SECTION VII THE 1969 WORK PROGRAM

The primary requirement of industrial planning in 1969 will be not for further "studies" as such but for initiation of projects in a few important areas.

It is recommended, therefore, that a working group be established immediately to undertake a review of the recommendations of this report and establish a program for their implementation. The working party should consist of representatives of the Joint Development Group, IDC, VDB (SOFIDIV), USAID/Industry, private industry, and others deemed appropriate. It is recommended that this group choose a limited number of priority projects, set up a program for further work in each and begin to move into the main stages of implementation. Working support should come from the staffs of each of the organizations represented. The working group itself should serve as a coordinating body to ensure the parallel efforts of all parties and should conduct discussions on changes to be made to the institutional structure. Specific recommendations for these changes should be made at the end of 1969 or earlier.

TABLE 9.8

PROJECTION OF MAJOR MANUFACTURES IN VIETNAM (1978) AND GENERAL STRATEGY FOR DEVELOPMENT

( ) Values in parentheses represent total output if substantial exports are attained. All values figures in millions of U. S. Dollars

		Value Added Million $	Value of Sales Million $	Amount per year, 1000 metric tons	Importance of economies of Scale	Export Potential	Remarks on Development Strategy
20-39	Total Manufacturing	523(593)	1325(1527)				
20	Food Products	71(93)	170(230)				
	Sugar processing and refining (priority)	20(30)	40(60)	270(400)	Critical for exports	Competitive Market	Minimum plant investment 10 million dollars; depends on agricultural program, U.S. quotas and achieving world competitive position.
	Fruit and vegetable canning (priority)	1(12)	3(31)	(45)	Importsnt	Substantial markets	Requires modern processing plents, coordinated agricultural program (Pineapples: 1 million standard cases, mushrooms: 200,000 std. caees.)
	Dairy processing	5	16	70 (processed milk)	Importsnt	Doubtful	Requires a global meat and deiry program, plue efficient plants. One modern plant has already been installed in Vietnam.
	Meat processing (priority)	1(2)	3(6)	200(400)	"	Possible Markets	Requires global plan. Large, modern meat processing and freezing, and byproduct recovery.
	Fats and oils (see chemicals) (priority)	3(6)	9(18)	70	Important	Possible Markets	Requires iarge modern solvent extraction units.
	Starch	1	3	10			
	Rice milling	10	33		Moderate	Possible Markets	
	Flour milling (wheat)	5	20	200	Important	None	Large efficient mills would reduce price to consumers.
	Animal feeds (priority)			130		Limited	Requires careful coordination with agricultural programs.
	Fish processing and salting			30 (minimum)		Limited	(Fish catch estimated at 500,000 T/Y)
	Tea processing						20,000 T/Y of tea processed.
	Miscellaneous, monosodium glutamate, yeast						5,000 T/Y MSG, and 2,000 T/Y yeast.
21	Beverage Industries	45	96			Limited	Natural competitive forces should develop sector.
	Wines, spirits, beer	40				"	Efficient competitive units needed.
	Soft drinks	5				None	(beer production is estimated at 400,000 hectoliter other alcoholic beverages 800,000 hectoliters).

() Values in parentheses represent total output if substantial exports are attained.

All value figures in millions of U. S. Dollars

		Value Added Million $	Value of Sales Million $	Amount per year, 1000 metric tons	Importance of economies of Scale	Export Potential	Remarks on Development Strategy
22	Tobacco Manufactures	50	90			None	Tobacco production estimated at 30,000 T/Y.
	Cigarettes	47	84			None	Cigarettes: 20 billion units per year. Efficient production units will automatically result.
23	Textile Manufactures	50	152				
	Cotton textiles and fabrics	27	94	70(80)	Critical	Limited	Large efficient integrated plants required.
	Spinning (yarn) (priority)	10	31	50	"		(250,000) continuous spindles vs. 100,000 existing).
	Weaving (priority)	13	51		"		200 million meters, 10,000 automatic looms.
	Finishing (priority)	4	12		"		
	Synthetic and Rayon textiles and fabrics	8	24		Important	Limited	
	Spinning			15	"		
	Fabrics (priority)						75 million meters.
	Silk fabrics					Limited	2,000 meters.
	Wool textiles and fabrics	3	10			"	
	Yarn	2	7	1	Important		
	Fabrics	1	3				2 million meters.
	Jute and other bags	4	12			"	
	Knitting mill products	4	13			-	
	Twine	2	8	2		-	
24	Apparel, shoes	18	48				
	Men's clothing	6	17		Moderate	None	Large efficient units should eventually develop.
	Women's clothing	2	5			"	
	Underwear	4	14		Moderate	"	2 million dozen.
	Leather shoes	3	7		"	Possible	Requires careful planning of cattle and leather sectors. (650,000 pairs mens, 1,700,000 pairs women's, 550,000 pairs childrens).
	Shirts (ready made)	(Incl. above)	10		"	None	1.5 million dozen.
	Dresses (Ready made)	(")	2		"	"	0.5 million dozen.
	Rubber and canvas shoes						3 million dozen.
25	Wood and Wood Products	19(23)	65(80)			Good	Includes some wood and plywood exports in estimate.
	Sawn lumber	11	46		Moderate	Good	Production estimate 1 million cubic meters.
	Plywood, veneer	5	14		Important	Competitive	30 million square meters.
	Hardboard, particle board	- (4)	-(12)		Critical	Difficult Entry	
26	Furniture	5(7)	13(18)		Not Impt.	Feasible	Requires modern industry, good design and standards.
	Chairs, desks, beds, chests, etc. of wood	4 (6)	11(16)			"	" " " " " "

( ) Values in parentheses represent total output if substantial exports are attained. All value figures in millions of U. S. Dollars

		Value Added Million $	Value of Sales Million $	Amount per year, 1000 metric tons	Importance of economies of Scale	Export Potential	Remarks on Development Strategy
27	Paper, Pulp and Paper Products	26(38)	51(67)				Estimate of $19 million value added includes some exports.
	Pulp, news print	6(18)	17(46)	90(270)	Critical	Feasible	Requires a 150,000 to 200,000 T/Y integrated pulp and paper mill with an investment of 40 million dollars or more.
	Chemical pulp	4(12)	12(30)	60(150)	"	"	
	Newsprint	2(6)	5(16)	30(120)	"	"	
	Paper, writing, wrapping					No	
	Paper, Kraft	5	20	100	Important	Limited	Production in integrated mill.
	Paperboard, boxboard, containers	5	14	30	Moderate	No	
28	Printing, Publishing, etc.	15	32		No	No	Newspapers, periodicals, books, etc. Natural forces will develop the sector.
29	Leather Products (except furniture)	2	8		Moderate	Limited	1 million square meters of leather, modern tanneries.
	Tanneries	1	3				(See note under footwear, apparel).
	Shoes, luggage	1	5				
30	Rubber Products	10	34		Important	Possible	
	Tires, tubes	5	17				300,000 tires; 300,000 tubes.
	Other rubber products	5	17				
31	Manufacture of Chemicals and Chemical Products	63(71)	176(203)				
	Fertilizers (Priority project)	16(20)	36(45)	300			Based on some exports of urea initially.
	Nitrogen and Mixed (N content)	11(15)	21(30)	200	Crucial	Feasible	Minimum size plant 140,000 T/Y nitrogen from urea
	Phosphate " " (P_2O_5 content)	3	9	60	Important	Doubtful	Based on imported phosphate, until local material located.
	Potash and Mixed (K_2O content)	2	6	40	Moderate	None	Based on imported potash, until local material located.
	Plastic polymers, PVC, PE, PS, etc.	4	10	15	Crucial	None	Based on imported intermediates through 1975.
	Explosives, ammonium nitrate, etc.	1	3	5	Important	Doubtful	Based on ammonium nitrate from fertilizer plant.
	Soda Ash	1	3	50	Crucial	None	Delay-Requires large glass markets, cheap salt.
	Caustic soda/chlorine	1	3	30/27	Crucial	Possible	Delay until 1970 - basic cheap power and salt.
	Sulfuric acid	--	1	30	Important	None	Possibly utilize existing plant from obsolete An Hoa fertilizer complex.
	Salt (Industrial)	1	3	50	Important	Doubtful	Depends on caustic soda and soda ash projects.
	Salt (total)						Total demand 500,000 tons.
	Industrial gases	1	3		Important	Doubtful	Integrated industrial gas plant required.
	Synthetic fibres	3	12	5	Crucial	None	Based on imported chemicals through 1975.
	Ethyl alcohol, molasses (cattle feed)	1	3	10	By-product	Feasible	Sugar byproducts, rice byproducts.
	Naval stores, turpentine, gum	(1)	(3)		Moderate	Feasible	Dependent on forestry program.

( ) Values in parentheses represent total output if substantial exports are attained. All value figures in millions of U. S. Dollars

		Value Added Million $	Value of Sales Million $	Amount per year, 1000 metric tons	Importance of economies of Scale	Export Potential	Remarks on Development Strategy
31	Manufacture of Chemicals, etc. (Continued)						
	Charcoal	1	2		-	None	Dependent on forestry program.
	Petrochemicals, (ethylene, and propylene based.)			5-10	Crucial	None	Petroleum refinery byproducts (delay until 1977).
	Fats and oils	3(6)	9(18)	25(50)	Important	Feasible	(See food products). Modern solvent extract plant and integrated agricultural program required.
	Paints, varnish, lacquers	2.5	9		Moderate	None	Several flexible competitive producers required.
	Pharmaceuticals, medicines	12.5	25		Moderate	Limited	Special study required for this sector.
	Soaps and detergents	4	14	40	Moderate	Doubtful	Synthetic detergents based on imported dodecylbenzene.
	Agricultural chemicals	2	5		Important	Doubtful	Based on imported intermediates; low production costs required.
32	Petroleum and Coal Products	25(50)	64(128)				
	Oil refinery products	20(40)	48(96)	2000(4000)	Crucial	Feasible	Priority postwar project - export markets important.
	Coal products	3	12		Moderate	None	Use primarily for thermal power.
33	Non-Metallic Minerals	32(33)	64(66)				
	Cement	13	26	1300	Crucial		200,000 T/Y or larger plants, dispersal of clinker grinding.
	Glass-flat	1.5	3		Crucial	None	Delay until 1975-77; lead bath process desirable.
	Glass - containers	3	8				Efficient plants located near main markets.
	Bricks, clay, tile	4	7				Geographical location important, modern plants.
	Concrete products	4.5	11				Strategic location of efficient plants.
	Lime (as needed by agriculture)	.5-1.5	1 - 3	30(90)	Moderate	None	Agricultural and construction requirements important.
	Clays, kaolin, etc.	1(2)	2(4)		Moderate	Possible	Depends on exploration activities.
34	Base Metal Manufacture	19(20)	65(67)				
	Basic iron and steel mills	8	28	250	Crucial		Delay until direct reduction process costs decline.
	rerolling of imports	(Inc. above)			Important		Base industry on imported skelp, etc.
	foundaries	2	8	10	Moderate		Efficient modern plants required.
	Aluminum	1	4	7	Crucial	None	Delay until after 1977; import aluminum metal.
	Copper	1	4	2	Crucial	None	Delay until after 1977; import refined copper metal.
	Ferroalloys	(1)	(2)	10	Moderate	Possible	Feasible with cheap power if chrome, nickel, etc. found.

