business District.



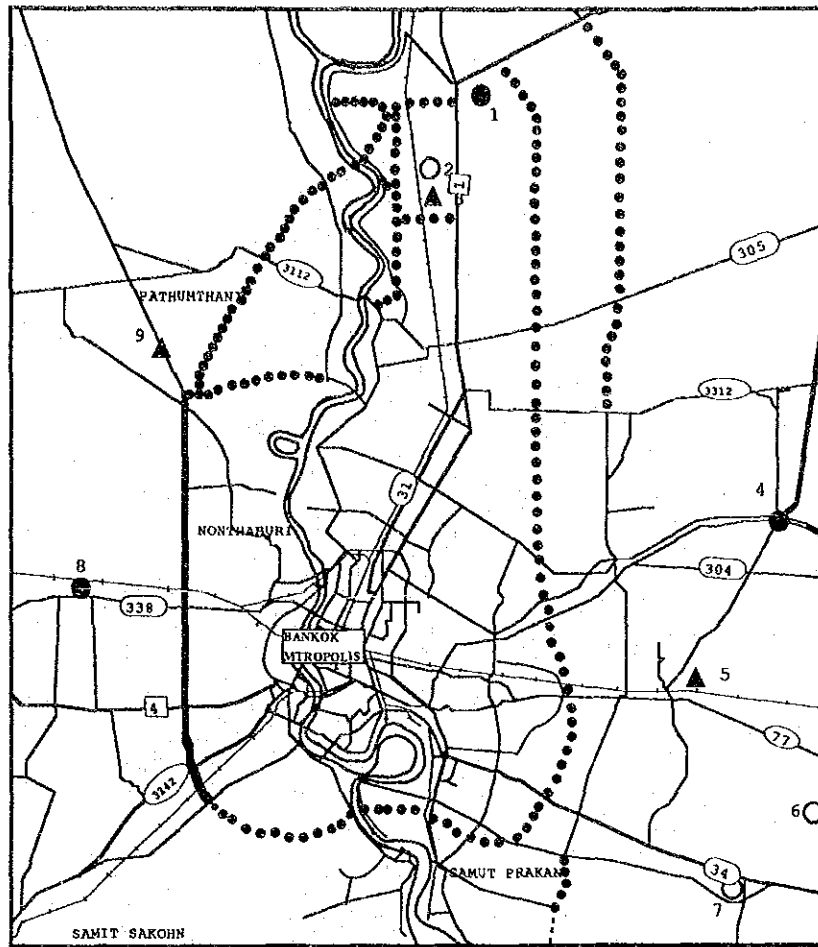


Figure IG 2.9 Terminal site proposed by different organizations

	Location (Distance from CBD)	Status	Area (rai)
1	50 km North	Application from Trucking Association being processed	403
2	43 km North	Application from MSH (private corporation) being processed	200
3	41 km North	Government Owned	169
4	21 km East	Adjacent to the ICD construction site	N/A
5	35 km East	Application from Trucking Association being processed	215
6	37 km East	Application from MMC (private corporation) being processed	200
7	40 km East	Application from Viriya (Private corporation) being processed	320
8	20 km Southwest	Application from Trucking Association being processed	211
9	25 km Southwest	Application from MMC (private corporation) being processed	200
10	Eastward	Opportunities searched by the government	N/A





