6. BRIEF REPORT ON MASTER PLAN OF HANOI'S TRANSPORTASION TO 2010

MINISTRY OF TRANSPORT

BRIEF REPORT ON MASTER PLAN OF HANOI'S TRANSPORTATION TO 2010

HANOI 2-1994

TABLE OF CONTENTS

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1. STATUS OF TRANSPORT IN HANOI CITY

1.1 Transport Infrastructure of Hanoi Capital

- The road network of Hanoi has a total length of 230 km, with total area of more than 2 million m², including centripetal lines, ring roads and local roads. However, there remain several irrationalities, namely:
  * Centripetal lines and ring roads have not yet been expanded and completed. The scale and specifications are not unanimous transit transport, especially inter-regional goods transport passes through the center of the city, causing pollution, noise and congestion.
  * Road system is not evenly distributed, except for the old inner city which has relatively rationally distributed road network including main thoroughfare and local roads, in the remaining areas, there has not been as complete network for new residential quarters. Local roads are mainly for pedestrians and bicycle riders. There has not been a proper infrastructure for the setting up of a public passenger transport to residential areas. Many intra-city lines have not been expanded as required. On the other hand, there are level crossings that cause chronicle congestion.

- In Hanoi, there are two railway lines. The line that passes the city center can be a good service. But it runs at the same level with roads, through center areas, causing congestion to the traffic flow from east to west. The ring railway line in the west in necessity has not been completed. But the main thing is that it is too far from residential area. From Hai Phong to Hanoi, it is 56.5 km longer than the former line. From Thai Nguyen to Hanoi; 43 km, from Lao Cai; 34.5 km, causing a lot of obstacles to transportation. That is why they have not been accepted by people in the city and adjacent provinces. For many years, they have been operated under provisional management. Both railway lines are single lines, with backward signal techniques, unclassified tracks, and limited throughput.

- The Red river crosses the city. The Tulien readjustment embankment has been effective over the past years in maintaining stable currents for Hanoi Port. However, berths and yards of port has not been completed, cargo throughput is low. Hanoi Port has not yet been a major transport link of the city. On the other hand, after Tulien embankment's construction, it is necessary to complete the groups of embankments of Phu Gia and Thachcau and Tam Sa in the northern bank of the river to maintain lasting stable currents for the river in the Hanoi area.

- Noi Bai International Airport is the direct gateway of the city to the outside world. However, it throughput is limited. The airport terminal is capable of receiving only one million passengers/year, thus has not met demands.

In short, transport infrastructure of Hanoi is backward, and small and poor in both quantity and quality, unequally distributed, thus it has not created a complete and chain network. Land area for transport infrastructure of the city does not exceed 8% of the total city's area while other regional countries earmarked from 23-25% of total land area or more to transport projects. Per capita land area for transportation in Hanoi is 3.4m2 as against 8-30m2 in the world.

1.2 Management and organization of public transport

This is a subjective weak point. Public transportation share has decreased to a very low rate. In Reality, it accounts for only 2-3% of public traffic volume of the city. Meanwhile, personal means of transport develop explosively out of the State control. The illegal occupation and use of pavements have seriously affected traffic order and urban civilization of Hanoi. If these issues are not settled, they will result in unprecedented serious consequences.

2. FUNDAMENTAL OBJECTIVES OF THE MASTER PLAN

Following are objectives of the Master Plan:

- The overall objectives is to have guidelines, and timely resolute measures to overcome to current state of lagging behind of Hanoi on transportation as compared with other regional countries to become a civilized and modern center and transport link to be worthy of its position as the capital city of the country and to catch up with capital of regional countries.

- The concrete objective is to ensure high-rate, convenient, easily-accessible traffic flow for inner city, outlying areas leading to satellite cities and adjacent areas to meet all demands for socio-economic development, security, national defense and to play well its role as the center of the region.

- Based on the Master Plan of the city approved by the Government, the Master Plan on Transportation will be made to concretize and complete the identification of trends on space development in the whole city, and at the same time to inherit and utilize existing technical and material basis, to step by step renovate and develop a harmonized and complete transportation infrastructure meeting specifications, quality requirements and of international characteristics.

- In the rehabilitation and construction of new infrastructure projects as well as in organization and management of transport projects of the city, the existing landscape of Hanoi must be preserved and a habit of movement and transport for the Hanoians must be shaped to make the city worthy of its tradition and to create a distinctive character of Hanoi.

3. ORIENTATIONS OF TRANSPORT DEVELOPMENT OF HANOI

3.1 Planning and development of transport infrastructure is the most important part which should be carried out in advance to arrange and shape urban space, city's landscape and structure, creating physical basis of vital importance to the living and working style of Hanoi.
However, the planning and development of transport infrastructure should be made on the basis of orientations and organizations of transport system. In other words, a planned transport model and technology dictates the preparation and investment in construction of corresponding and appropriate infrastructure

3.2 Prompted by criteria and instructions of academic characteristics on organization of public transportation of big cities observed by countries in the world, as well as consulting experience of other developed cities and stemming from the fundamental

nature of the Socialist State to show concern to the community interest, we should manifest responsibility and will in management and orientation on the use of public transport system as the central task. It is necessary to be determined in control the development and use of individual means of transport. If this trend is not controlled, and maximally limited, the city transportation will become more chaotic and congested. Law and order, and civilization can not be ensure, environment will degrade, and urban landscape will be damaged. *It is necessary to point out that the spontaneous and uncontrolled use of individual means of transport which is like a fever will push Hanoi into a situation more dangerous and serious than in any other cities in the region.* That cities also meet with difficulties in terms of public transportation. However in the process of development, they did not be in the situation of free utilization of individual means of transport like in Hanoi. As Mr. Hans Orn, a well known expert on city public transportation of Sweden put it: "If decisive actions can not be taken at the initial stage, within dozens of years, Hanoi will fall into a difficult situation, when wrong calculation can only be rectified by high cost and substantial sacrifice".

3.3 Persistent policies must be implemented to assist and facilitate infrastructure and public transport development such as priority and investment encouragement policies towards domestic and foreign economic sectors, subsidy and support policies towards lines or means of public transport which can not be able to balance their revenue and expenditure, The State assistance will be compensated by ensured economic and social benefit of urban communities and especially no fund will have to be spent on land acquisition. *The investment on infrastructure is more expensive than investment for encouragement of public transport development. If develop infrastructure without due concern and clear-sighted decisive policies and responsibility on public transportation, capital investment will not be cost effective and the problems will not be solved. That is why, there must be complete investment measures to develop both infrastructure and public transport.*

3.4 The construction of infrastructure projects, selection and organization of means of transport including the selection of types, quality of means and means of transport should be up to required specifications and quality and must apply international specification which do not only meet immediate demands by can satisfy demands for long-term development of the city.