( ) Values in parentheses represent total output if substantial exports are attained. All value figures in millions of U.S. Dollars

		Value Added Million $	Value of Sales Million $	Amount per year, 1000 metric tons	Importance of economies of Scale	Export Potential	Remarks on Development Strategy
35	Manufacture of Metal Products, Except Machinery	18	52				
	Structural products and shapes	3	11		Important		One or two modern efficient producers.
	Wire nails and other wire products	3	10	30	Moderate		" " " " "
	Tin cans	1	5				Manufacture products, but not tinplate.
	Miscellaneous metal products (incl. agricultural and hand tools).	5	13				Flexible product facilities desirable.
	Cast iron pipe			10			Pipe factory 1975-1977.
36	Machinery, except electrical	11	30	50	Important	None	Start with assembly of a few models only of
	Pumps; water, deep well, etc. motors	2	5			"	each item and integrate backward, using low
	Agricultural machiner	2	5			"	tariff policy to prevent premature production;
	Special machinery, textile, food,	2	5			"	utilize foreign licenses, franchises, or
	Office equipment	1	5			"	ownership wherever possible.
37	Electrical Machinery and Equipment	17	47			None	Hold entry to limited number of qualified firms.
	Radios, TV, receivers	3	9		Important	"	Start with assembly of only a few models and integrate backwards, 250,000 radio receivers; 30,000 TV receivers.
	Telephone & communications equip.	1	5		Important	"	200,000 telephones, standardize, 1 or 2 producers Start with assembly after 1975.
	Light bulbs	3	7		Important	Limited	One efficient major producer, initiate in 1972; 5 million units.
	Batteries	2	5		Moderate	Limited	100,000 units, standardize.
	Electric wire and cable	1	4		Important	"	One efficient major producer.
	Distribution and control equip.	1	3		Important	None	" " " "
	Refrigerator and air conditioners	3	12		Important	"	Start with assembly of a few models (1975); 10,000 units.
	Miscellaneous electrical supplies	1	3		Important	"	Flexible production units.
	(Basis: 800,000 KW installed capacity in 1978, 4 billion KWH/year generation).						
38	Transportation Equipment and Vehicles	15	45			None	Initially limit assembly to truck bodies, control
	Motor vehicles, assembly (3 wheeled trucks, etc.)	6	24		Crucial		models, consider assembly policy in 1973; stock (1978) 200,000 vehicles, production (1978) 30,000 vehicles per year (15,000 cars and 15,000 commercial vehicles); make some parts.
	Motor vehicles, parts and repairs	2	5		Crucial	None	
	Bicycles and motorcycles	3	8		Moderate	None	Limit entry to a few qualified firms, 30,000 units/year.
	Shipbuilding	3	7		Moderate	None	Primarily for domestic fleet, 5,000 gross tons/year. (Merchant fleet estimated at 300,000 GWT but international fleet would be purchased or leased).
39	Miscellaneous Manufactures	12	30				
	Matches, clocks	1	3		Important	Doubtful	Clock assembly limited number of makes.
	Plastic toys and end products	3	12		Not Impt.	"	Natural forces can develop sector.

Table 9.9

Estimated Investment Requirements for Fixed Assets in Vietnamese Manufacturing 1970-77
(millions of current US $)

ISIC	Industrial Sector	Domestic Markets Only		Domestic Markets plus Exports					
		Foreign Exchange	Total	Foreign Exchange	Total	Approximate Breakdown of Total 70-71	72-73	74-75	76-77
	All Sectors	377	641	443	749	108	164	174	303
20	Food Prod.	37	77	60	117	13	21	33	50
21	Beverages	7	17	7	17	2	3	5	7
22	Tobacco	9	24	9	24	4	5	7	8
23	Textiles	34	55	34	55	8	15	17	15
24	Apparel, etc.	5	10	5	10	2	3	3	2
25	Wood Prod.	14	25	19	33	8	3	9	13
26	Furniture	1	3	2	6	1	1	1	3
27	Pulp, Paper	32	53	45	73	3	30	25	15
28	Printing	4	10	4	10	1	2	3	4
29	Leather	1	2	1	2		1		1
30	Rubber	7	12	7	12	1	3	4	4
31	Chemicals	73	117	82	132	33	39	18	42
32	Petroleum, Coal	29	41	44	63		2	15	46
33	Non. Met. Min.	28	45	28	45	15	7	7	16
34	Base Metals	24	35	24	35	2	3	3	27
35	Metal Prod.	20	33	20	33	5	6	11	11
36	Machinery	17	25	17	25	2	4	6	13
37	Electrical	17	25	17	25	2	8	2	13
38	Transport	14	23	14	23	5	6	2	10
39	Miscellaneous	4	9	4	9	1	2	3	3

CHAPTER 10 DEVELOPMENT OF THE INFRASTRUCTURE

The Joint Development Group has considered the requirements for development in transportation (highways, railways, ports, inland waterways and airports), sanitation, telecommunications, power and housing. When applicable, the emphasis in the formulation of a post-war program in each of these sectors is initially on repair of war damage followed by longer-term programs over a ten-year period through 1978. The projects proposed in this report incorporate where appropriate the views of the Ministries concerned, USAID, and US and GVN Armed Forces planning agencies.

An effort has been made to consider practicable ways to incorporate in the post-war programs as many elements as possible of the infrastructure already developed by the Armed Forces. In fact, in some sectors, ports and airports for example, the capacity of the facilities developed by the military, when added to existing civil facilities, probably exceed immediate post-war requirements. The establishment of effective procedures for operation and management is also considered.

Finally, the Joint Development Group emphasizes that many of the projects listed here are tentative and much more investigation will be required to demonstrate their feasibility. To this end, recommendations are included on this report for establishment of continuing planning functions to ensure that post-war programs are fully responsive to the needs of the developing economy.

WAR DAMAGE

Summarized in this section are estimates of damage due to enemy activities. These data represent the approximate total costs of facilities damaged or destroyed, based on estimates of the Ministries concerned in cooperation with technical staff of the Joint Development Group:

Highways

Bridges	VN $9,000 million
Highways	1,000
Ferries, GVN motor vehicles, equipment, etc.	1,000
TOTAL	VN $11,000 million

Railroads

Bridges	VN $3,000 million
Track	2,000
Rolling stock and equipment	1,000
TOTAL	VN $6,000 million

Inland Waterways

The waterways system of the Mekong Delta has suffered little direct war damage, but because of insecurity maintenance dredging has not been adequately performed. It is estimated that nearly 10 million cubic meters of dredging will be required to return all navigable waterways to their pre-war condition.

Estimated cost..... VN$2,300 million

Airports

Minor damage to terminals and navigational aids.

Estimated cost VN $ 30 million

Telecommunications

Numerous cuts in interprovincial systems, spot

damage to radio facilities and buildings.
Estimated cost..... VN $ 500 million

Electric Power

Damage to urban transmission facilities, except Saigon.....	VN $	155 million
EOV and Saigon Power Company.....		140
Danhim Plant 230 KV lines.....		285
TOTAL	VN $	580 million

Housing

Approximately 100,000 housing units.
Estimated cost VN $ 10,000 million

The damages summarized here total about VN $30,410 million. Repair work is already well advanced on some of these facilities, for example, the highways and the railroad. In the sections which follow, specific recommendations are included concerning the extent of war damage repair actually needed in the post-war period.

SECTION I HIGHWAYS

With a total highway network in excess of 20,000 km, Vietnam has a well articulated system which is potentially capable of serving all developed areas of the country and all centers of population and production. In cooperation with the Ministry of Public Works, Communications and Transportation (MPWCT), the Joint Development Group has reviewed the present condition of Vietnam's highways, and has suggested

Table 10.1

Statistics of Highways
(By Highway District)

ITEM	DISTRICT					TOTAL
	Hue	Nha Trang	Dalat	Saigon	Can Tho	
National Highways (KM)	730	862	1,044	918	224	3,778
Interprovincial Highways (KM)	143	184	534	900	832	2,593
Provincial Roads and City Streets (KM)	2,025	1,536	2,262	4,314	3,747	13,884
TOTAL HIGHWAYS (KM)	2,898	2,582	3,840	6,132	4,803	20,255