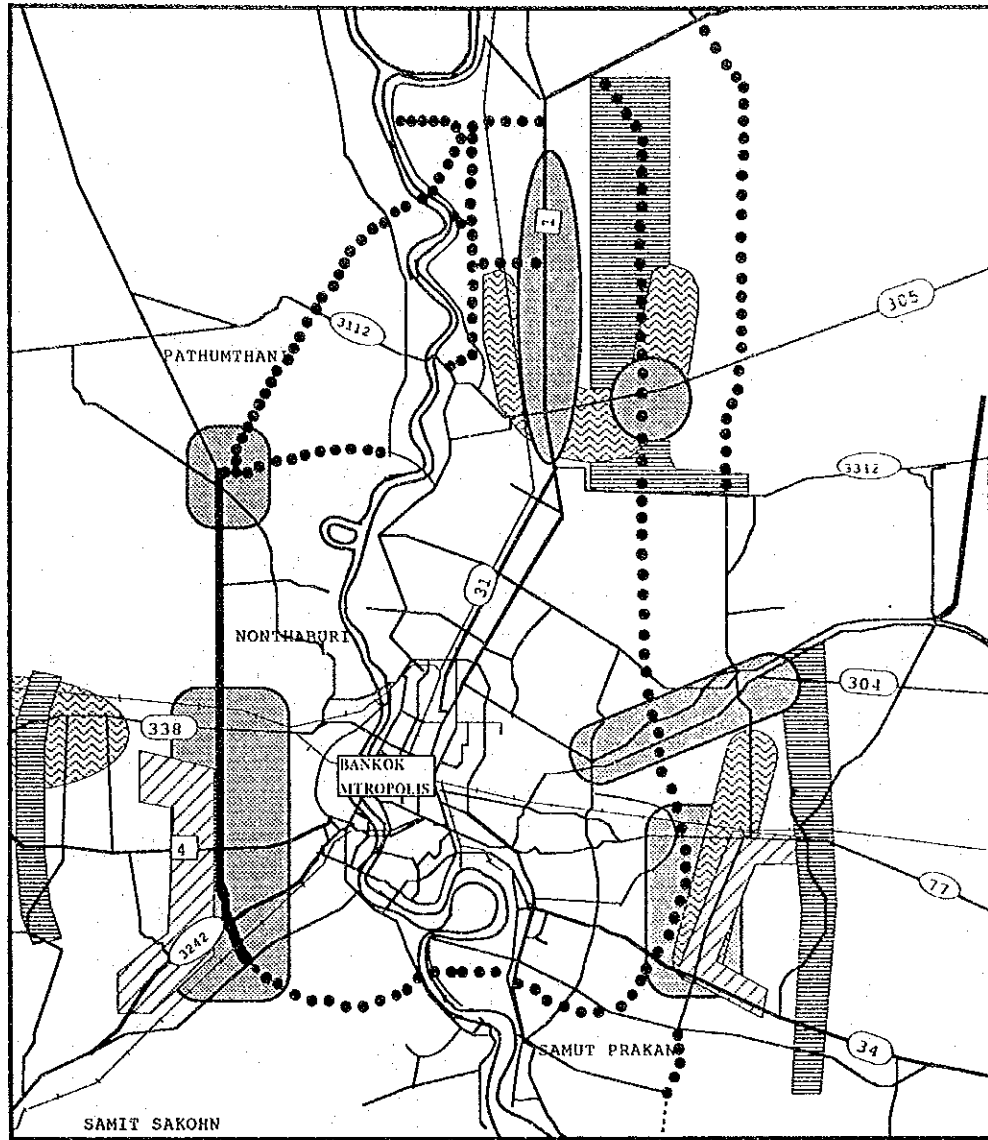


Figure IG 2.10 Optimum Sites for Truck Terminal Construction

1. Site Selection Criterion:

- a) Daily movement limitation for delivery and collection
- b) Freight movement pattern and network aggregated shortest running distance point for line-haul and pick up/delivery truck movement
- c) Land use from city planning
- d) Relocation of urban facilities in CBD



Table IG 2.4 Integrated Priority Order for Pilot Feasibility Study

Index	Weight	North Truck Terminal	East Truck Terminal	West Truck Terminal
1. Cargo Flow Rationalization Index	0.20	0.260	0.236	0.106
2. Transport Cost Saving Index	0.10	0.133	0.047	0.120
3. Transport Congestion Relieving Index (1)	0.10	0.131	0.070	0.099
4. Transport Congestion Relieving Index (2)	0.10	0.198	0.037	0.065
5. First Year Revenue/Cost Index	0.20	0.204	0.212	0.186
6. Land Acquisition Index	0.20	0.178	0.332	0.090
7. Urban Development Index	0.10	0.100	0.120	0.080
Total	1.00	1.204	0.924	0.876

1. Socioeconomic indicators are adopted to evaluate priority of three terminals.
2. The integrated priority order indices prove that **the highest priority truck terminal** falls on the **North Public Truck Terminal**, followed by the East Terminal.
3. This study proceeds to the feasibility study on the North Public Truck Terminal as a pilot study.



D. Project Outline of Pilot Feasibility Study

Table IG 5 Outline of Pilot Feasibility Study  
Construction Plan

Cargo Handling Volume:	6,795 ton/day (1995) 9,530 ton/day (2000)
Handling Capacity of Berth:	20 ton/berth
Terminal Scale:	350 berth (1995) 500 berth (2000)
Number of cases:	Case 1; 500 berth in one place at the year 1995 Case 2-1; 350 berth in one place at the year 1995 Case 2-2; 500 berth in one place at the year 2000
Required Area	Case 1 180 rai Case 2-1 145 rai Case 2-2 65 rai
Operation Start:	First Step; 1995 Second Step; 2000

1. The Case 1, 500 berth is considered in the **two-staged construction program**, since the demand of the terminal at the year 1995 is far less than that at the year 2000.
2. The Case 3, which is the combination with the Case 2-1 and Case 2-2, is considered for the economic analysis.