4. CONCRETE TARGETS TO BE ACHIEVED AND CONTROLLED

- Technical and material basis and organization of transportation should meet demands of the city with a projected population of 2.4 million by 2010, of which 1.7 million in the inner city. Besides, it has to serve million of passengers transiting the city.

- The average length of roads (excluding roads in residential areas) per territory unit is as follows: in old areas like Hoan Kiem and Ba Dinh, the current rate will be maintained (more or less 10 km/km^2), in other areas: 4-5 km/km^2.

- Average distance from people's houses to bus stops and terminals of public transport is from 500-600 m in the inner city and 1 km in residential areas in the suburbs.

- Land areas from transportation must reach 25% of the total city areas, 19% for roads and structure, and 6% for parking, garages and terminals. (Excluding lands area for roads leading to houses in housing areas.)

- 60-70% of traffic demands are serviced by public transport means.

- Traffic speed in the inner city must reach 20-25 km/h.

- Means of transport structure must be rational as follows:
  1 bus (of 90-120 seats) for 1,000 people, or 100 seats of public transportation means for 1,000 people.

- Within 20 years, the number of cars should be restricted to 50 cars over 1,000 people.

5. DEMANDS FORECAST AND SELECTION OF MEANS OF TRANSPORT IN THE CITY

Based on results of field survey, and calculation according to different methods (Detroit, Fratar, and average traffic coefficient methods), a diagram of passenger flow for different development stages of the city has been drawn up (See diagram 4, report on planning of passenger public transport network of Hanoi). Passenger flow tend to take the city center as focal point. The trend of distribution and development of passenger flows are totally appropriate and bespeaks the space and development trend of the city in the immediate future and future. This is the basis for planning of infrastructure development and selection of means of transport to meet the immediate demands and long-term development.

From statistics and passenger flow forecast, it is clear that in some routes which in 1993 were already overloaded or threatened to be overloaded, if only non-motorized vehicles or different types of cars (including buses) are used. They are Cau Gia - Cau Dien route with 5,705 passengers/peak hour, Nguyen Luong Bang - Nga Tu So - Ha Dong with 8,500-9,250 passengers/peak hour, Long Bien - Gia Lam with 4,967 passengers/peak hour, Giai Phong - Nga Tu Vong, with 6,530 passengers/peak hour. This will become more serious in coming years as the passenger volumes will increase at the rate of 3.5% annually from now to 2000, and 2.3% from 2000-2010. This is a problem which should be settled correctly when preparing the Master Plan for transportation in Hanoi.

The flow of passengers is like the flow of water after a heavy rain. It can not be allowed to ran wantonly but be led into a drainage system suitably built with different size pipe depending on the flow volume. Only by so doing, can we avoid flooding, inundation and congestion.

Similarly, the correct selection of transport process must be :

One : To resolutely develop public transport as the main means of transport of the people in the city (step by step reach the target of 70% of traffic demands of the Hanoi population. Or 1,000 population should have access to 100 seats in public transport means). It is cars develop rampantly results in great difficulties because roads have to be expanded times and again. Though this is done, it is difficult to avoid traffic jam which happens everywhere in the world.

Two : While bus is the major means of transport of the city, it must be aware that if after new lines are opened and traffic flow is diverted, the traffic volume still exceeds the capacity of bus, it is necessary to use large capacity means of transport that is the MASS-RAPID-TRANSIT-SYSTEM. Due to several economic and technical reasons, in the coming dozens of year, it is better for Hanoi to have elevated

railway system along lines of large passenger volume. So, transport infrastructure types of Hanoi will basically include:

- Road system
- Elevated railway lines and metro railway system
- National railway lines
- Inland waterways
- International and domestic airports

The above-said infrastructure will be combined into a close and complementary system, creating a comprehensive effectiveness meeting all demands of transportation of the city. That system will be constructed into a more modern and complete system.

6. ROAD SYSTEM

The road infrastructure of Hanoi include:

Mobile transport system includes expressways, roads of Grade I and II, inter-regional roads and roads in residential areas.

Fixed transport system include inter-regional bus stations, bus stops in center, residential, and parking areas especially parking for increasing number of cars.

It is necessary to remind that one of the primary objectives of setting up a road network to meet the demand for organization and operation of public bus for the whole city. The identification of scale and specifications of expressways, roads Grade I and II is based on specification 20 TCN-104-83. However, these specifications are mainly applied for newly build roads in the expanding area. In the centre and ancient quarter of Hanoi, the main task is to improve and rehabilitate within the permissible capacity. The width of inter-regional and residential area roads as compared with 20 TCN-104-83 should be reduced to be suitable to the land area and real situation.

6.1 Arterial Roads

Expressway Ring Road :

Starting from Noi Bai Airport, passing through Thang Long - Nghia Do - Dich Vong - Yen Hoa - Thuong Dinh - Phap Van - Thanh Tri - Vinh Tuy. After Thanh Tri Bridge is built, it can connect with Sai Dong (meeting Highway No.5) or continue passing through Duong Bridge to Yen Vien (meeting Highway No.1 to the north).

Besides that express ring road, when Highway 18 is upgraded into expressway will connect from Bac Ninh to Noi Bai, forming the second expressway in Hanoi.

Standard width of expressways according to 20 TCN-104083 is 68 meters.

Grade I road arteries :

1. Cau Duong - Chuong Duong - Tran Khanh Du - Tran Quang Khai - Nguyen Khoai
2. South of Thang Long Bridge - Buoi - Hung Vuong
3. Cau Dien - Cau Giay - Cua Nam
4. Ha Dong - Nga Tu So - Nguyen Luong Bang - Tong Duc Thang - Hung Vuong
5. Phap Van - Giai Phong - Le Duan - Cua Nam

6. Ring Road 1 : Cau Giay - O Cho Dua - La Thanh - Dai Co Viet - Tran Khat Chan - O Dong Mac - Vinh Tuy
7. Ring Road 2 : Nhat Tan - Nghia Do - Cau Giay - Nga Tu So - Truong Chinh - Dai La - Minh Khai - Vinh Tuy

The standard width of Grade I roads at newly built sections according to 20 TCN-104-83 is 60 meters.