Present Highway Conditions

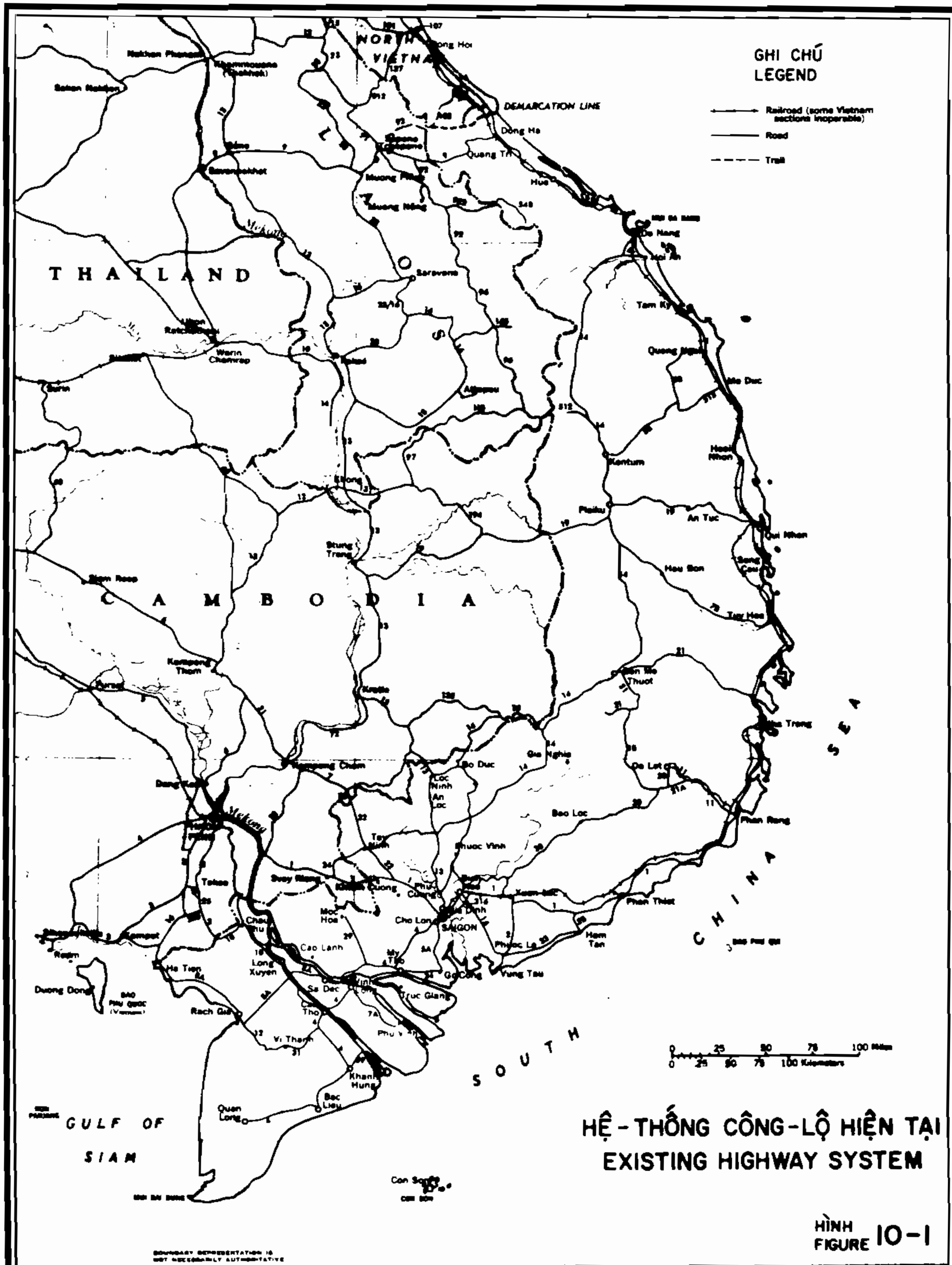
While highways are well developed for service to all parts of the country, their geometric and structural standards are inadequate for modern traffic use. The system has evolved over five decades and most older roads are narrow (4 to 5 meters) with insufficient width of shoulders and inadequate curve radii. The subbase and surface course thicknesses are inadequate for continuous service under modern loads. Insufficient maintenance has compounded these structural defects.

Underlying these deficiencies, however, is the lack of security in some areas which has prevented proper maintenance, as well as the extensive damage caused by military operations. By 1968, 3,195 bridges and culverts had been sabotaged and many wholly destroyed (Table 10.2). By July, 1968, 2,000 had been repaired either temporarily or permanently, leaving nearly 1,200 to be repaired, or an aggregate of 13,300 meters of bridge construction still to be undertaken. War damage to the highways themselves has also been extensive. In addition to direct destruction by the enemy the movement of heavy military vehicles, especially tracked units, over existing bridges and highways has contributed substantially to highway deterioration.

Post-War Planning Criteria

When the war ends, the most important activity in the highway sector will be to re-establish communications with areas of Vietnam isolated by road and bridge destruction. All programs for highway development have taken account of this requirement; it will be accomplished by repair or replacement of the war damaged bridges and highway sections referred to above.

At the same time, a progressive program of highway development should be undertaken. In Working Paper No. 35, the Joint Development Group has proposed a three-year program of highway reconstruction to meet anticipated traffic needs through 1975, followed



HỆ-THỐNG CÔNG-LỘ HIỆN TẠI
EXISTING HIGHWAY SYSTEM

HÌNH
FIGURE 10-1

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Table 10.2

War Damage to Highways and Bridges
(As of July, 1968)

Bridges and Culverts

Item	Number	Length of Facility	Portion Damaged
Sabotaged	3,195	80,454 m	34,800 m
Temporarily Repaired	1,999	49,860 m	21,500 m
Unrepaired	1,196	30,594 m	13,300 m

Highways

Length Destroyed	-	70,000 m
Area Destroyed	-	300,000 sq. m

by a ten-year program of highway development to meet needs through 1985. These are workable plans and are based on a point system of priorities which reflect the rated sufficiency (geometric and structural) of individual highways, economic and social characteristics of the areas served, the proportion of trucks in the traffic flow, and anticipated increases of average daily traffic.

Very little is known, however, of the probable composition and distribution of highway traffic in the post-war years, so that a continuing program of highway planning will be required. This can ensure that highway reconstruction and development afford Vietnam the maximum economic return. In this way, not only may the rate of highway development be modified in accordance with development trends in other sectors and the availability of capital, but changes in highway priorities can be made to provide timely highway service in support of new agricultural or other development activities, as may be required.

Highway planning in Vietnam must also take into account the substantial highway development which has been undertaken for military purposes. Practically all of this construction will serve the purposes of post-war development.

Finally, the highways of Vietnam will need adequate maintenance in the post-war period. The strengthening of the maintenance capabilities of the Directorate General of Highways should be a principal consideration in planning for post-war highway development, and attention should also be directed to ways in which the highway construction capability of the private sector can be enlarged.

First Approximation of a Highway Development Program (Working Paper No. 35)

A post-war development program in three parts was suggested:

1) Re-establishing communications- To restore communications with areas of Vietnam which have been isolated by the destruction of bridges and segments of highway, a program of emergency construction was proposed. This provided for the temporary repair of 13,300

meters of damaged bridges and 70 km of highway road sections. The total estimated cost, using temporary construction methods, at approximately 20% of the cost of permanent construction, was VN $1,100 million. We estimated that the work could be accomplished within 12 months and would utilize a labor force of at least 5,000 men.

2) Reconstruction phase - Over a three-year period, we proposed the reconstruction of the most heavily used sections of important National and Interprovincial highways to improve their geometric and structural standards. Priority would be given to the main access routes in the Saigon area and to portions of QL-1, QL-4, QL-13, QL-15, LT-6 and LT-15 (Figure 10.2). Approximately 374 km of highway, including 6,400 m of bridges, would be rebuilt at an estimated total cost of VN $9,247 million.

3) Development phase - Following the three-year reconstruction phase, the Joint Development Group suggested a longer term period of highway development involving some 42 separate projects. On its completion, all major routes in the southern half of Vietnam (Saigon and the III Corps and IV Corps Zones) would be rebuilt. Relatively less attention was directed to main routes to the north because substantial military construction has already been carried out, especially on QL-1 in the I Corps and II Corps Zones. In this development phase, we recommended the rebuilding of 2,300 km of highways and 20,400 m of bridges at an estimated cost of VN $38,380 millions.

The basic standards to which the road system would be reconstructed under this program are based generally on the requirements of the Central Joint Committee on Navigation and Highway Communications (CENCOM), April 20, 1968, which are as follows:

	2-Lane Pavement	Shoulders
Class A	7.3 m	2.5 m
Class B	6.0 m	2.5 m
Class C	6.0 m	1.5 m

However, the six meter paved surfaces of Classes B and C (20 feet) are not considered to be adequate for modern vehicles and vehicle flows. As more reliable traffic data become available, it is recommended that the assignment of standards to individual route segments be re-examined. In general, the mixture of traffic in Vietnam, the extensive use of the highways by pedestrians, and the lack of controlled access suggest the need for a minimum 2-lane pavement width of 7.3 m on all important route sections. This is the standard throughout the world for main highway construction, and has been developed in recognition of currently increasing vehicle widths. On the limited traffic data available, a 7.3 meter width is already warranted for QL-4 as far as My Thuan, QL-13 to Phu Cuong, QL-15 to Phuoc Le, and on selected other routes where relatively heavy traffic flow may be expected.

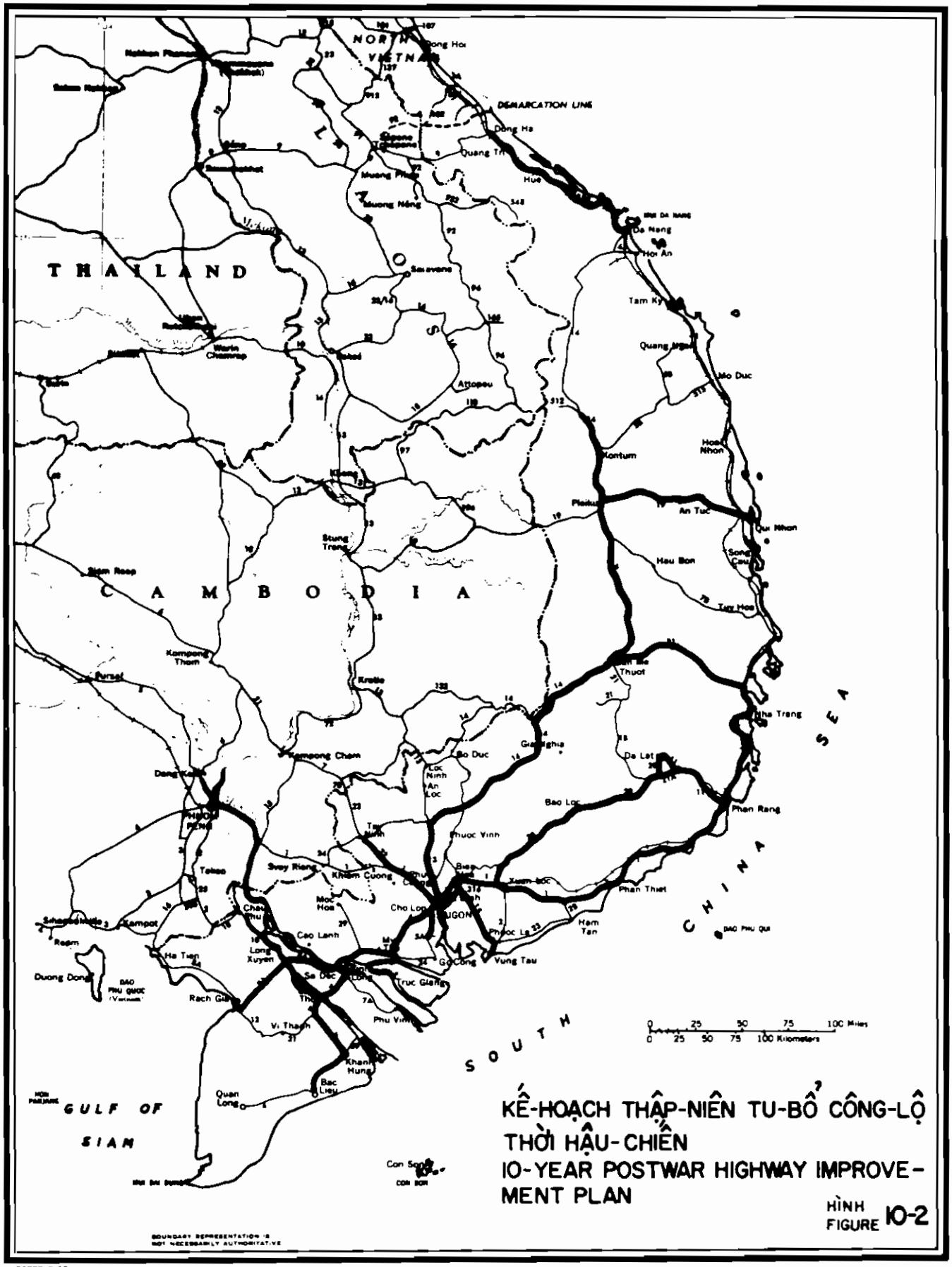
Military Assistance Command Vietnam (MACV) Highway Program

The military effort in Vietnam and its required support facilities have placed heavy demands, in terms of both traffic flow and vehicle loads, on Vietnam's highways. In response, MACV has initiated an extensive highway reconstruction program, working through its Lines of Communications (LOC) division. In 1968, MACV took over the highway development activities of USAID.