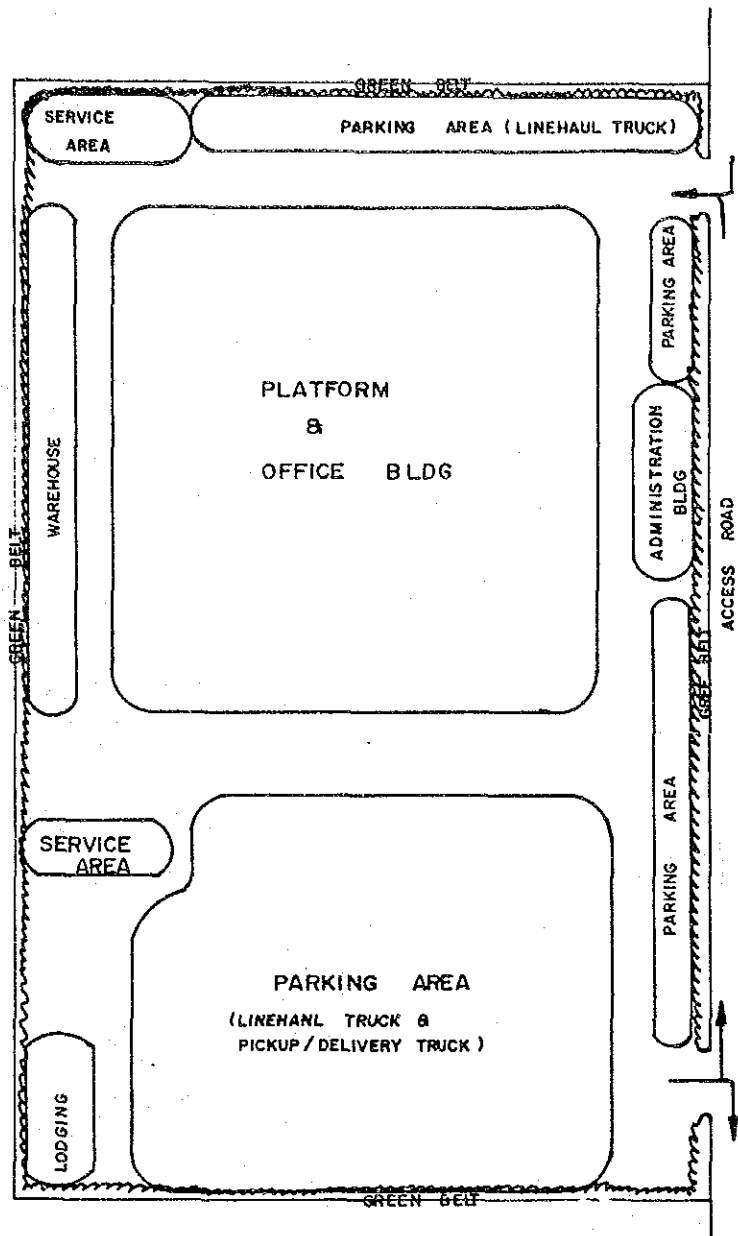


Figure IG 2.11 Standard Layout of Public Truck Terminal and Its Necessary Facilities

1. The service area includes maintenance shop, gas station and car washing facilities.
2. Administration Building consists of meeting room, training room, canteen, doze rooms, shower room, medical clinic and shops.
3. Administration Building has meeting rooms, wait training room, canteen, resting area, shower rooms, medical clinic, and car maintenance shop.





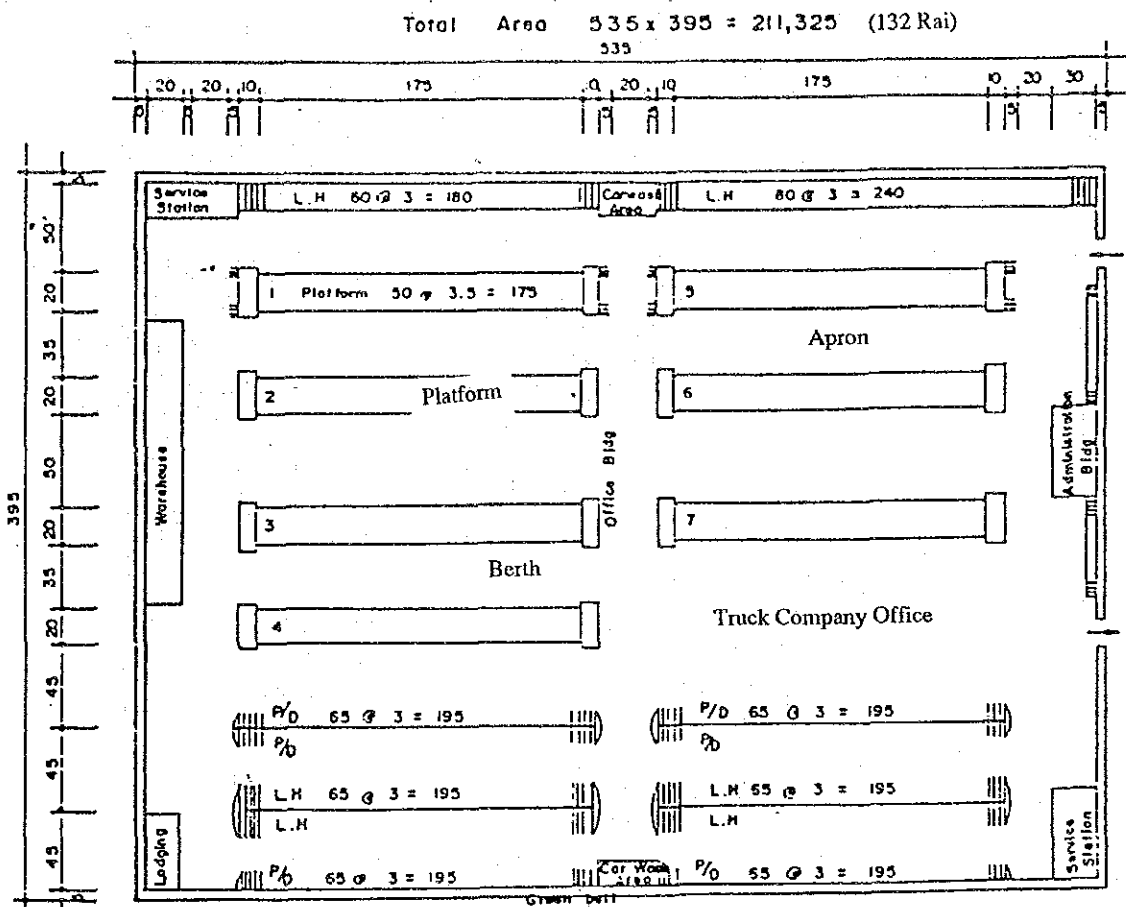


Figure IG 2.12 Recommended Layout Plan and Necessary Facilities (Case 2; 350 Berth)

1. Berth, parking lots and other facilities are clustered.
2. Beside above cluster plan, two other alternatives are analyzed.
  - a) Platform and other facilities as a small group (independent type)
  - b) Several small terminals at different place not to provide a large berth in one place.