Grade II road arteries :

1. Due Giang - Gia Lam - Sai Dong - Ngoc Tri village
2. Phu Thuong - Nghia Do - Dich Vong - Nhan Chinh - Thuong Dinh - Giap Bat - Lang Tam - Tan Mai - Mai Dong - Thanh Tri village
3. Buoi - Cau Giay - Women's School - Ap Thai Ha - Chua Boe - Kim Lien - Dong Tam - Bach Khoa - Thanh Nhan - Lac Trung
4. Cat Linh - Quoc Tu Giam - Tran Hung Dao
5. Phu Dien station - Co Nhue Nghia Do - Buoi
6. Lang Ho (Thuy Khe) - Doi Can - Ngoc Khanh - Lang Tung - Trung Kinh - Yen Hoa
7. Tam Da gradient - Ngoc Ha - Doi Can - Kim Ma - Cat Lin Giang Vo junction - Lang Ha - Nhan Chinh - Thanh Xuan - Ha Dong
8. Tran Qyu Cap - Kham Thien - Kim Lien - Ton That Tung - Khuong Trung - Tan Trieu - Yen Xa - Ha Cau village
9. Restore-sword lake - Hang Bai - Hue street (one-way road of Ba Trieu) - Bach Mai - Mo - Truong Dinh - Duoi Ca
10. Municipal theater - Phan Chu Trinh - Lo Duc - O Dong Mac - Mai Dong - Tam Trinh - Yen So village - Khuyen Luong
11. Long Bien - Yen Phu - An Duong - Tu Lien - Nhat Tan - south of Thang Long bridge

The standard width of Grade II roads in the newly built sections according to 20 TCN-104-83 is 50.5 meters.

Inter-regional road :

1. Ring Road around West Lake - Nhat Tan - Nghi Tam - Yen Phu - Thanh Nien - Thuy Khe - Buoi - Lac Long Quan
2. Phu Dien - Truong Nguyen ai Quoc - Dich Vong
3. South Than Long - Co Nhue - Xuan La
4. Mai Dich - An Phu - Song To - Quan Ngua - Dai Yen - Ngoc Ha - Bao Tang Ho Chi Minh - Hong Phong Street
5. Dai Mo - Me Tri - Dinh Thon - Lang Cot - Chua Lang
6. Cat Linh - La Thanh - Road along Hao Nam Canal - Yen Lang - Nhan Chinh - Thanh Xuan - Phung Khoang
7. Khuong Thuong - Khuong Ha - Ha Dinh - Trieu Khuc - Van Quan
8. Road along To Lich river that start from Thuong Dinh Street - Kim Giang - Cau Buou
9. Route 70 from Van Dien - Van Quan
10. Thanh Nhan - Quynh Loi - Tan Mai - Tuong Mai
11. Road along Set River starts from Dai Co Viet Street - Bach Khoa - Dai La - Truong Dinh
12. Route Bach Dang : from Phucxa - Nam Chuong Duong - Ham tu Quan - Pha Den - Vinh Tuy
13. Yen So - Khuyen Luong
14. Cau Duong - Gia Thuong - ai Mo - Lam Du - Thach Ban
15. Route from Gia Lam Station to Nguyen van Cu Street
16. Hang Khay - Trang Thi

The width of these roads is 30 m in the newly built sections

Residential area roads has a width of 16.6 meters and will be identify when the plan is made or when the residential areas will be readjusted or designed .

6.2 Intersections

- There are two type of intersections :
  *At-grade intersections
  *Grade-separated intersections

- There are two type of at-grade intersections :
  *Intersections using signals
  *Roundabout

- Other intersections : including fly-over and roundabout .

Interchanges are used for expressways and some on Grade I roads to ensure smooth interchange among Grade I arteries, especially in the city centres.

At-grade intersections are used for Grade I and II roads

Other intersections are used for level crossings .

The cities has 73 intersections which need to be constructed and improved including : 38 at-grade and other type of intersections, and 35 level crossings (see pages 30, 31, 32 in the report on road transport system - Hanoi)

To ensure transportation through intersections in the whole city, it is urgent to install a signal control system with a traffic control centre. Through this centrally controlled system, step by step separate and guide traffic flow, prevent and disperse traffic jam.

6.3 Bus Terminal and Parking Areas

- There are :
  *Long Bien and Gia Lam Bus Terminal in the northeast of Hanoi,
  *Cau Giay Terminal in the west (in Chua Ha site),
  *Ha Dong and Ha Dinh Terminals in the southwest, and
  *Giap Bat Terminal in the south.
  Each terminal need an average area of 2 to 3 ha (in the immediate future).

- Workshops and garages for bus maintenance are in Lac Tung, Gia Lam, Mai Dich and Van Dien.
  Each need an area of 2-3 ha

- Following are origin and destinations of bus lines :
  *In the city centres : Phuc Xa , Bac Co and Hang Voi
  *In residential area : a bus terminal for 20,000 population in an area of 2000 m2
  *When elevated railway will be constructed , Hang Co Station will be built into a transit terminal for all means of transport

- Parking areas :

A foreign experts says it is a potential threat of Hanoi. That is why much attention must be paid to and measures must be taken to solve this issue resolutely and rationally. At present, Kim Lien and Kim Ma are identified as central car parks. The principle is : like bus terminal, in a residential area of 20,000 population there must be car park or garage for rent with an area of 10,000 m2. Besides, all hotels, commercial and service centres must have parking areas (either an area next to them or in the underground floors). The areas of the parking lots must correspond to the capacity of those centres. There must be a strict regulation that if parking conditions are not satisfied , no construction permission will be given.

6.4 Data on Road Infrastructure

a. Road Network in the Plan (classified length)

Road Type	No. of Road	Total Length (km)	Newly Constructed (km)	Rehabilitated Length (km)	Length for Readjustment (km)
Expressway	1	28.8	28.8	-	-
Grade 1	7	79.2	20.5	36.4	22.50
Grade 2	11	97.6	70.0	17.00	10.70
Inter-regional	16	100.20	67.1	20.2	12.93
Total	35	305.90	186.40	72.50	46.00

Note : Another 98 new roads surrounding residential areas with a total length of more than 80 km . These roads will be taken into consideration when the Master Plan will be drawn up .

b Investment Estimate

- From 1994 - 1995 :
  *Newly built 39.2 km with estimated investment of 144.5 million US$.
  *Technical infrastructure readjustment :
  13.858 km with investment estimate of 6.6 million US$.
  *Total : 53 km with investment estimate of 151.5 million US$
  (including fund for land acquisition of 99.3 million US$ and 52 million US$ for road construction).

- Period of 1995- 2000 :
  198.5 km of roads will be built and rehabilitated with total estimated investment of 1.3 billion US$: in which 1 billion is for land acquisition and 300 million for road construction).

c. Demand for Land Areas for Roads

- Mobile road traffic needs 15,500,000 m2 or 17.1% of the total land area of the city.

- The fixed road traffic facilities including 214 stations, parking, stops and terminals needs 3,600,000 m2 or 4.3 % of the total area of the city.

7. NATIONAL RAILWAY, ELEVATED RAILWAY AND METRO RAIL

Prompted by demands for public transportation and to bring into its role as the large transport link of the region and the whole country, creating convenient linkage between the city centres with industrial centres, tourist and recreations centres, it is imperative to build a complete

railways for the city including : national railways lines , elevated inner city railways or metro system.