The purpose of the MACV program is to restore National and Interprovincial highways to two-lane, structurally adequate systems. Three classes of highway are planned, identical with those approved by CENCOM and set out in Figure 10.3 of this Chapter.

The MACV program calls for the reconstruction of 4,060 km of highways and numerous bridges*. By November 1, 1968, nearly 650 km of highway had been rebuilt under the program, mostly on route segments immediately adjacent to Saigon and along portions of the coast route QL-1 (Figure 10.3). The program extends forward over four funding periods with completion of construction scheduled in 1971 (Table 10.3).

*"MACV Highway Program Funding Study," Office of the Director of Construction, MACV, November 21, 1968.



KẾ-HOẠCH THẬP-NIÊN TU-BỔ CÔNG-LỘ THỜI HẬU-CHIẾN

10-YEAR POSTWAR HIGHWAY IMPROVEMENT PLAN

HÌNH FIGURE 10-2

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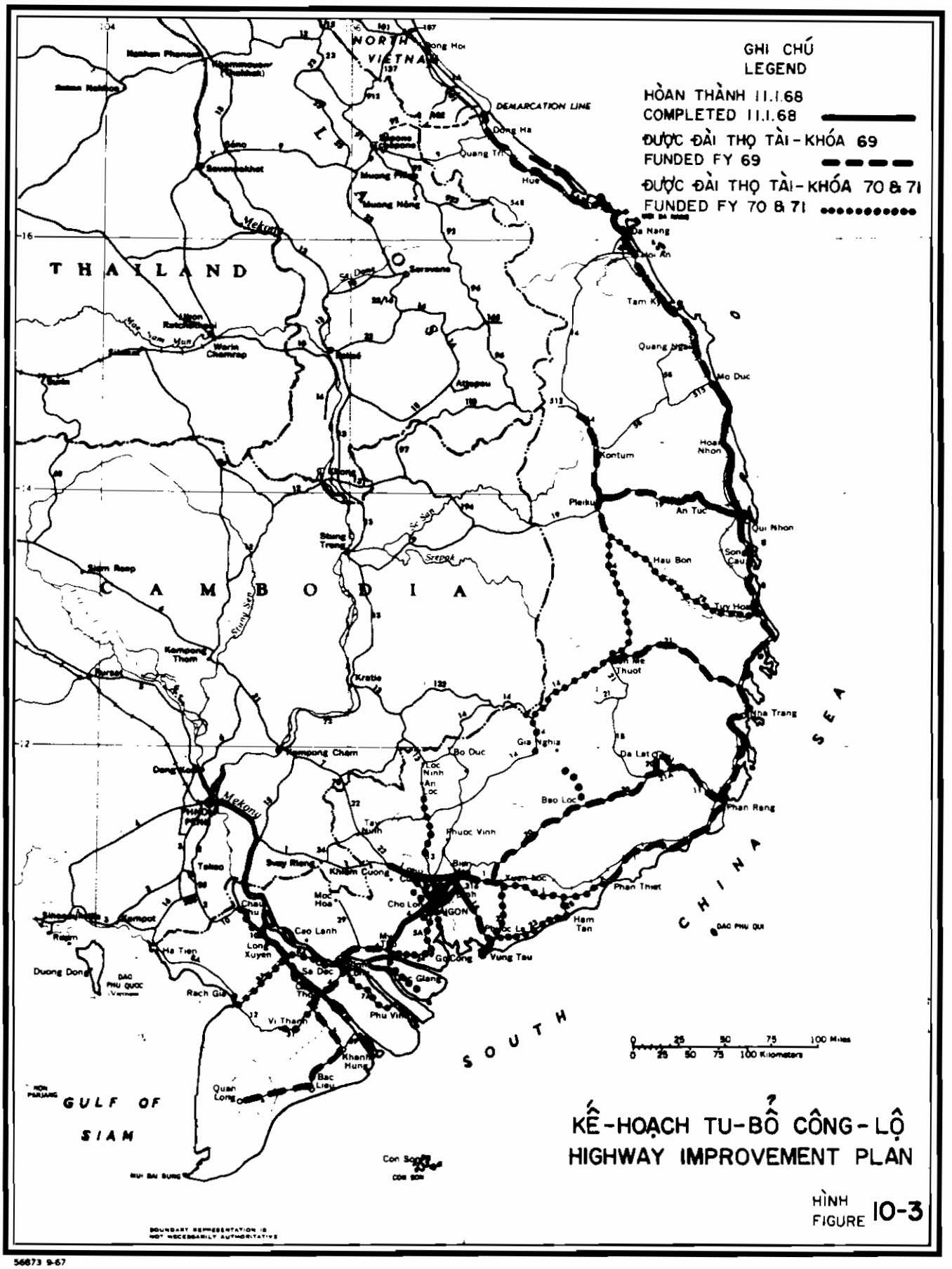
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ĐƯỢC ĐÀI THỌ TÀI-KHÓA 69
FUNDED FY 69
ĐƯỢC ĐÀI THỌ TÀI-KHÓA 70 & 71
FUNDED FY 70 & 71
NORTH VIETNAM
DEMARCATION LINE
THAILAND
CAMBODIA
GULF OF SIAM
SOUTH CHINA SEA
Mekong
Da Nang
Hoi An
Tam Ky
Quang Ngai
Mo Duc
Kontum
Hoai Nhon
Pleiku
An Tuc
Qui Nhon
Hau Bon
Tuy Hoa
Nha Trang
Da Lat
Phan Rang
Bao Loc
Phan Thiet
Ham Tan
Vung Tau
Gia Nghia
Bo Duc
Kompong Cham
Kratie
Stung Treng
Siem Reap
Kompong Thom
Phnom Penh
Takeo
Svay Rieng
Khanh Hung
Bac Lieu
Quan Long
Rach Gia
Ha Tien
Duong Dong
Dao Phu Quoc
Dao Phu Qui
Con Son
0 25 50 75 100 Miles
0 25 50 75 100 Kilometers
KẾ-HOẠCH TU-BỔ CÔNG-LỘ
HIGHWAY IMPROVEMENT PLAN
HÌNH
FIGURE 10-3
BOUNDARY REPRESENTATION IS NOT NECESSARILY AUTHORITATIVE

56873 9-67

Table 10.3

Highway Improvement Program
(MACV-LOC)

Funding Program

Fiscal Year	Highway Length (km)	Est. Cost US $*
1967 and Earlier	480	68,015,000
1968	1,024	145,717,000
1969	1,200	97,574,165
1970	1,294	66,070,000
1971	62	9,500,000
TOTAL:	4,060	386,876,165

Construction Program

Completed 1 November 1968	-	649 km
Estimated Completed 1 November 1969	-	1,760 km
Estimated Completed 1 September 1971	-	4,060 km

* Includes bridge construction.

1) Fiscal Year 1968 and Earlier - With previously committed funds and funds programmed for FY 68, 1,504 km of highways would be rebuilt, mainly to Class A standard, comprising the main links adjacent to Saigon (including the Saigon by-pass Bien Hoa - Cu Chi), National Route QL-4 as far as My Thuan, almost all of QL-1 except the segment Phan Thiet - Xuan Loc (scheduled for FY 70) and QL-19, An Nhon - Pleiku. There is also provision in the same period for reconstruction of 65 km of Saigon streets; 20 km of this work was completed by November 1, 1968.

Estimated cost..... US $214 million

2) Fiscal Year 1969 - A further 1,200 km of highway work is programmed for funding in FY 69. This consists mainly of construction to Class B standard. It comprises continuing the reconstruction of QL-4 in the Mekong Delta as far as Ca Mau, the extension of the QL-22 and QL-13 routes further northward from Saigon, and reconstruction of QL-20 to Dalat and QL-21 between Ninh Hoa and Ban Me Thuot in the Central Highlands. Including the FY 68 program, a total of 40 km of the 62 km Saigon by-pass will be funded by FY 69.

Estimated cost..... US $98 million

3) Fiscal Year 1970 - In FY 70, the program calls for funding construction of 1,294 km consisting of interprovincial routes in the Mekong Delta and the III Corps Zone, most of National Route QL-14 in the Central Highlands, and other highway links not previously rebuilt in the northern section of the country. A substantial additional segment of the Saigon beltway would also be funded in FY 70.

Estimated cost..... US $66 million

4) Fiscal Year 1971 - The final component of the MACV program is the completion of the Saigon beltway.

Estimated cost..... US $9 million.

The MACV highway program almost completely duplicates the proposals described earlier in this section. However, we suggest the construction of additional lanes to bring all principal radial routes in the Saigon area up to 4-lane standards and in some cases more than this will be warranted. The timing of this additional construction cannot now be precisely established, but the cost estimates which follow (Table 10.4) include an allocation for part of it. The only highway link which appears in the previously proposed program and not in the MACV program is the connection between QL-14 at Dao Thong and QL-13 at An Loc. This has been included in the cost estimates presented in Table 10.4.

Post-War Highway Development

Because of the comprehensive nature of the MACV program, and the degree of funding which has already been committed, the Joint Development Group recommends generally that the projects and general priorities established in that program be adopted for post-war planning purposes.

Future funding, of course, is not assured, and the end of the war may produce changes in the fund allocations of the United States. Accordingly, we suggest that the safe assumption is that only the highway reconstruction programmed for funding through FY 69 will in fact be carried out. This comprises 2,704 km of highways and represents an investment of US $312 million. None of these costs are included in the post-war highway development estimates of this report.