Table IG 2.6 Estimated Spaces for Each Facilities

(unit; sq. meter)

Case	Case 1 (500 berths)	Case 2-1 (350 berths)	Case 2-2 (150 berths)
Platform	35,000	24,500	10,500
Apron	43,750	30,625	13,125
Parking	41,550	32,430	11,325
Linehaul Truck	(18,000)	(18,000)	(6,075)
Pick-up/Delivery Truck	(19,500)	(11,700)	(3,900)
Staff Use	(4,050)	(2,730)	(1,350)
Admin.Bldg	1,500	1,000	600
Office Bldg	6,000	4,200	1,800
Warehouse	5,000	3,000	2,000
Lodging	1,120	800	640
Service Station	4,000	2,800	2,000
Repair Shop	(1,600)	(800)	(800)
Petrol Station	(1,600)	(1,200)	(800)
CarWash Station	(800)	(800)	(400)
Green Belt	10,150	9,200	5,850
Road & Others	114,080	102,770	40,510
<b>Total</b>	<b>262,150</b> (164 Rai)	<b>211,325</b> (132 Rai)	<b>88,350</b> (55 Rai)
Land Acquisition Area	283,050 m <sup>2</sup> (177 Rai)	230,325 m <sup>2</sup> (144 Rai)	100,650 m <sup>2</sup> (63 Rai)

- (Note)
- Figures related to the building indicate the floor area.
  - Road area does not include that of access roads.
  - Construction requires the right of way with width of 10 meters around the terminal site.



Table IG 2.7 Construction Cost

(Unit 1,000 Baht)			
	Case 1 (500 Berth)	Case 2-1 (350 Berth)	Case 2-2 (50 Berth)
1. Earthworks	9,437	7,608	3,180
2. Drainage	13,273	10,080	4,081
3. Foundations	66,149	45,880	23,556
4. Paving	73,371	61,024	23,905
5. Platform	153,298	107,309	45,989
6. Building	81,000	55,800	27,000
7. Warehouse & Lodging	25,900	16,500	11,800
8. Facilities	16,022	14,014	7,507
9. Green Belt and Fence	9,206	8,339	5,279
10. Intersection	3,395	3,395	3,041
11. <u>Miscellaneous</u>	<u>2,000</u>	<u>2,000</u>	<u>1,000</u>
Sub total	453,052	331,957	156,339
12. Supervision	23,381	16,598	7,817
13. <u>Value Added Tax</u>	<u>36,522</u>	<u>26,723</u>	<u>12,585</u>
Total	558,260	408,474	192,375

1. The cost estimate is based on the 1992 price, and is not adjusted by inflation factors.
2. The item "Facilities" are included such as repair shop, petrol station, (as wash, truck scale, sewerage treatment plant, substation and water reservoir.
3. The terminal is assumed to be very close to the aim road so that the construction cost for the approach is not included.
4. The cost of "Intersection" is estimated at level crossing method after compared with flyover method.



Table 2.8 Operation and Maintenance Cost (Case 2-1)

(Unit: 1,000 Baht)

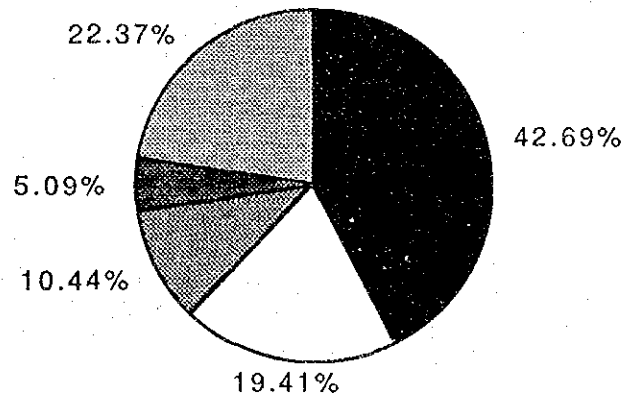
Item	Basis for Estimation	1st 1996	2nd 1997	3rd 1998	4th 1999	5th 2000	6th 2001	7th 2002	8th 2003	9th 2004	10th 2005
<b>OPERATION COST</b>											
Water supply General water	307 m <sup>3</sup> /D x 25D x 12M = 92,100 m <sup>3</sup> 8 Bt/m <sup>3</sup> x 92,100 m <sup>3</sup> = 736,500 Bt	737	737	737	737	737	737	737	737	737	737
ditto Car washing	70 m <sup>3</sup> /D x 25D x 8M = 14,000 m <sup>3</sup> 8 Bt/m <sup>3</sup> x 14,000 m <sup>3</sup> = 112,000 Bt	112	112	112	112	112	112	112	112	112	112
Sewerage treatment	(736,800 + 112,000) x 20% = 169,760	170	170	170	170	170	170	170	170	170	170
Electric power supply	2,525/kWh/D x 25D x 12M = 757,500 kWh 2 Bt/kWh x 757,500 kWh = 1,515,000 Bt	1,515	1,515	1,515	1,515	1,515	1,515	1,515	1,515	1,515	1,515
Administration cost	Basic salary = 3,420,000 Bt Allowance = 855,000 Bt Overhead = 542,000 Bt = 4,817,000 Bt	4,817	4,617	4,617	4,617	4,617	4,617	4,617	4,617	4,617	4,617
Security cost	90,000 Bt/Person x 10 p. = 900,000 Bt	900	900	900	900	900	900	900	900	900	900
Sub total		8,051	8,051	8,051	8,051	8,051	8,051	8,051	8,051	8,051	8,051
<b>MAINTENANCE COST</b>											
Overlaying	(165,825 + 10,500) x 1/2 = 88,163 m <sup>2</sup> 2008 Bt/m <sup>2</sup> x 88,163 m <sup>2</sup> = 17,633,600 Bt		17,633		17,633		17,633		17,633		17,633
Cleaning/ Sweeping	7 Worker/D x 25D x 12M = 2,100 W 180 Bt/W x 2,100 W = 378,000 Bt	378	378	378	378	378	378	378	378	378	378
Re-Painting	(3,000 + 2,400 + 2,800 + 24,500) x 0.5 m <sup>2</sup> = 16,350 m <sup>2</sup> 260 Bt/m <sup>2</sup> x 16,350 m <sup>2</sup> = 4,251,000 Bt					4,251					4,251
Sub total		378	18,011	378	18,011	4,629	18,011	378	18,011	378	22,252
Grand total OM Cost VAT 7%		9,019 8,429 590	27,885 26,061 1,824	9,019 8,429 590	27,885 26,061 1,824	15,567 12,680 888	27,885 26,061 1,824	9,019 8,429 590	27,885 26,061 1,824	9,019 8,429 590	32,434 30,312 2,122