7.1 National Railways Line

The most important demand is to make the national railways network in Hanoi a reliable, mass, rapid system from the city centre to strategic transport corridors, or to transport links or satellite cities. On the other hand, it is necessary to stabilize and balance the transport by railway established over the past decades in the city. If this old railways are to be renovated and rehabilitated, there must be a new and superior railway system to replace them.

The existing ring railways in the periphery of Hanoi is from Yen Vien passing through Dong Anh, Bac Hong, Phu Dien, Ha Dong and Ngoc Hoi stations.

A new line will be constructed form Yen Vien to Pha Lai which will join the railway line to Uong Bi - Cai Lan, linking Hanoi with the new deep water port and the potential tourist centre in the north of the country. When cargo volume through Cai Lan port increases, the rail distance between the southern provinces in the Red River Delta and central Vietnam with Cai Lan port should be reduced. Then consideration should be taken to construct ring railway in the east from Ngoc Hoi through Thanh Tri bridge to Yen Vien. In Thanh Tri in future, there will be bridges for railway and road.

On that ring railway lines, there will be major stations as follows :

- Cargo stations : Yen Vien, Ngoc Hoi and may be Bac Hong and Sai Dong stations.
- Passenger stations : Gia Lam . Cau Dien , Ha Dong and Giap Bat stations.
  (Hanoi station will be dealt with in the next part).

Going along with these stations, there will have maintenance and repair depots for locomotive, rolling stocks, communication and signal and warehouses. (which will be identified in Giap Bat, Ngoc Hoi, Yen Vien and Bac Hong areas.)

7.2 Inner City Railway Lines
(They can be elevated railways or metro rail)

Given the road system of Hanoi, in principle, in those lines which have approximately 6,000 passengers/hour/line, public transportation means such as rail must replace buses and other means to avoid traffic jam.

The objectives of construction of inner city railways are :

One : To create mass, rapid public transport arteries from the city centres to its periphery which there are many residential areas, production and service establishments or to large transport link such as Noi Bai International Airport. These inner city railway lines constitute arteries in the public transport system, attracting and joining with bus public transport to meet traffic demands of public transportation for the city in the immediate as well as long-term future.

Two : The inner city railway network should create a linkage and interchange with the national railways to from rapid transport flow between the capital with the whole region .

This does not only create new capacity on passenger transport in the capital but a new strategy on population distribution and development of the region, reduce pressure caused by population growth due to migration and land demand for housing construction.

In the process of making plan of inner city railways network, several alternatives have been considered and discussed.

Elevated railways alternative in the inner city linking the national railways from Cau Dien and Ha Dong to Cau Giay and Nga Tu So were not selected as they complicate the infrastructure of the city and do not from a direct transport lines for passenger flow from the centre to other directions and vice versa.

Metro solution has the advantages of land saving, and harmless to the existing architecture of Hanoi. However, some points should be taken into consideration :

*First : Construction cost is very expensive as compared with other places due to its geological conditions and the required depth.

Construction cost of elevated railways is commonly 3 times higher that railways on land, and that of underground railways is 4 times higher than elevated railways. Unprecedented force majeure underground will cause complicates and increase construction cost. Initial cost estimate for construction of a km of underground in Hanoi is more or less 115 million US$.

Meanwhile, cost estimate for a km of elevated railways is about 15 million US$ (for two ways).

*Second : Operation cost of underground will also 5% higher than that of elevated railways due to installation of additional elevators and stairs for passengers to go down - 10 times longer than that of the former one, besides other systems of air ventilation and light.

*Third : Hanoi is subject to frequent storms and floods. Monsoon. storms occur, it is difficult to ensure safety to equipment and facilities and avoid filling of underground. It is because of tropical weather that countries in Southeast Asia such as Thai land, Indonesia, Malaysia and the Philippines constructed elevated railways.

*Fourth : Due to complicated construction techniques and lack of investment, the construction of underground in Hanoi can not be done quickly. Meanwhile, traffic congestion and urgent demand for operation of inner city railways can not wait to be solved after 2005

This means that when selecting alternatives for inner city railways for Hanoi, it is necessary to consider economic, technical and time feasibility.

- Most of professionals agree to the alternative of elevated railways because it can satisfy the demand for modernization of urban transport network. It is more economic than the underground and is highly reliable and feasible. Some people are concern that the elevated railways will affect the landscape of Hanoi. This is not well-grounded because the elevated railways of Singapore and Indonesia are spectacular and harmonious with landscape of modern cities.

This alternative is selected to combine and disperse passenger flows form the transit centre of Hang Co to populated areas with service and production establishments in different directions such as Northeast, Gia Lam, Giap Bat, Phap Van in the south, Ha Dong in the southeast, Nghia Do and Phu Dien in the northwest (this line can be extended through Thang Long Bridge to Noi Bai Airport for passengers going from the city centre to the airport and vice versa. This elevated railways can be double lines with meter gauge, with Hang Co station as the centre and link with passengers stations of the national railways of Gia Lam, Giap Bat, Ha Dong and Phu Dien, creating a close linkage between inner city railways and ring railways to ensure public transportation of passenger in the city centre and linkage and interchange with national railways lines to satellites cities of the city.

First of all, the elevated railways is in the public transportation system of the capital. With mixed train operation diagram like those of other countries, the international trains or trans-Vietnam train can run straight to Hang Co Station. This is reasonable. In India, with mixed train operation diagram, 400 pairs of trains can still pass through a section in a day night.

Hang Co station will be designed and rearranged to with a central station for elevated railways. Tran Hung Dao Street will link with Quoc Tu Giam and Cat Linh Streets. The remaining area of the Station will be bus terminal and car park with a total area of 20 ha. Besides, a centre of international service for transportation will be set up. So, Hang Co station will become a large transit centre, a beautiful and imposing architectural complex, typical old dynamism and development of a civilized and modern capital.

- As for metro alternative, the network and line direction are basically the same as those of elevated railways explained above. The remarkable difference between the two is that the metro from Hang Co stations will have distributes to the ancient quarter then runs through the direction of Hue - Bach Mai - Truong Dinh Streets which has high population density.

- Especially, it is necessary to consider an integrated alternative combining elevated and metro railways. In which the elevated railways is the Gia Lam - Hang Co - Giap Bat line. Other lines of metro rail will be maintained. The transit centre is still Hang Co. The basis of this alternative is to overcome the present situation caused by level crossings in the city centres, to move passenger stations to Gia Lam and Giap Bat and still maintain the direct link by railways between adjacent transport links with the city centre, as mentioned above. This is a development trend and the existing tradition and practices of the whole region. The elevated railways linking Gia Lam- Hang Co - Giap Bat should be built urgently into a complete complex. This is the inner city railways. If the mixed train operation mechanism is applied, it is possible to allow trans-Vietnam train from the North and the South to the elevated platforms of Hang Co station .