Those portions of the MACV program now scheduled for funding after FY 69 might, therefore, form the post-war highway development program for which additional funds are required. It is recommended, however, that only those route segments be included which also appear in the Group's program (excluding roads programmed primarily for military purposes) and that the priorities for their construction follow those we have suggested. This construction will be assumed to take place in the period 1971-1978, the years following assumed completion of all MACV projects scheduled for funding through FY 69.

Table 10.4

Post-War Highway Development

Priority	Project	From	To	Class	Length(km)	Est. Const. Cost US $*	Remarks
1	(Immediate repairs of war damage to restore communications).....					9,300,000	
2	QL-1	Xuan Loc	Phan Thiet	A	110	13,200,000	Reconstruction
3	QL-13	Lai Khe	QL-14	B	30	3,300,000	Reconstruction
4	LTL-5A	Saigon	Go Cong	B	58	16,240,000	New Construction
5	LT-8A	Vinh Long	Bassac Ferry	B	53	14,840,000	New Construction
6	QL-14	Dragon Mt.	Ban Me Thuot	B	150	16,500,000	Reconstruction
7	QL-14	Ban Me Thuot	QL-13	C	235	23,500,000	Reconstruction
8	LT-8A	Bassac Ferry	Rach Gia	C	79	21,330,000	New Construction
9	LT-10	Long Xuyen	Chau Doc	C	55	14,850,000	New Construction
10	(Additional lanes for Saigon Area highways).....					35,000,000	
					770	168,060,000	
	Design and Supervision of Construction.....					6,940,000	
	TOTAL:					175,000,000	

* Estimated Construction Cost Based on MACV-LOC Cost Factors for CPAF Contractor, From "MACV Highway Program Funding Study," dated 11-21-68.

Class "A" Road Reconstruction	-	120,000/km outside Delta
Class "B" Road New Construction	-	280,000/km in Delta, 190,000/km outside Delta
Class "B" Road Reconstruction	-	110,000/km outside Delta
Class "C" Road	-	No cost estimate for MACV CPAF Contractor

JDG ESTIMATE: (a) Class "C" Road Reconstruction - 100,000/km outside Delta
(b) Class "C" Road New Construction - 270,000/km in Delta.

In these estimates, it is assumed that the temporary bridge repairs and the highway repairs necessary to restore communications, as recommended in the Group's program, will not be included in the MACV program; all this work is included in the post-war development estimates of Table 10.4.

The proposed development program now comprises 770 km of highways projects, exclusive of the addition of lanes on selected routes. It includes the reconstruction of the remaining portion of National Route QL-1, will provide a rebuilt route through the northern section of III Corps into the Central Highlands via QL-14, and will extend an improved route into the Mekong Delta from the vicinity of My Thuan to Rach Gia, via LT-8 (Figure 10.4). This program should be continually re-examined as traffic flow data are accumulated and trends in traffic flow are identified.

The estimated cost of the program is US $175 million. Costs are based on estimated unit prices for construction by private contractors in Vietnam. MACV's estimated costs for the same route segments are generally lower, because they assume use of troop construction on many highway links. The contract prices used here represent wartime construction conditions and actual post-war construction costs well may be lower.

For these types of construction, foreign exchange requirements are taken to be about 50% so that the program cost in dollars and piasters is as follows:

US $90 million
VN $9,440 million

Capital requirements for the program may be assumed to be evenly distributed over the development period except that the cost of restoring communications should all be included in the first year after the war.

Maintenance Costs

As yet, the Joint Development Group has not examined

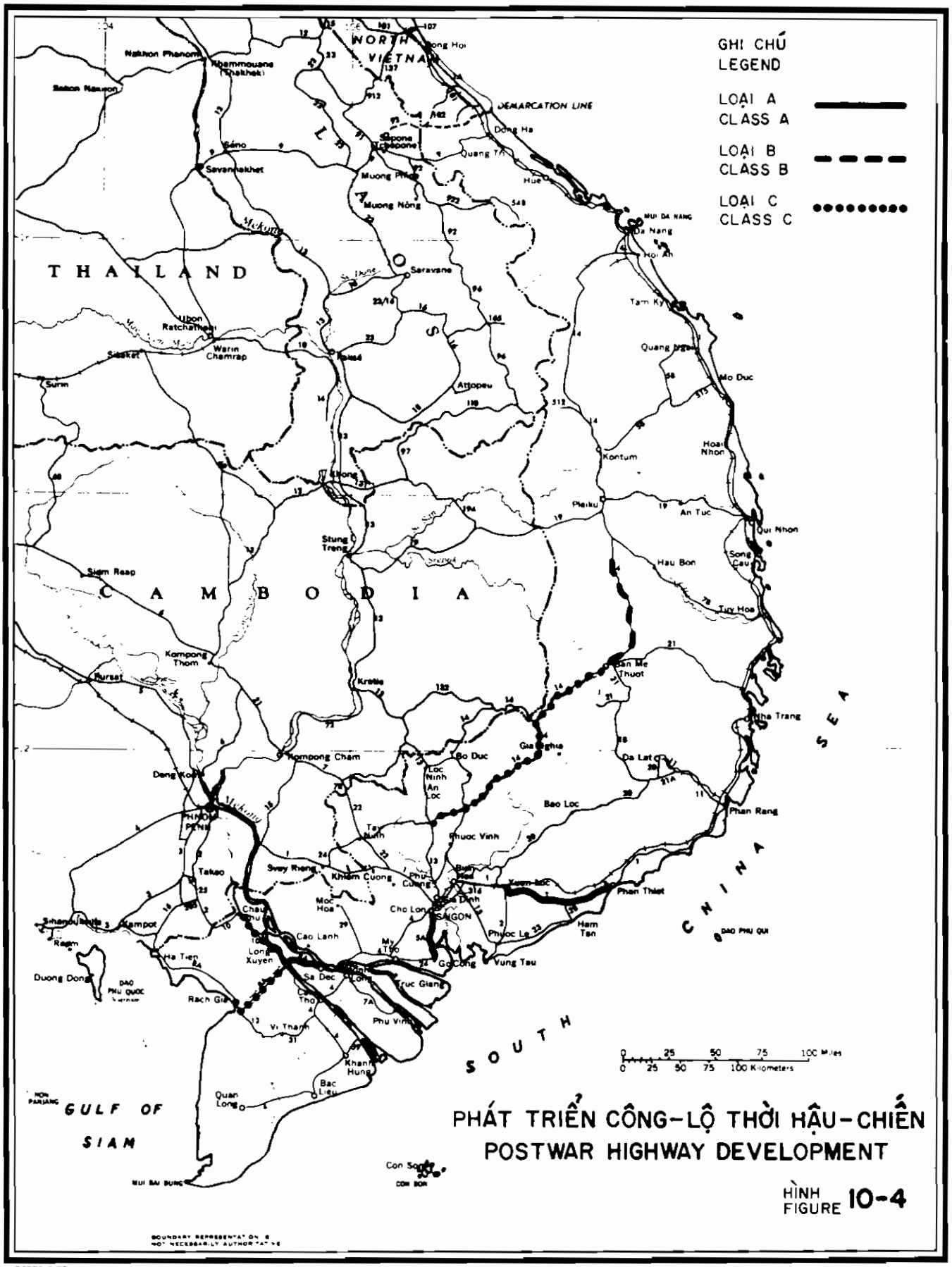
highway maintenance operations and costs, but research is to be undertaken in 1969 on ways to increase maintenance capability (see below). Major elements of the former USAID highway program, and an important element of the MACV program, have been devoted to supplying maintenance equipment and developing appropriate maintenance standards and procedures.

It is assumed that the highway maintenance equipment of US forces and contractors will be left in Vietnam, and that present programs to assist the Directorate General of Highways to activate its existing plant will be completed. On these bases, annual costs of maintenance are taken to be as follows:

Class A road	-	VN $247,800 per km/yr.
Class B road	-	VN $212,400 per km/yr.
Class C road	-	VN $212,400 per km/yr.

Adequate maintenance of the newly built highways of Vietnam is essential to their continued service. It is estimated that annual costs of maintenance, at the unit prices stated, will range from VN $659 million in 1971 to VN $818 million in 1978.

Activities of the Joint Development Group during 1969 are oriented towards assistance in strengthening the highway planning function and the organization of highway maintenance, assessment of construction capability, and related advisory services.



PHÁT TRIỂN CÔNG-LỘ THỜI HẬU-CHIẾN
POSTWAR HIGHWAY DEVELOPMENT

HÌNH FIGURE 10-4

BOUNDARY REPRESENTATION IS NOT NECESSARILY AUTHORITATIVE

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SECTION II RAILWAYS

The main line of the Vietnamese National Railway System (VNRS) extends 1,109 km northward along the coast from Saigon to Dong Ha, serving almost all the principal population centers of the country except those of the Mekong Delta. Including branch lines, the total system comprises 1,357 km. Most of it was built in the period 1885-1936, and in the years before the present war it provided the only reliable system for overland haul of commodities. The railway was damaged during World War II and during the Viet Minh wars, but by 1959 it had been repaired and the entire line between Saigon and Dong Ha was operational.

Facilities of the VNRS

The VNRS comprises an extensive operational system with eleven main workshops, 56 diesel locomotives (provided under Development Loan Fund agreements in 1961-1965) and nearly 1,000 freight cars of all types. Track is of one meter gauge, weighing 27 to 30 kilos per meter, laid on steel ties. Ruling grades on the main line do not exceed 1.5%, and 90% of the system has grades under 1.0%. The Dalat branch line, partly a cog railway, encounters grades of 12%. Motive power, grade and carrying capacities of the cars are reasonably well balanced for efficient operating conditions.

The VNRS has about 3,500 employees; it is an autonomous governmental agency whose management is responsible to a Board of Directors. The Chairman of the Board is the Minister of Public Works, Communications and Transportation.

Conditions of the Railroad in November 1968

Viet Cong attacks on the VNRS began in 1960; in 1964 alone there were 650 separate incidents of sabotage. In total, 620 bridges and nearly 72,000 meters of track have been destroyed or damaged. Locomotives have been damaged nearly 400 times. The VNRS estimates that damage to the system has totalled VN $6,000 million.

At the present time, approximately 460 km of the system are operational*. Owing to insecurity, the 117 km branch north from Saigon to Loc Ninh near the Cambodian border, built in 1960, has been inoperative since 1961.

Railway Operations

For these reasons, in the last ten years traffic on the VNRS has declined sharply. Between 1957 and 1966, freight carried dropped nearly 50% to 229,600 metric tons (Figure 10.5). There was an increase in freight carried in 1967, owing to growing use by the military, especially for relatively short hauls of construction materials.