## E. Economic and Financial Analysis

Figure IG 2.13 Composition of Economic Benefit



Legend:

42.69%:	Saving in Line-haul Truck Operation Cost (Curtailment of Fixed Cost)
19.41%:	Saving in Line-haul Truck Operation Cost (Reduction of Waiting Time)
10.44%:	Saving in Handling Cost
5.09%:	Congestion Relieving Cost (Curtailment of Truck Trips)
22.37%:	Congestion Relieving Cost (Reduction of Trip Length)

1. Saving in operation costs of the 10-wheel line-haul truck and the saving in cargo handling costs were analysed by comparing "without truck terminal" and "with truck terminal" situations.
2. Saving in traffic congestion costs were analysed in a similar manner using marginal social congestion costs.
3. Beside the above-mentioned benefit items, there are uncountable benefits, which are called economic effects, such as stability of goods service, protection of living environment, better utilization of land, urban renewal near the terminal area, and rationalization and systematize of physical distribution.



Table IG 2.9 Result of Cost Benefit Analysis

		IRR (%)	NPV (unit: 1,000 Baht)	B/C
Case 1	(500 berth)	17.39	249,732	1.60
Case 2-1	(350 berth)	15.60	131,409	1.28
Case 2-2	(150 berth)	16.7	36,196	1.30
Case 3	(500 berth in different location)	20.24	316,946	1.54

From the summary of cost and benefit flows for the economic internal rate of return (IRR), the following results were found:

1. Every case shows IRR higher than 12% of opportunity cost of capital, and proves to be feasible.
2. It is better to construct first 350 berths at one site and next 150 berths at a different site (Case 3), than to construct them at the same site in the years 1995 and 2000 (Case 1).
3. This is attributable to the timing of land acquisition of 150 berths, which is planned at five years after the first land acquisition for 350 berths. In other word, Case 1 is enforced to invest excessively to the land that will not generate any economic benefit for five years.
4. From the sensitivity analysis, which applies 20% increase of construction cost and 20% decrease of benefit, the IRR becomes 11.29% as a result. Early construction is expected.



Table IG 2.10 Model Charge of the Public Truck Terminal  
(Unit: Baht/m<sup>2</sup>/months)

Unit Charge of Lease Contract	1992	1995	(1996)	2000
1. Berth	49	54	61	77
2. Parking	27	30	34	43
3. Administration Building				
(a) Meeting Room	80	87	98	124
(b) Training Room	80	87	98	124
(c) Canteen	77	84	95	120
(d) Rest Room *1	99	108	122	155
4. Office	78	85	96	122
5. Warehouse	41	45	51	65
6. Lodging	97	106	92	117
7. Service Station				
(a) Gas Station *2	63,846	69,766	78,522	99,469
(b) Repair Shop *2	63,846	69,766	78,522	99,469
(c) Car Washing Shop				

(Note): \*1 Average of room areas is 13 sq. meter per room.  
\*2 Unit of this charge is set per whole area of one factory.

- Unit charge of the terminal berth (157.5 m<sup>2</sup>) is within a range that make the total revenue equivalent to that total economic benefit, and the level that makes the truck company's revenue equal to zero.

$$134 \text{ baht/m}^2 > \text{unit charge} > 236 \text{ baht/m}^2$$

- Revision of charge is necessary. Charge escalation rate will be set between 3 ~ 6% with 5 years interval.
- Three percent escalation rate is applied in the above table.



Table IG 2.11 Revenue Accruing to the Truck Terminal (Case 2)

(Unit: 1,000 Baht/year)

Items	1995	(1996)	2000
1. Berth	32,414	35,721	40,352
2. Parking	10,507	11,675	13,231
3. Administration Building			
(a) Meeting Room	154	167	188
(b) Training Room	96	104	118
(c) Canteen	462	504	570
(d) Rest Room	428	467	527
4. Office	7,862	8,568	9,677
5. Warehouse	1,476	1,620	1,836
6. Lodging	1,341	1,465	1,272
7. Service Station			
(a) Gas Station	766	837	942
(b) Repair Shop	766	837	942
(c) Car Washing Shop	0	0	0
Total	56,272	61,966	69,655

1. Revenue is obtained by multiplying unit charge with each facility area.
2. About 58% of revenue comes from lease of berth, and 19% come from the usage of parking facility.