  Besides, the project can combine the reconstruction of Long Bien Bridge when its lifetime expires. The estimated cost of the whole project is 243.5 million US$ (if underground : 1,173 million US$). *Compared with underground alternative, this alternative is highly economic feasible, with simple technic and existing line directions and land area.* This alternative can be completed quickly.

The arrangement of a mixed inner city railways system can be considered as an option for inner city railways intersections in which there is elevated railways, underground railways to reduced complications of underground project.

Hence, in the immediate future, elevated railways from Gia Lam to Hang Co to Giap Bat will be built (including the renewal of Long Bien Bridge). For the remaining loans,

consideration should be taken to whether they are elevated or underground through the formulation of feasibility studies.

7.3 Data on Railways System in Hanoi

a. National Railways Projects

Items	Volume of Work (km of double tracks)	Cost estimate (million US$)
- Northeast ring railways from Gia Lam to Bac Hong	16.8	25.2
- Southwest ring railways from Bac Hong to Thang Long bridge to Ngoc Hoi station	41.645	41.645
- Southeast ring railways from Ngoc Hoi through Thanh Tri bridge to Yen Vien.	25.6	157.2
- New station construction		
*Giap bat		12.00
*Gia Lam		12.00
*Phu Dien		5.00
*Ngoc Hoi		17.30
*Yen Vien		23.60
*Hac Hong		19.60
*Ohter stations		10.00
- Fly-over Intersections (Tang Mi, Phu Dien, Ngoc Hoi, Sai Dong)		16.00

Total funding for National Railways system is 339.545 million US$ and land area of 559 ha.

b. Inner City Railways Network

Investment Items	Elevated Railways	Underground
- Gia Lam - Giap Bat line		
* Line length (km)	10.9	10.2
* Number of stations	6	9
*Construction cost (million US$)	243.59	1,173.00
*Land area (ha)	27.24	20.90
*Construction duration (year)	5 - 8	15-20
- Hang Co - Cau Giay - Phu Dien line		
*Line length (km) (can be linked to Noi Bai)	11.2	7.9
* Number of stations	7	7
*Construction cost (million US$)	168.00	908.50
*Land area (ha)	12.00	0.700
*Construction duration (year)	5	10 - 20
- Hang Co - Ha Dong line		
*Line length (km)	13.2	10.4
*Number of stations	8	8
*Construction cost (million US$)	198.00	1,196.00
*Land area (ha)	13.00	0.80
*Construction duration (year)	5	10 - 20
- The three lines		
*Line length (km)	35.3	28.5
*Number of stations	21	24
*Construction cost (million US$)	609.50	3,277.50
*Land area	52.24	22.40
*Construction duration (year)	19-20	30 - 50

8. AIRPORT IN HANOI

8.1 Noi Bai International Airport

The location of Noi Bai is very convenient for a large international airport. There is virtually almost no obstacle to the visibility and operation of planes, including the largest planes of international air services. The distance between the airport and the city centre is acceptable so it does not affect environment (noise) to the city population. It is a convergence of roads, expressways and railways. It can become a transport link of most importance of the country.

Forecast of throughput of the airport :

*1995 : 1.5 million passengers and 20,000 tons of cargo with more than 20,000 takes-off and landings/year.
*2000 : 2.4 to 3.5 million passengers and 35,000 tons of cargo with more than 30 landings and takes-off/year.
*2010 : 6-8 million passengers and 80,000 tons of cargo and more than 70,000 takes-off and landings/year.

The airport is capable of expanding with throughput of 20 million passenger/year.

Airport development plan has been studied and considered several times. The accepted alternative is called Alternative 2 (among the 3 alternatives raised).

According to the alternative, the airport includes the runway in the north (the existing runway) and the runway 2 will be extended to the south. It is located close to and part of it will pass through the existing highway 2.

The terminal will be in the middle of the two runways. These two runways are "distant parallel runways". They do not cause interference when under operation, thus ensuring throughput of the airport to more than 20 million passengers/year in the future.

The northern runway is used for civil and military planes. (Similar to those of Bangkok, Thailand and Kuala Lumpur of Malaysia.)

In the immediate future to accommodate B747-400 planes, the existing runway should be extended 600m to the west to achieve a total length of 3,800m before 2000. The second runway will be built after 2005 with the size of 3,200m × 45m.

Land use for Noi Bai airport :

*Existing area : 218.5 ha
*Joint area with air force : 107 ha
*Total area for the airport in 2005-2010 : 815.5 ha

Phased investment and cost estimate for Noi Bai Airport :

- From 1994-2000 : 170.7 million US$ for the following items :
  *Western runway
  *Apron for passenger plane parking, cargo and repair workshop
  *Terminal 1 and yard for car parking and other facilities at the terminal
  *Other flight control facilities

-From 200-2010 : 184.4 million US$ for constructing runway 2 in the south and the remaining complete projects.

Total construction cost is 355 million US$.

8.2 Gia Lam Airport

Gia Lam Airport has a total area of 437.3 ha, including facilities of civil aviation of 93.2 ha, and military 344.1 ha, including runways of 1920m × 45m size. If the turning part is included, the runway is 2,050m long and can accommodate small-size plane such as YAZ40, AN24-26, AT72. In the long run it is better to change in into domestic airport, for short flights and small and private planes.

9. RIVER PORTS IN HANOI

Hanoi has two major river port Pha Den and Khuyen Luong.

Pha Den port covers and area of 20 ha and Khuyen Luong 4 ha. It the group of embankments Phu Gia, Tu Lien and Thach Ban is completely constructed (together with the Tam Sa embankment in the north), the channels to the ports will be stabilize. The draft will less than 2.5 m and the waterways will be accessible by boats all the year round. On that basis, Hanoi's river ports can be built into a transport link of passenger and cargo especially for such commodities like coal and construction materials.

The through put of river ports of Hanoi in 1994 was 1 million tons and 2000, it can reach 2 million tons.

1O PUBLIC TRANSPORT DEVELOPMENT

10.1 Operation of Public Passenger Transport by Bus

a: Objectives and Targets of Public Transportation by Bus :

As seen, the status of Hanoi public transportation is uncontrolled consumption and without orientation of the State.

Restoration and development of public transportation, especially passenger public transportation is in reality a land preparation to bring about the real capacity of the existing and will-be-created infrastructure system. Foreign experts often said due to non-motorized and motorcycle wanton development the capacity of the existing urban road networks has been used up to only 30%. The restoration and development of passenger public transportation is at the same time a situational solution but a long-term strategic task of Hanoi. Delay in this work will result in serious consequences in both infrastructure investment effectiveness and order and civilization of the capital.

The objectives is to build a convincing public transport system which can meet the minimum 60 to 76% of traffic demands of Hanoi.

To achieve this objective, it is necessary to use a combination of means of public transportation and in the immediate future is the passenger public transport network by different types of bus. The inner city railways system will be built to create major passenger transport flows. Besides this major force, there are also taxi for different services.