In terms of both distance and tonnage the ton-kilometers of haul in ten years declined by over 80% to 14 million in 1966. In 1967, when traffic was nearly three times that of the previous year, VNRS still accounted for only 27 million ton-kilometers, a decline of 65% from 1957 figures**. The decrease in passenger traffic has been even more marked, falling in the same period by more than 90%.

In the circumstances of severe, recurrent enemy attack and resultant curtailment of operations, this is only to be expected. There have been no less than 1,225 casualties among VNRS employees from enemy action, and the fact that the railway is still operating at all and is even rapidly reconstructing war damaged segments is a tribute to the strength and dedication of its officers and staff.

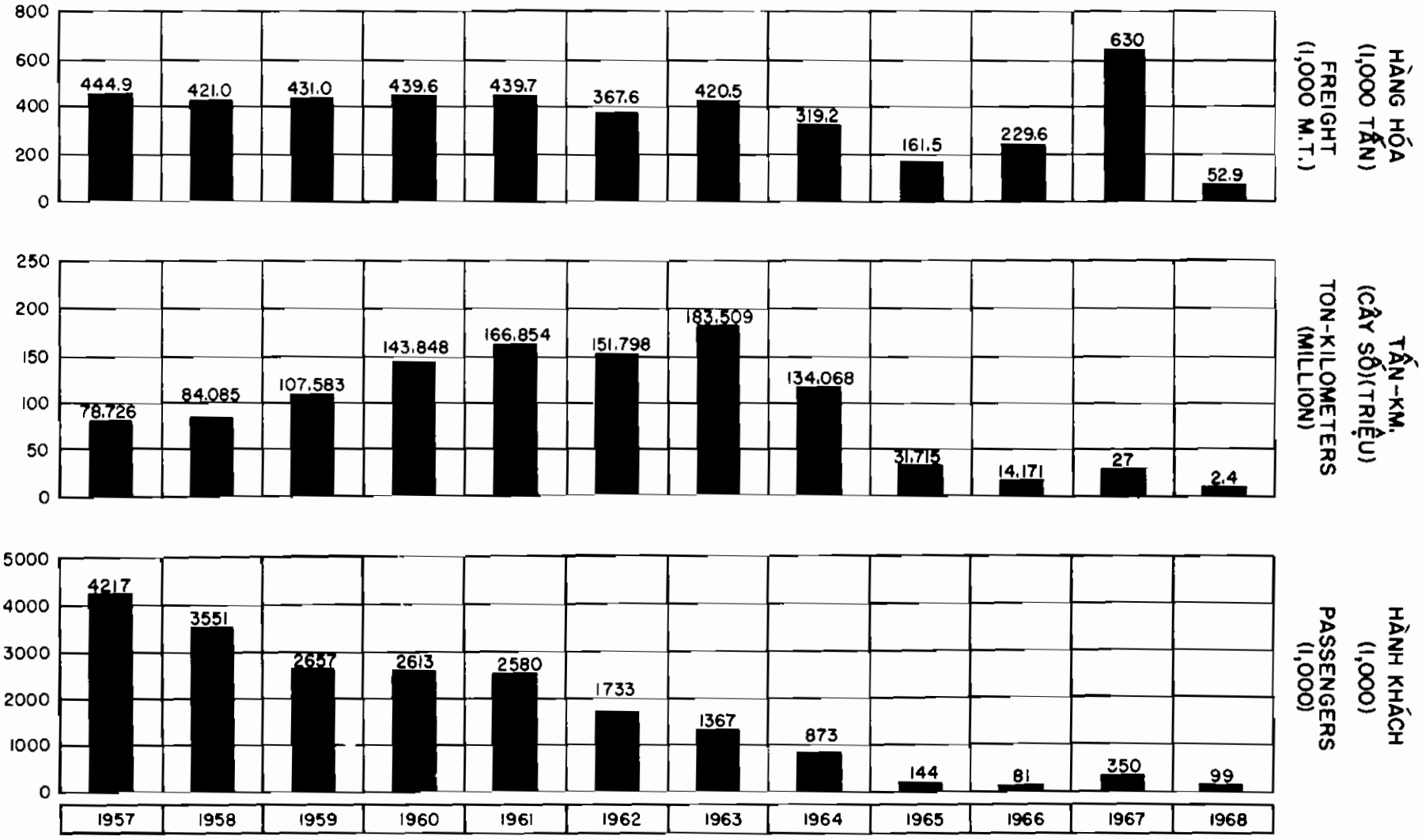
But in spite of these magnificent efforts, substantial and regular deficits have been incurred; in 1967 expenditures exceeded

* Railroad Development, JDG Working Paper No. 30.

**"Resumé on Railroads," USAID, April 1, 1968.

TỶ-GIÁO VIỆC CHUYÊN CHỞ HÀNH KHÁCH VÀ HÀNG HÓA, TRONG NĂM 1957-1967, VÀ 3 THÁNG ĐẦU NĂM 1968

COMPARATIVE FREIGHT AND PASSENGER BUSINESS 1957-1967, ALSO FIRST (3) MONTHS 1968



HÌNH
FIGURE 10-5

receipts by VN $341 million*. Until the railway resumes full operation, it has little prospect of improving its financial operating results.

Present Railway Improvement Program

A Railroad Rehabilitation Project, directed at restoring service by the end of 1969 on the main line from Saigon to Dong Ha and on branch lines (except the spur to Loc Ninh), is presently in progress. This is a joint effort by VNRS , the Armed Forces of Vietnam and the United States and USAID. The US Army has been active in promoting this undertaking, and at present has 200 railroad cars of its own in service on the VNRS for movement of military cargo.

The Government of Vietnam has committed VN $970 million to the work, and USAID commodities to the value of US $18.3 million are being contributed by the United States.

Under this program, freight and passenger service will be restored on 762 km of the main line early in 1969, leaving only a 279 km gap between Phu Cat and Da Nang and a 68 km segment north of Hue still inoperative (Figure 10.6). Program schedules call for completion of reconstruction on the entire main line by the end of the year.

The Railway in the Post-War Period

Vietnam should, therefore, enter the post-war period with a fully reconstructed railway system and consequently no funds additional to those already committed to reconstruction are included in estimates of post-war development costs. At the same time, however, Vietnam's highways are also being extensively improved. The reconstruction of National Route QL-1 which parallels the railway for its entire length is scheduled for completion at about the same time that the railway will be able to resume full operations.

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* Comparative Study of Saigon-Da Nang Transportation Modes, JDG Working Paper No. 33.

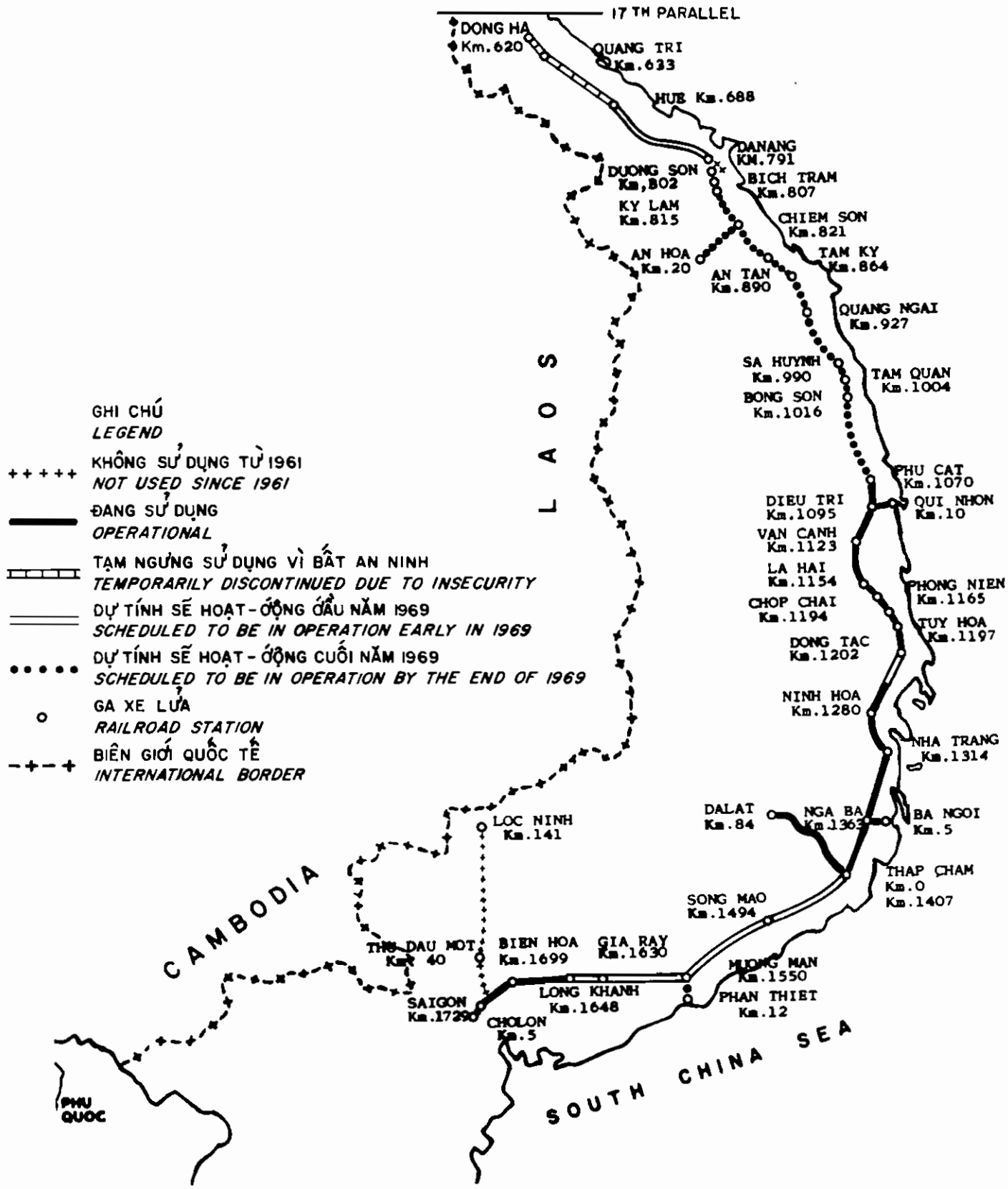
This is a newly competitive circumstance. For some years it has been recognized that, except for large volumes over relatively long distances, rail transportation could not compete with truck transportation on a modern highway system in Vietnam. Preliminary studies of rail and truck shipping costs undertaken in 1968 by the Joint Development Group indicated, for example, that the railroad is not competitive with trucking for small shipments (under 4 tons) at distances less than 650 kms; and that it cannot compete with trucking for large shipments (over 15 tons) at distances less than 140 kms.* These are not definitive findings, for the system of truck tariffs in Vietnam is greatly distorted by war and rail tariffs in many cases may be unreasonably low. However, they do illustrate the disadvantages of rail transportation in the face of modern motor truck transportation on reconstructed highways.