Table 2.12 Result of Revenue and Expenditure Analysis  
(Internal financial Rate of Return in Case 1)

Conditions	Case 1	Case 2-1	Case 2-2
Cost E Charge 2 Gearing Ratio 10:90	10.26	14.67	18.11

Conditions:

- a. Cost E ( with the Government supports as described 2. below)
  - b. Charge 2 (Berth charge ; 60 Baht/m<sup>2</sup>/month)
  - c. Gearing Ratio 10:90 (Equity : Loan)
1. With the government's support, the project Case 2-1 proves its financial feasibility of 14.67% of financial internal rate of return (FIRR). Case 2-2 can guarantee the highest FIRR of 28.11% if Case 2-1 is implemented prior to Case 2-2. Without the government support, financial feasibility indicators cannot reach the minimum level of project justification. Necessary government support are as follows;
    - Land provision by the government
    - Capital participation of the government
    - Provision of infrastructure, and
    - Provision of terminal facilities.
  2. This public truck terminal project cannot be feasible without government's supports. On the contrary, with the government's supports on the land acquisition, capital participation, construction of infrastructure and terminal facilities, the project turns out to be feasible. This provides the rationale for the government to support this semi-public project by its nature.



## F. Implementation Enforcement

Table 2.13 Fund Raising Plan

### Project Cost

Item	(Unit : Million Baht)		
	First Stage (Case 2-1)	Second Stage (Case 2-2)	Total
Preparatory Works	32.2	15.6	48.8
Construction Works	332.0	156.3	488.3
Supervision	16.6	7.8	24.4
Others	26.7	12.6	39.3
<b>Total</b>	<b>408.5</b>	<b>192.4</b>	<b>600.9</b>

\* Excluding land price

### Annual Investment Plan

	(Unit : Million Baht)									
	1992 1st	1993 2nd	1994 3rd	1995 4th	1996 5th	1997 6th	1998 7th	1999 8th	2000 9th	
1st Stage	5.9	35.3	299.2	68.0	-	-	-	-	-	
2nd Stage	-	-	-	-	-	-	16.7	93.8	81.9	
<b>Total</b>	<b>5.9</b>	<b>35.3</b>	<b>299.2</b>	<b>68.0</b>	<b>-</b>	<b>-</b>	<b>16.7</b>	<b>93.8</b>	<b>81.9</b>	

### Fund Raising Plan

Item	Amount	(Unit : Million Baht)
		Remarks
1. Capital	48.2	
- Government	23.6	49% of total capital
- Private	24.6	51% of total capital
2. Government Support	118.5	
3. Loan	434.2	
<b>Total</b>	<b>600.9</b>	

\* Excluding land price

1. Sixty-eight percent of the total cost is invested in the first stage
2. The project cost does not include the land acquisition cost which is estimated at 673 million baht for the first stage and 302 million baht for the second stage, because land will be leased.
3. Disbursement amount at the third year occupies 50% of the total investment, followed by 16% for the 8 year.
4. This study proposes three sources share the fund raising burden.



Table IG 2.14 Justification for Government Participation

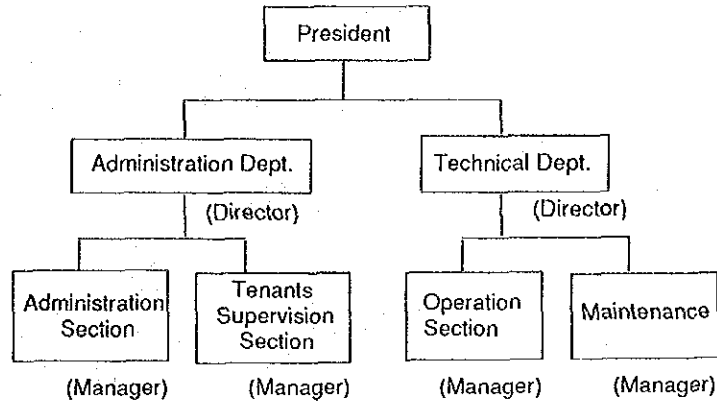
	(Cosigner) Shippers	Trucking Companies	Citizens near the Terminal	Citizens in General	Administration
1. Transportation Cost Saving	⊙	⊙	○	○	○
2. Decrease in Traffic Volume	○	○	—	⊙	○
3. Stability of Goods Supply	⊙	—	⊙	⊙	○
4. Better Utilization of Land	—	—	—	—	○
5. Protection of Living Environment	—	—	○△	○	○
6. Urban Renewal near the Terminal Area	—	—	⊙	○	○
7. Increase of Public Services	—	—	⊙	—	—

Direct Benefit: ⊙  
 Indirect Benefit: ○  
 Minus Benefit: △

1. There are many effects accrue to public besides to cracking companies.
2. This proves the fact that the government should participate in the project.