As said above, due to limited fund and time, from now to 2000, a reliable inner city railways system can not be completed. That is why, the urgent work is to build a network of passenger public transport system by bus.

Experience and lessons drawn out over the past years show that package investment should be made n a reliable, convincing and attractive bus network to the city population, look-warm and slow solution can not achieve result, and sometimes can be counter-productive. This network must meet the following demands :

- Creating a new transport scene for Hanoi, changing rapidly urban transport civilization, contributing to improving social productivity and making the ways of life and style of the Hanoians healthy.

- Quantitatively : meeting the minimum 60 to 70 % of traffic demands (ideally 75-85%), restricting the increase of personal means of transport, and eliminating gradually bicycles and motorcycles.

- Passenger public transport should give wide coverage and be convenient, quick, safe, civilized, polite and reliable in all circumstances.

Fares must correspond to people's income, acceptable by the population who voluntarily give up personal means of transport. At present, spending on fares should not exceed 10% of the minimum income of the Hanoians.

On the basis of the above objectives, following are targets for bus network :

*Average route density 1.5 - 1.8 km/km²
*Route coefficient : 1.5 - 1.6 km/km
*Average distance from door to bus stop : 400 - 500m in the inner city
*Average distance between bus destinations : 400-500m
*Operation duration of bus routes 4 hours to 24 hours (20 - 21 hours a day)
*Bus interval : 8 - 10 minutes
peak hours : 3 - 5 minutes
*Speed : 22 - 26 km/h
*Number of seats on bus : 100 - 120 seats/1,000 population
*Fares at present should be :
Trips under 2 km : 200 dong
Trips from 2-5 km : 500 dong
Trips more than 5 km : 1,000 dong

b. Scale and Investment Volume for Passenger Public Transport by Bus :

Based on quantitative target mentioned above and results of surveys and forecast of passengers flow, a network of bus transport was designed (from now to 2000) as follows :

- Total routes : 63
including 41 major routes on arteries
22 subsidiary routes in distributors, and regional roads
The remaining can be distributed as follows :
*On the east-west directions : 10 routes
*On the north South direction : 12 routes
*On the Northeast - Southwest direction : 20 routes
*On the Southeast -Northwest direction : 21 routes

- 140 roads and streets are accessible to buses accounting for 44% of the total roads and streets of Hanoi.

- bus density :
*In the inner city : 11.2 km/km²
*In the whole city on an average : 8.89 km/km²

- Total length of routes in the network : 800.2 km

- Average length of route : 12.7 km/route

- Number of buses :
*Operating buses : 1,890 buses of different types
*Total buses needed (operating and reserve) .
2,700 buses (if new)
3,150 (if old)
Including : large-size bus : 965 (new)
Medium-size : 1080
Minibus : 655

Investments required for the first period of setting up the public bus service network in the above:
- Investment for repair and expand 73.514 km of roads is estimated 23.5 million US$.

- Investment on vehicles :
  *Alternative 1 : Import of new buses : 155 million US$
  *Alternative 2 : import of chassis , bus frame made in Vietnam : 106 million US$
  *Alternative 3 : temporary use of old bus in 5 - 10 years : 49 million US$.
- Investment on other facilities : 29 origins and destinations of routes, 1,524 stops and 4 maintenance, repair stations in Lac Trung, Van Dien, Gia Lam and Mai Dich : 46 million US$.

Total investment :
*Alternative 1 : 233 million US$
*Alternative 2 : 176 million US$
*Alternative 3 : 118 million US$

c. Accounting Mechanism and Economic Responsibility of Bus Transport Businesses :

The unchanged principle is these businesses must be self-financing and bear all responsibility on their operation. However, only 10% of people's income are used for bus fares (9% at present condition), it is not sufficient for these businesses to cover their operation. The State will invest in building infrastructure such as stations, terminals, stops and destinations. Besides of the bus companies are State enterprises, the State will invest initially to procure vehicles and construct service and maintenance facilities, then the companies will be given capital for operation and preserve.

To encourage and ensure balance of revenue and expenditure for these enterprises, following policies and measures must be taken :

One : exemption of following taxes and fees :
*Registration fee
*Turnover tax
*Capital tax
*License fee
*Transport fee
*Parking fee

Two : For state-enterprises which have been initially invested, they are allowed to keep the depreciation for reinvestment.

The level of reduction or exemption of taxes and fees can be readjusted through auditing of business and operation of the bus transport companies. In case such a company still suffer loss, it is allowed to engage in other businesses to make up for the loss. When it make profit, those businesses of low priority will be cut down and it will become more autonomous and self-financing.

Note : To create health competition, to ensure service quality and socio-economic interest, at least 2 Bus transport companies should be set up.

One can be a joint venture with foreign company in which Vietnam had better contribute not less than 50 %. The State managing office is the Transport and Public Works Service of Hanoi (TUPWS). It is necessary to set up a council to decide bus fares. The Council has the responsibility of defining a scale of bus fares ensuring social interest the company's interest, and acceptable by the people.

d. Some Supporting Measures :

Besides major measures on investment, organization and management, some other measures must also be implemented to ensure the implementation of passenger transport network by bus.

- Prohibition of bicycles and motorcycles on streets and roads where bus service can meet traffic demands.

- Gradual restriction of motorcycles. The first step is to separate traffic lanes. Motorcycles are allowed to operate on some routes. At the same time to increase taxes and fees on motorcycles:
  - *Import taxes
  - *Registration fees
  - *Transport fees
  - *Fee on operation at peak hours
  - *Parking fee
  - *Fee on access to prohibited areas

  Through these measures the use of motorcycles in the inner city will be minimize and eliminated.

- Right from now, it is necessary to restrict the use of personal car. As said above, within 20 years, it is necessary to control the number of cars under 50 cars/1,000 population. It is necessary to increase and set up other kinds of taxes and fees such as "import tax, transport fees and operation fees in restricted areas and in peak hours.

10.2 Reorganization of Taxi Service in the City

Taxi is a kind of passenger public transportation service and should be developed according the following principles :

- Diversifying taxis services, besides comfortable taxi for foreign tourists and businesses, there must be other types of taxi, lambretas which are convenient, cheap fares for ordinary people.

- Taxi is a profitable service and is subject to fierce competition. This service must be rearranged to be a large company for easy management and ensure revenue for the State. By companies can be allowed to opens taxi service to balance it revenue and expenditure.

10.3 Organization of Cargo Transportation in the City

Cargo transportation by large truck in the inner city can only be done at night or not at peak hours. Developing and use of light trucks will ensure aesthetics and do not cause pollution for transport of cargo and food for people's daily consumption.