Coastal shipping is another potential post-war competitor of the railroad. With railway service interrupted during the war and insecure conditions on many sections of the highway system, coastal shipping has captured a large share of freight traffic, especially military cargoes, northward from Saigon. These conditions are now changing and the role of coastal shipping will diminish; however, it will still compete with the railroad on long-haul movements, especially between Saigon and the coastal ports.

The future of the railway was considered in a 1966 transportation study of Vietnam**. At that time it was recommended that, in the absence of an adequate highway network, the VNRS should be rebuilt in order to provide for heavy hauls over long distances. But it was pointed out that as the highway system developed, the railway would lose most of its passenger traffic and much of its general goods traffic, especially over the shorter distances. Recommendations were made for operating and management improvements, freight solicitation, and reduction of excess labor, with a view to making the VNRS more competitive with the highways in the future, and so enable it to retain a special

* Railroad Development, JDG Working Paper No. 30.

** "Vietnam Transportation Study," Transportation Consultants, Inc. Washington, D. C., 1966.



HỆ-THỐNG HOẢ-XA VIỆT-NAM
THÁNG 12, 1968
VIETNAM RAILWAY SYSTEM
AS OF DECEMBER 1968

HÌNH *FIGURE* 10-6

position as a long-haul carrier of heavy cargo.

The railroad will soon be in a position to assume this role if it can. Its success is not assured. While the railway has an effective physical plant, has established modern operating practices, and has conducted a program of modernization, the inherent disadvantages of its fixed route, combined with a limited demand for haulage of heavy bulk cargoes over long distances and the probable decline in military shipments, may render its continued service impracticable.

The coming years will, in effect, be a trial period in which VNRS operations and financial returns should be closely and continuously observed, so as to develop, if possible, more competitive and specialized services, and at the same time to assess the feasibility of continuing operation.

SECTION III PORTS

Vietnam's deep draft port facilities to serve ocean-going vessels have been greatly expanded in recent years, mainly to provide logistic support to the Armed Forces. In fact, if the facilities now devoted to military use were made available, port facilities in Vietnam would amply satisfy the needs of civil development. This probably will not happen in the immediate post-war period. Even in the longer term, some military use of existing military port facilities should be assumed, although not nearly to the same extent as now. For these reasons, there will be a need for limited but steady expansion of deep draft marine terminal capacity in the post-war period.

Terminals for coastal vessels at Vietnamese ports have not been improved as part of the military effort; and the severe curtailment of land transportation by enemy action has resulted in unusually heavy traffic on the coastal shipping system in recent years. Most existing coastal shipping terminals are now outmoded, in many cases badly deteriorated, and they have inadequate capacity to meet traffic demands. These circumstances have resulted in excessive congestion and delay to ships; coastal vessels in the Saigon-Nha Trang-Da Nang-Qui Nhon trade, for example, are reported to spend more than two-thirds of their time in port, usually awaiting berthing space.

After the war, with modernization and reconstruction of the highway system and the full restoration of the railway, the demand for coastal shipping will undoubtedly diminish. However, some base traffic for which coastal shipping is the cheapest and most convenient mode will surely continue. This traffic will be generated at Saigon and at those outports having hinterlands of relatively concentrated population and production.

The Joint Development Group has reviewed the recommendations for port improvement made by the Director of Navigation and by consultants to USAID, and presents in this section for budget purposes

summarized estimates of cost of the improvements likely to be justifiable in the first ten years after the war (Figure 10.7)*. As post-war trends in waterborne commerce emerge, detailed economic and engineering feasibility studies should be undertaken for each of these projects before steps are taken to finance construction.

Marine terminals for bulk commodities (petroleum oils and lubricants, ores, coal, etc.) are usually associated with private industries or form a functional part of new development undertakings, and are therefore excluded from these estimates. It is assumed that handling capacity in these cases will be built and paid for in accordance with specific industrial needs. It may, however, be necessary to treat the needs of the proposed fertilizer industry as a special case, since location of the industry in the Mekong Delta will require extensive dredging of either the Mekong or the Bassac Rivers.

Saigon

1) Existing conditions - The port of Saigon with the equivalent of ten berths for ocean-going general cargo vessels in its commercial section and four modern berths at the Newport military terminal appears to have adequate capacity to meet present traffic demands. Under the stress of wartime conditions, the port is operating relatively efficiently and, at the commercial port, wharves may be handling up to 250,000 metric tons per year per berth. This is twice the rate normally achieved at modern general cargo marine terminals in the United States. It is accomplished by virtue of a relatively high proportion of bagged or semi-bulk cargo, which can be handled faster than more diversified general merchandise, by longer working hours than are usually acceptable to stevedore labor, and by a high rate of occupancy of ships at berth.

2) General cargo commerce - Saigon is now reported to be handling upwards of 2,500,000 metric tons a year at its commercial port; forecasts of deep draft general cargo tonnage in Saigon indicate volume of 3,200,000 metric tons in 1970, 4,400,000 metric tons in 1975

* Port Development, JDG Working Paper No. 36.

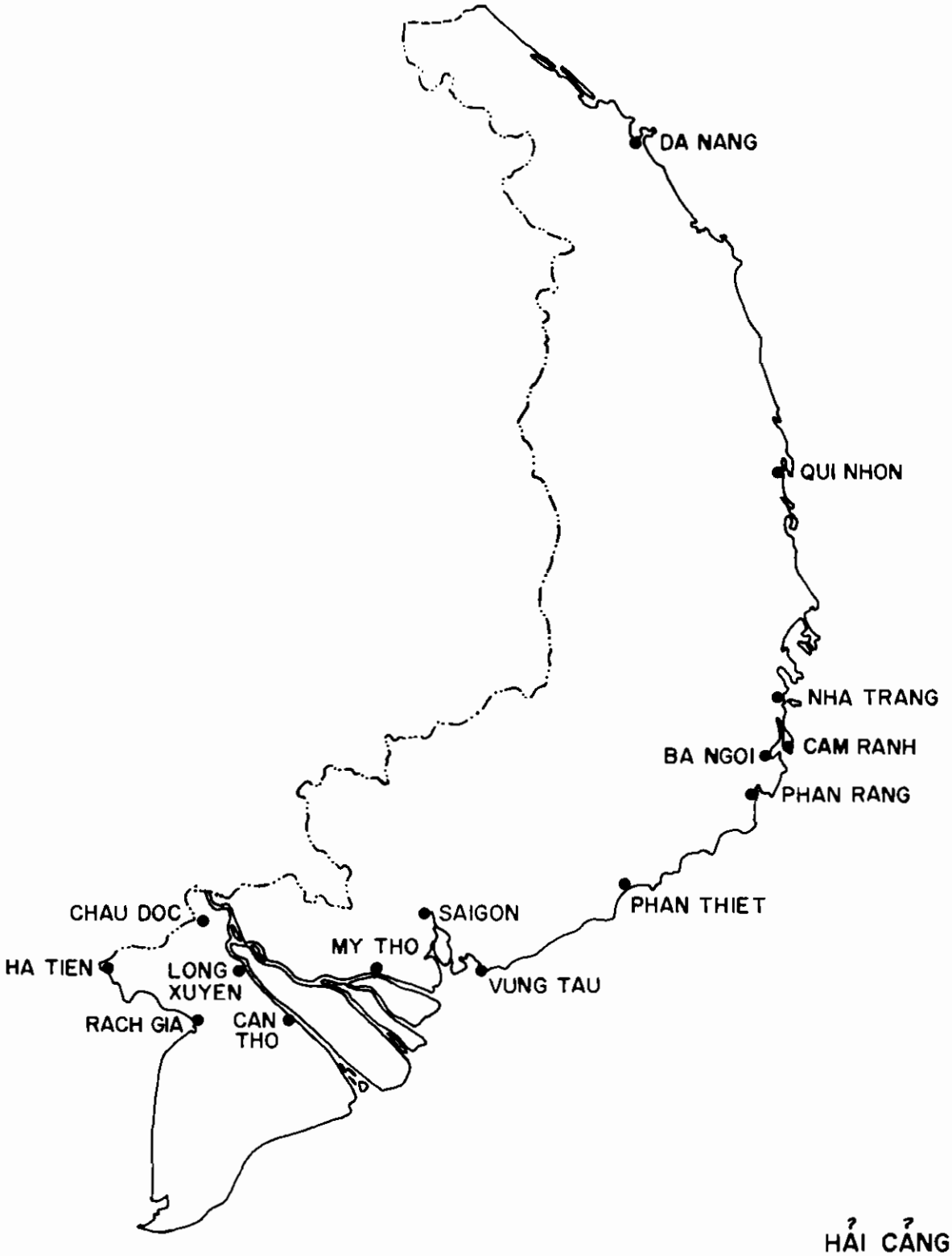
and 5,500,000 metric tons in 1980*.

3) Post-war port capacity - After the war, the release of the Newport terminal for civil use would probably accommodate deep draft general cargo demand through 1971 or 1972, and possibly longer. However, it is most unlikely that the Newport terminal will be converted to civilian use by that time, and it is conceivable that the entire terminal will never be released. On this assumption, additional marine terminal construction should probably proceed immediately after the war so that Saigon can handle increasing general cargo demands without undue congestion.

On the other hand, note must be taken of new trends in marine transport, especially the advent of containership services. The use of containers, loaded on specially designed or adapted vessels, is revolutionizing ocean transport. Trends in the industry are still changing, but an expansion of such services is certain; extensive use is already made of containership transport to Vietnam by the US armed forces. Berths for container vessels handle upwards of 400,000 metric tons of general cargo per year. They are characterized by broad open working spaces adjacent to the ship for storage and for assembly of containers. Transit sheds are unnecessary. Unless ship-mounted equipment is available, berths are fitted with gantry cranes. The use of one or both of the open berths at the Newport terminal for container services (as at present), and the possible conversion of the present K-10 open berth, at the commercial port, either separately or together, would greatly add to post-war commercial port capacity at little or no capital cost.

4) Post-war development - When post-war trends in waterborne commerce can be seen, the question of port capacity for Saigon should be examined in more detail. For budget purposes, however, it is reasonable to assume that some investment in additional port capacity is going to be needed at Saigon during the first ten years after the war and an estimated construction cost of US $6,000,000 is assumed. This

* "Development of Harbor Facilities for the Port of Saigon," USAID (Daniel, Mann, Johnson and Mendenhall), 1966.