Figure IG 2.14 Organization of Truck Terminal Company

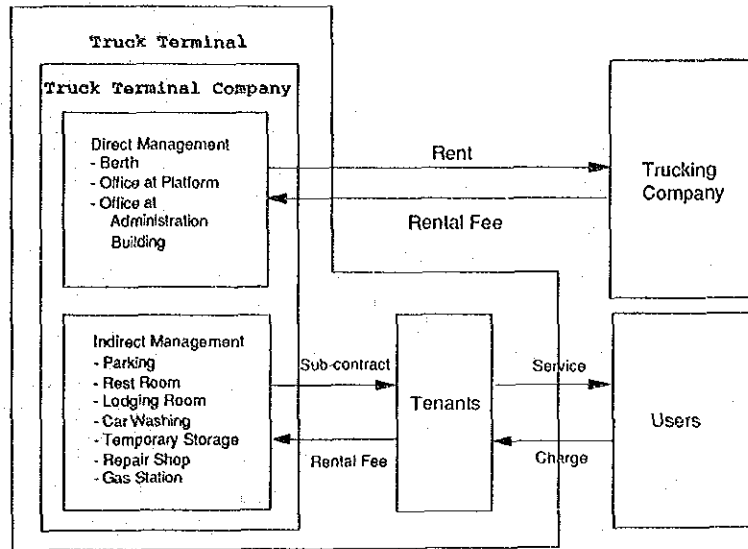


1. The truck terminal company concentrates to manage the truck terminal operation and management of company, and to supervise tenants. Above chart is recommendable.
2. For an effective management, number of staff should be reduced as much as possible.
3. Optimum number will be 20 for 500 berths, 15 for 350 berths, and 10 for 150 berths.





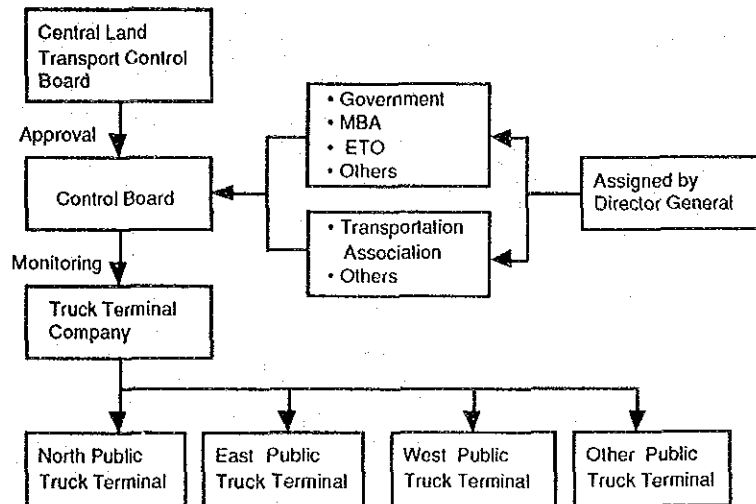
Figure IG 2.15 Structure of Facility Charges



1. The basic service had better be provided by the truck terminal company and the fringe services, which usually needs specific know-how and techniques, should be provided by the sub-contract tenants.



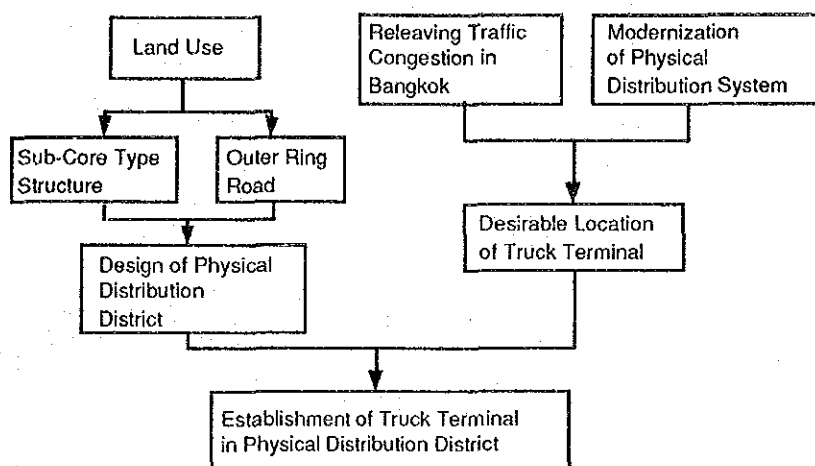
Figure IG 2.16 Proposed Administrative Organization



1. Need to establish new official control board to advise the following policy matters:
  - a) Future planning aspect (expansion or others)
  - b) Policy coordination among authorities such as traffic police and others.
  - c) Reviewing the management matters such as revise of charge
  
2. Its key member should include:
  - a) Government : staff of MOTC and DLT
  - b) BMA : planning staff and others
  - c) ETO : operation and management staff



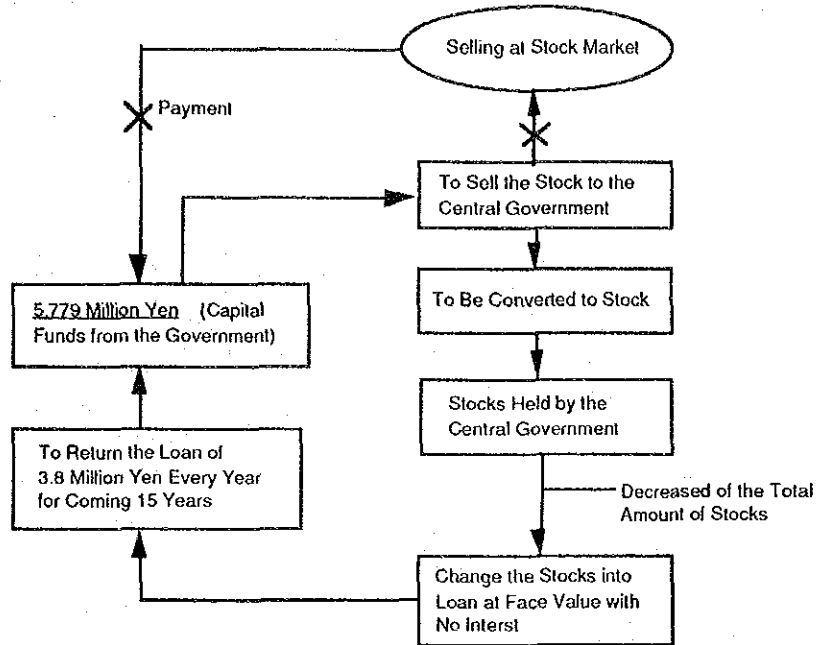
Figure IG 2.17 Relationship between Truck Terminal & Physical Distribution District