Cargo transport transit through the city should follow the ring roads. However, traffic density in ring road 2 from Cau Giay - Nga Tu So - Truong Chinh - Dai La - Minh Khai - Vinh Thuy is too high, and often cause congestion. In the immediate future, it is urgent to open the route Phap Van - Thanh Xuan - South of Thang Long Bridge - Noi Bai linking with Highway 2 and 3. On the other hand, to open and improve cargo transport route from Phap Van to Yen So - Khuyen Luong - Chuong Duong bridge linking with Highway 1, creating an absolute flow to cargo from North to South of the city.

Besides organizing and developing the passenger public transportation network, it is necessary to organize inner city cargo public transport companies. They will have small-size trucks from 1 to 2.5 tons with 500-6,000 trucks in the period of 1995-1996 to transport cargo for production and for daily consumption of the capital population. On that basis, cargo bicycles and cyclo as other noisy and unsafe trucks like "cong nong" will be eliminated.

11. THINGS NEED TO BE DONE IMMEDIATELY

11.1 Planning

- The MOT and HPC reach agreement to early promulgate regulations on implementation of the MP on transportation of Hanoi after is approved at to identify priority list of projects fro investment or calling for investment.

- The MOT and HPC give guidance and facilitate TUPWS and other related offices to early define delineation and land areas for road, railways, inner elevated railways, stations, parking areas, garages and land reserve.

This work must be carried out urgently. If the whole network and other transport project can not be carried out at the same time, independent routes or project must be carried out. After each project is completed, it must be made known to people. Focus must be given to projects which have demand for investment for construction and areas which under threat of occupation and dispute. Plan for delineation of transport project must be made for the two years 1994 - 1995.

One important thing that should be enforced is in areas which have been set aside for development of transportation projects and as opening a new route, line or making a terminal and parking places, if the delineation has not been made clear, people should not be permitted to engage in any king of construction activities until a decision has been made. And those who decide to build without permission will be required to take full responsibility for their acting.

Other legal regulation on land acquisition and compensation can be clarifies.

11.2 Priority Projects and Projects Calling for Investment in 1994-1995

Road projects :

*Expressway Noi Bai - Thang Long Bridge - Phap Van
*Grade I routes : South of Thang Long Bridge - Buoi - Hung Vuong
*Open and improve routes : Phap Vn - yen So - Khuyen Luong - Chuong Duong to separate truck traffic from south to north without crossing the city centre, reduce load for route Dai la and Minh Khai which is highly congested.
*Continue to open the route from Lac Long Quan to ring road 1 : Cau Giay , O Cho Dua, La Thanh - Dai Co Viet - Tran Khat Chan - O Dong Mac - Vinh Tuy.
*Clear Grade II routes : Lac Trung - Thanh Nhan - Bach Khoa - Dong Tam - Kim Lien - Chua Boc - Ap Thai Ha - Truong phu nu and route : Lang Ho (Thuy Khe) - Doi can - Ngoc Khanh - Lang Trung - Trung Kinh - Yen Hoa and route Lang Ha - Nhan Chinh - Thanh Xuan.
*Improve and construct intersections : Nga Tu Vong and Nga Tu So

National Railways and Etevated Railways Projects :

*Expand and construct two stations of Giap Bat and Gia Lam to meet the immediate demands as well as future development demands.
*Formulate F/S for investment and calling for investment for inner city elevated railways or metro lines including the use of ODA or apply the form of BOT.

The construction of inner city elevated railways from Gia Lam to Giap Bat including improvement and construction of architectural complex of transportation and service in Hang Co Station can be ranked as a typical and key project, so that Hanoi can have combination of modern, typical and priority project.

Not Bai International Airport Project :

*Construction of parallel runway in the west of the airport, apron, and drainage system of the region.
*Complete the radar system to control long flight and landing.
*Construction of a terminal for the airport.

Inland Waterways Project :

*Complete construction of group of embankment : Phu Gia, Tu Lien, Thach Ban and Tam Sa.
*Improve and upgrade Hanoi port.
*Plan and prepare the construction of Nhat Tan river port

11.3 Restoration and Development of Bus Public Transport

To propose the government to consider the project on passenger public transport system for Hanoi as presented and approve it implementation including the setting up of a joint venture company on bus transportation of Hanoi with foreign countries.

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The last point is to restore public transport order, strengthen and develop transport infrastructure to bring out a new transport scene to the capital. This is a difficult and complex task. It can only be implemented with rear-sighted-timely, urgent and resolute guidelines and decisions. Otherwise, the situation can aggravate and more difficult, and can be out of the State control and regulation resulting in unprecedented consequences. That is why, as mentioned above, this is a task of situation solution significance and of strategic and decisive importance to the healthy development of the city, creating great impact on the socio-economic development of the city.

7. VISTILA 保有地図リスト

OFFER SHEET No. 1 : MAP OF LAOS AND CAMBODIA

No	*DESIGNATION*	*SCALE*	*NOTE*	*PUBL.YEAR*	*UNIT PRICE (CIF-USD)*
1	Topog.Map of Laos	1/100,000	175 sheets	1987	875.00
2	Topog.Map of Laos	1/250,000	28 sheets		140.00
3	Topog.Map of Cambodia	1/50,000	284 sheets		1,420.00
4	Topog.Map of Cambodia	1/100,000	87 sheets		435.00
5	Topog.Map of Cambodia	1/250,000	19 sheets		95.00
6	Administrative Map of Laos	1/1,750,000		1991	5.00
7	City Map of Luangphabang	1/10,000		1990	5.00
8	Administrative Map of Vientiane	1/125,000		1990	5.00
9	Tourist Map of Vientiane	Both sides		1993	8.00
10	Topo.Map of Laos	1/500,000	11 sheets	1987	100.00