1. In implementing the truck terminal project, all other investment plan should be prepared in a frame of town planning or land use plan.
2. To complete the outer ring road construction as soon as possible, and
3. To allocate all the physical distribution facilities alongside this outer ring road which now spread in the CBD of Bangkok.
4. To designate an integrated physical distribution district,
5. To make a truck terminal plan inside this district, and
6. To confine the plan of other facilities unfavorable to the physical distribution activities.



Figure IG 2.18 Procedures to Return Capital Funds for Privatization

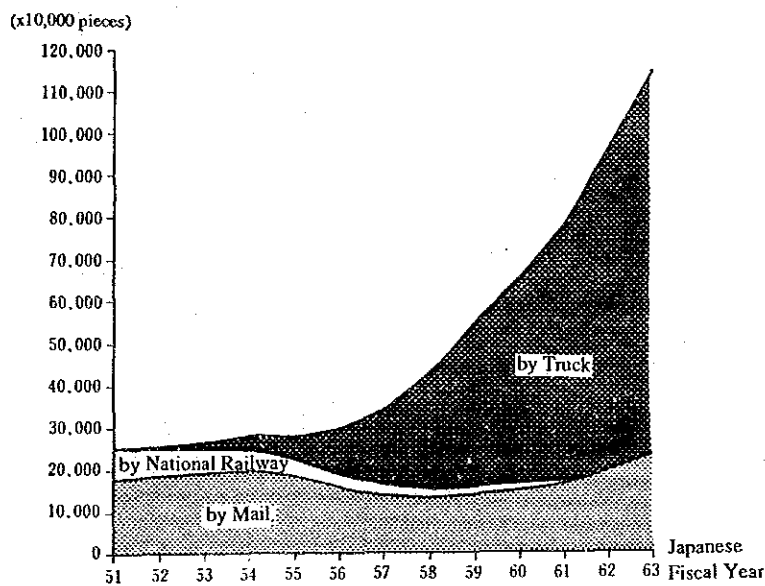
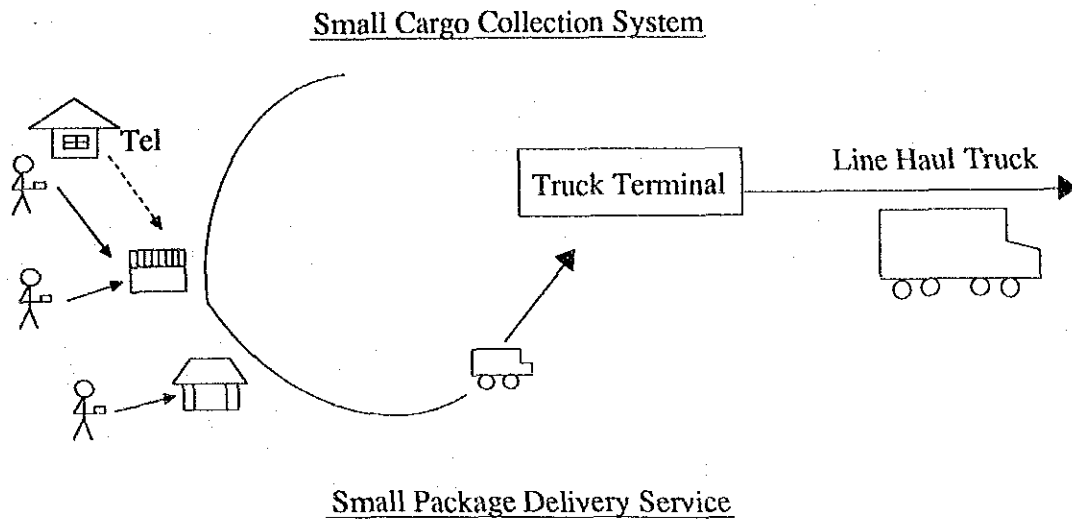


1. This Tokyo Public Truck Terminal Corporation was privatized completely in 1985, 20 years after its foundation.
2. Capital of the Central Government was transferred to the privatized company, "Japan Truck Terminal Company".
3. This process of transition can be applied to the Bangkok truck terminal.





Figure IG 2.19 Accessibility of Truck Terminal Utilization



1. This is a revolution of truck transport by systematize of small package system in Japan.
2. The small package delivery service is targeted for general consumer.
3. They provide a next day door-to-door delivery service to most of the areas in Japan.
4. Most of the users bring the cargo to the cargo receiving depots.
5. There are over 60,000 cargo handling agents which makes these depots accessible by everybody by foot.
6. Many liquor store, franchised grocery stores, laundry shops and rice sales stores are incorporated into the network of cargo handling agents.





JICA