OFFER SHEET No. 2 : THEMATIC MAP OF VIETNAM

No	DESIGNATION	SCALE	NOTES	PUBL. YEAR	UNIT PRICE (CIF - USD)
1	Land Use Map	1/1,000,000	6 sheets	1981	50.00
2	Soil Map of the NorthVietnam	1/500,000	6 sheets	1975	50.00
3	Communication Map of Indochina	1/500,000	18 sheets	1986	90.00
4	Geological Map of Vietnam	1/1,500,000		1986	60.00
5	Geological Map of Vietnam Laos and Cambodia	1/1,000,000	6 sheets	1988	180.00
6	Agri-ecological Map of the Mekong Delta	1/250,000	6 sheets	1988	60.00
7	Soil Map of the Mekong Delta	1/250,000	6 sheets	1990	60.00
8	Geological Map of Vietnam	1/500,000	28 sheets	1989	250.00
9	Structural and Formational Map of Vietnam	1/1,500,000	3 sheets	1992	120.00
10	Atlas Vietnam Population		100 pages	1991	100.00
11	Vietnam Administrative Map	1/2,500,000		1993	10.00
12	Vietnam Administrative Map	1/1,000,00	6 sheets	1991	30.00
13	Vietnam Physical Map	1/1,500,000	4 sheets	1989	20.00
14	Vietnam Road Map	1/1,000,000	4 sheets	1989	20.00
15	Vietnam Road Map	1/2,000,000		1990	10.00
16	Vietnam Physical Map	1/2,000,000		1989	10.00
17	Small Atlas of Vietnam			1989	10.00
18	Atlas of Laichau Province			1975	50.00
19	Agricultural Atlas of Thaibinh Province			1975	50.00
20	Tourist Map of Hanoi		Both sides	1991	7.00
21	Tourist Map of Vietnam and Hochiminh City		Both sides	1992	10.00
22	Tourist Map of Vietnam and Vungtau Province		Both sides	1990	10.00
23	Tourist Map of Vietnam and some major tourist Centres		Both sides	1992	10.00
24	Tourist Map of Nhatrang			1990	7.00
25	Administrative Map of Haiphong	1/50,000	6 sheets	1986	30.00
26	Tourist Map of Haiphong			1987	7.00
27	Economical Map of Haiphong	1/125,000		1989	7.00
28	Tourist Map of Hue			1992	7.00
29	Tourist Map of Danang			1991	7.00
30	City Map of Vinh			1993	7.00
31	Metalogenic Map of Vietnam	1/1,000,000	4 sheets	1991	120.00
32	Hydro-geological Map of Vietnam	1/500,000	26 sheets		250.00
33	Atlas of Plain of Reeds	1/250,000	26 pages	1990	250.00

OFFER SHEET No. 3 : TOPOGRAPHIC MAP OF VIETNAM

No	DESIGNATION	SCALE	NOTES	PUBL. YEAR	UNIT PRICE (CIF - USD)
1	Topomap of Vietnam	1/1,000,000	12 sheets	1990	60.00
2	Topomap of Vietnam	1/500,000	24 sheets	1970-75	120.00
3	Topomap of Vietnam	1/250,000	40 sheets	1982-83	200.00
4	Topomap of whole Vietnam (published by USA)	1/50,000		1965	5.00/sh.
5	Topomap of Red River and Mekong Delta	1/5,000		1980-90	3.00/sh.
6	Topomap of Hanoi and Ho Chi Minh City	1/2,000		1980-90	3.00/sh.
7	Topomap of Cuulong province	1/100,000	4 sheets	1983	20.00
8	Topomap of Hauglang province	1/100,000	6 sheets	1980	30.00
9	Topomap of Daclac province	1/100,000	12 sheets	1981	60.00
10	Topomap of Bentre province	1/100,000	2 sheets	1983	10.00
11	Topomap of Kienglang province	1/100,000	8 sheets	1983	40.00
12	Topomap of Dongnai province	1/100,000	4 sheets	1983	20.00
13	Topomap of Nghiabinh province	1/100,000	10 sheets	1981	50.00
14	Topomap of Danang province	1/100,000	8 sheets	1981	40.00
15	Topomap of Minhhai province	1/100,000	6 sheets	1980	30.00
16	Topomap of Songbe province	1/100,000	8 sheets	1980	40.00
17	Topomap of Lamdong province	1/100,000	8 sheets	1981	40.00
18	Topomap of Longan province	1/100,000	4 sheets	1980	20.00
19	Topomap of Thuanhai province	1/100,000	12 sheets	1980	60.00
20	Topomap of Gialai-Kontum province	1/100,000	15 sheets	1983	75.00
21	Topomap of Phukhanh province	1/100,000	8 sheets	1981	40.00
22	Topomap of Anglang province	1/100,000	4 sheets	1980	20.00
23	Topomap of Dongthap province	1/100,000	4 sheets	1980	20.00
24	Topomap of Laichau province	1/100,000	15 sheets	1983	75.00
25	Topomap of Hoanglienson province	1/100,000	9 sheets	1983	45.00
26	Topomap of Hatuyen province	1/100,000	8 sheets	1983	40.00
27	Topomap of Caobang province	1/100,000	6 sheets	1982	30.00
28	Topomap of Langson province	1/100,000	6 sheets	1983	30.00
29	Topomap of Bacthai province	1/100,000	4 sheets	1983	20.00
30	Topomap of Quangninh province	1/100,000	6 sheets	1983	30.00
31	Topomap of Vinhphu province	1/100,000	4 sheets	1983	20.00
32	Topomap of Sonla province	1/100,000	12 sheets	1983	60.00
33	Topomap of Hasonbinh province	1/100,000	4 sheets	1983	20.00
34	Topomap of Haihung province	1/100,000	2 sheets	1983	10.00
35	Topomap of Thaibinh province	1/100,000	1 sheet	1983	5.00
36	Topomap of Hanamninh province	1/100,000	4 sheets	1983	20.00
37	Topomap of Thanhhoa province	1/100,000	9 sheets	1983	45.00

PLAIN OF REEDS

(Dong Thap, Long An and Tien Giang Provinces)

- Atlas for Natural conditions and resources
- Published years : 1990
- Size : $715^{mm} * 758^{mm}$
- Scale : 1/250,000
- Language : Vietnamese and English
- Contents :

1. Authors, Collaborator, Redactor, Designer
2. Introduction
3. Short explicative notes of the maps
4. Quaternary deposits of the plain of Reeds
5. Soil characteristics of the plain of Reeds
6. Vegetation of the plain of Reeds
7. The Hydrologic regime in the plain of Reeds
8. Aquatic Resources
9. Assessment of Agricultural potentials of the plain of Reeds
10. Relationship between natural factors
11. political map
12. Geographical map
13. Geological map of quaternary deposits
14. Map of mineral resources
15. Soil map
16. Vegetation map of the plain of Reeds
17. Flooding map
18. Map of Water supply in dry period
19. Map of water quality
20. Map of water resources assessment
21. Map of potentials assessment of aquatic resources
22. Map of land evaluation
23. Agro- ecological system of Anlong- Truong Xuan section, Dong Thap Muoi Provinces
24. Suitability map for rice cultivation
25. Map of Agricultural potentialities
26. Map of land use for the year 1989.

NATIONAL ATLAS OF VIETNAM

will come out in September 1995

INITIATIVE PART

FOREWORD

CONTENT

CHAPTER IV : HYDROGRAPHY

CHAPTER V : PEDOLOGY

CHAPTER VI : FLORA

CHAPTER VII : FAUNA

CHAPTER VIII : THE EAST SEA

CHAPTER IX : DEMOGRAPHY AND ETHNIC POPULATION

CHAPTER X : AGRICULTURE

CHAPTER XI : INDUSTRY

CHAPTER XII : COMMUNICATION - TRANSPORTATION - POST AND TELEGRAPHY - TRADE

CHAPTER XIV : EDUCATION - HEALTH - CARE - CULTURE AND SPORTS