HẢI CẢNG VIETNAM
VIETNAM PORTS

HÌNH 10-7
FIGURE

would be adequate for construction of two marginal general cargo berths of 180 to 190 meters in length with transit sheds and related facilities. Alternatively, this sum would be adequate for construction of a single open berth equipped with gantry cranes for container operations.

5) Other works - Establishment of a customs-controlled Free Trade Zone has been suggested on the Saigon River near An Khanh, about 2.5 km below the present commercial port. Free trade zones are the key to the commercial success of Hong Kong and Singapore; whether Saigon can support the entrepôt activity necessary for a viable customs free zone of this kind is doubtful at the present time, but the idea is a good one and will bear further study after the war.

6) Coastal shipping - All the deep draft terminal facilities of Saigon's commercial port are available to coastal traffic and there are literally hundreds of other locations in the port's many waterways where small vessels, especially rice barges and junks from the Delta, can be worked. Further development of terminals for coastal traffic at Saigon should not be necessary.

The Directorate of Navigation has represented the need for channel improvements in the Saigon River and for a range of improvements to shore facilities in the commercial port area. An allocation equivalent to US $500,000 per year is made in these estimates for work of this kind.

Overall, the foreign exchange component of the various works described is taken to be about 40%, and the total budgetted development expense for Saigon is as follows:

Foreign Exchange	-	US $ 4,400,000
Local Currency	-	VN $775,000,000

The terminal construction is assumed to take place in the period 1973-1975.

Da Nang

Da Nang is the commercial center of the I Corps Tactical Zone and has good connections by road and rail with all the northern provinces of Vietnam. It will clearly be a center for post-war development in this part of the country. Some of the prospects for post-war development in Da Nang's hinterland are reviewed elsewhere in this report (Chapter 12), and in 1969 the Joint Development Group will make additional development studies of the area.

Until very recently, the port of Da Nang provided terminal facilities for coastal vessels only. Deep draft ships were anchored in the bay and cargo was lightered to and from the shore. The US Armed Forces recently constructed a deep draft marine terminal with six deep-water berths on Tien Sha, opposite Da Nang, together with land connections and cargo storage facilities.

The commercial port of Da Nang is on the Song Vinh Dien, near the town center. It consists of a group of concrete and wooden marginal wharves providing berthing space of about 638 meters for coastal vessels. This includes new construction in 1968 which was to have been completed by the end of that year.

Systematic repair, replacement and possible extension of the coastal vessel berthing area will be required over the first ten years of the post-war period, probably at a rate equivalent to about US $100,000 per year, inclusive of local currency requirements of VN $7 million per year. These funds could also be used for conversion of the US military landing craft terminal located near the commercial port area.

In the long term, Da Nang's ability to attract a substantial share of Vietnam's deep draft waterborne commerce, in competition with Saigon, is doubtful. Charter vessels will have occasion to call, but steamships are attracted to ports where better opportunities to assemble cargoes are found. Similarly, liner services are not usually scheduled to outports such as Da Nang, preferring surer prospects of larger cargo offerings at major ports.

The deep draft terminal facilities built by the US Armed Forces are not conveniently located for efficient civil port operations. However, they represent a substantial investment and their combined cargo-handling capacity, if available for civil use, could easily accommodate deep-draft general cargo traffic at Da Nang for the first ten years after the war. Accordingly, no post-war capital investment in deep draft terminals at Da Nang is believed to be necessary.

Cam Ranh Bay

Cam Ranh Bay is probably one of the world's great natural harbors. Its protected entrance and the natural deep waters of the bay (5 to 15 meters) afford unusual advantages for development of a marine terminal to serve large ocean-going ships. The US Armed Forces have taken advantage of this situation and have built on Cam Ranh peninsula a major port complex comprising several piers and adjacent cargo handling areas.

Because of the natural advantages of the site, and the large investment which has already been made, a range of possible post-war uses has been suggested involving forms of industrial and urban development. Regardless of what may eventually happen at Cam Ranh, no further public investment seems to be required for deep-draft general cargo port facilities.

Across the bay from the military port lies the town and port of Ba Ngoi. Here the first construction phase of a new town, "Cam Ranh City," intended primarily to house workers in the nearby military facilities is being completed. At Ba Ngoi there is a small pier for coastal vessels. This has deteriorated badly but is now being reconstructed at a cost of US $500,000. No further investment is deemed likely at Ba Ngoi in the ten year post-war period.

Other East Coast Ports

The east coast of Vietnam affords a number of other protected locations for port development. Small piers and wharves for coastal vessels have been built at Quang Ngai, Qui Nhon, Nha Trang,

Phan Thiet and Vung Tau. Generally waterborne commerce to most of these ports has been upbound from Saigon and has been dominated by rice shipments. Vung Tau has been recommended as a site for transshipment of cargo from ocean vessels to smaller ships for delivery to points in the Mekong Delta*.

Specific improvement projects for both deepwater and coastal shipping trade have been identified at each of these ports. Each has a definable hinterland area, where rapid post-war agricultural development is likely to occur. While it is unlikely that deep-draft port facilities could be justified at any of these locations, repair and minor expansion of coastal shipping terminals may be appropriate. For budget purposes, the Joint Development Group assumes an expenditure of the equivalent of US $2,500,000 for these ports over the ten-year post-war period, divided between local currency and foreign exchange as follows:

Foreign Exchange	-	US $ 1,000,000
Local Currency	-	VN $180,000,000

The Delta Ports

The importance of the Delta ports is that they are collection and forwarding points for the Delta's agricultural produce to Saigon. In 1963, for example, Delta river ports accounted for over 1,000,000 metric tons of waterborne commerce; two-thirds of this was rice destined for the capital.

Traffic moves in a variety of small inland waterway barges and self-powered junks, the largest being barges of approximately 200 metric tons dead-weight capacity. These craft wind their way through the intricate canal system of the Delta from widely dispersed loading points. While there are limited opportunities for mechanization of cargo handling to and from the inland waterway craft, the river ports will not require investment in fixed terminal facilities in the ten-year post-war period. Over the long term, of course, there is a prospect

* "Development of Harbor Facilities for the Port of Vung Tau," USAID (Daniel, Mann, Johnson and Mendenhall), 1966.

for handling rice in bulk form instead of in bags as at present, and in that circumstance, much more elaborate central loading and storage points with mechanical loading and unloading equipment would be required.

In addition to the inland waterway traffic originating in the Delta, however, coastal and small ocean-going ships move up the Mekong from the sea. In 1967, from 40 to 60 ships a month made this passage, approximately half of the vessels being destined for My Tho, and the rest for Cambodia. The maximum size of a ship is limited to a draft of about 5 meters and a dead-weight tonnage of roughly 2,000 tons. The Bassac is a more direct route into the Delta from the sea, but, owing to enemy activities, the channel has been too hazardous for steamship operations in recent years.

After the war, one Delta river port, possibly My Tho, on the Mekong, or Can Tho or Long Xuyen on the Bassac, might be developed with terminal facilities for ocean-going ships. The basis for commerce would be the agricultural production of the Mekong Delta, initially rice. In past years, Vietnam exported up to 340,000 metric tons of rice per year. The proposed water-control project for the Delta is expected to increase substantially the country's export potential in agricultural commodities.

Can Tho probably affords the best prospects for port development. It is not as close to the open sea as My Tho, but the Bassac channel is less circuitous than that of the Mekong, and dredging requirements to Can Tho would be less than to My Tho *. While development of another outport directly handling exports from the Delta would compete with Saigon and would involve radical changes in the present system of commodity collection, shipment and distribution from Delta areas, the very large potential volume of export trade (possibly 20% of the Delta's estimated future production of 10 million tons) might afford a valid basis for a new deep draft port.

A port at Can Tho would require dredging from a point 20

* "Mekong River Crossing," USAID (King and Gavaris-Peril) Figure VI-19, 1968.

km offshore of the mouth of the Bassac upstream for 110 km. Initial operations could probably take place with a relatively shallow channel of 5 meters at low water (8 meters at high water) permitting access by C-1 and C-2 type dry cargo vessels. Dredging to assure a low water depth of 5 meters would require removal of roughly 3.0 million cubic meters of material*. Later dredging to a depth of 8 meters at low water would probably be indicated.

The cost of such a development including first stage dredging, navigation aids, terminal and shore access facilities might be in the order of US $8 to $10 million, of which 40% would probably be foreign exchange. The development would probably not take place until the latter part of the ten-year post-war period, though this could be rescheduled to take into account the needs of a fertilizer industry, if, in the event, this is located at Can Tho. The Joint Development Group is including in its estimates an allocation of US $4,000,000 and VN $710,000,000, distributed equally over the years 1976, 1977 and 1978, for this project.

Summary of Post-War Investment in Ports

Investment in the individual projects discussed in this section will total US $9.8 million and VN $1,735 million over the ten-year post-war period as shown in the accompanying summary Table:

	US $ (millions)	VN $ (millions)	Total (US $) (millions)
Saigon	4.4	775.0	11.0
Da Nang	0.4	70.0	1.0
Cam Ranh	-	-	-
East Coast	1.0	180.0	2.5
Can Tho	4.0	710.0	10.0
TOTALS:	US $9.8	VN $1,735.0	US $24.5

* "Mekong River Crossing," USAID (King and Gavaris-Peril), Figure VI-19, 1968.

SECTION IV INLAND WATERWAYS

The natural and man-made waterways of the Mekong Delta total nearly 5,000 km, and water transportation has traditionally been the dominant transport mode of the region (Figure 10.8). In recent years, enemy action has sharply restricted traffic on some canals and a considerable shift to truck transportation has taken place. Because of the war, canal maintenance dredging has been neglected, so a number of waterways are now badly obstructed, though almost all are still navigable to some extent. Estimates by others in recent years indicate that the backlog of maintenance dredging required is about 15 million cubic meters*.

The Directorate of Navigation (DON) maintains a dredge fleet with a rated capacity for dredging of about 10 million cubic meters annually. This represents the approximate volume of maintenance dredging required each year; before the war the fleet was fully utilized in this work.

Through enemy harassment and loss of personnel, the dredge fleet's capability has been severely reduced. Current programs of the DON, USAID and the Republic of Korea are directed to the training of additional dredge crews and improving dredge maintenance, leading to restoration of the full capabilities of the existing dredge fleet.

Post-War Waterway Development

Where large volumes of bulk commodities are available for regular haul, as is the case for rice between the Delta and Saigon, inland waterway transportation is traditionally much cheaper than highway transportation. At the present time, for example, the cost of

*"Mekong River Crossing," USAID (King and Gavaris-Peril), 1968.

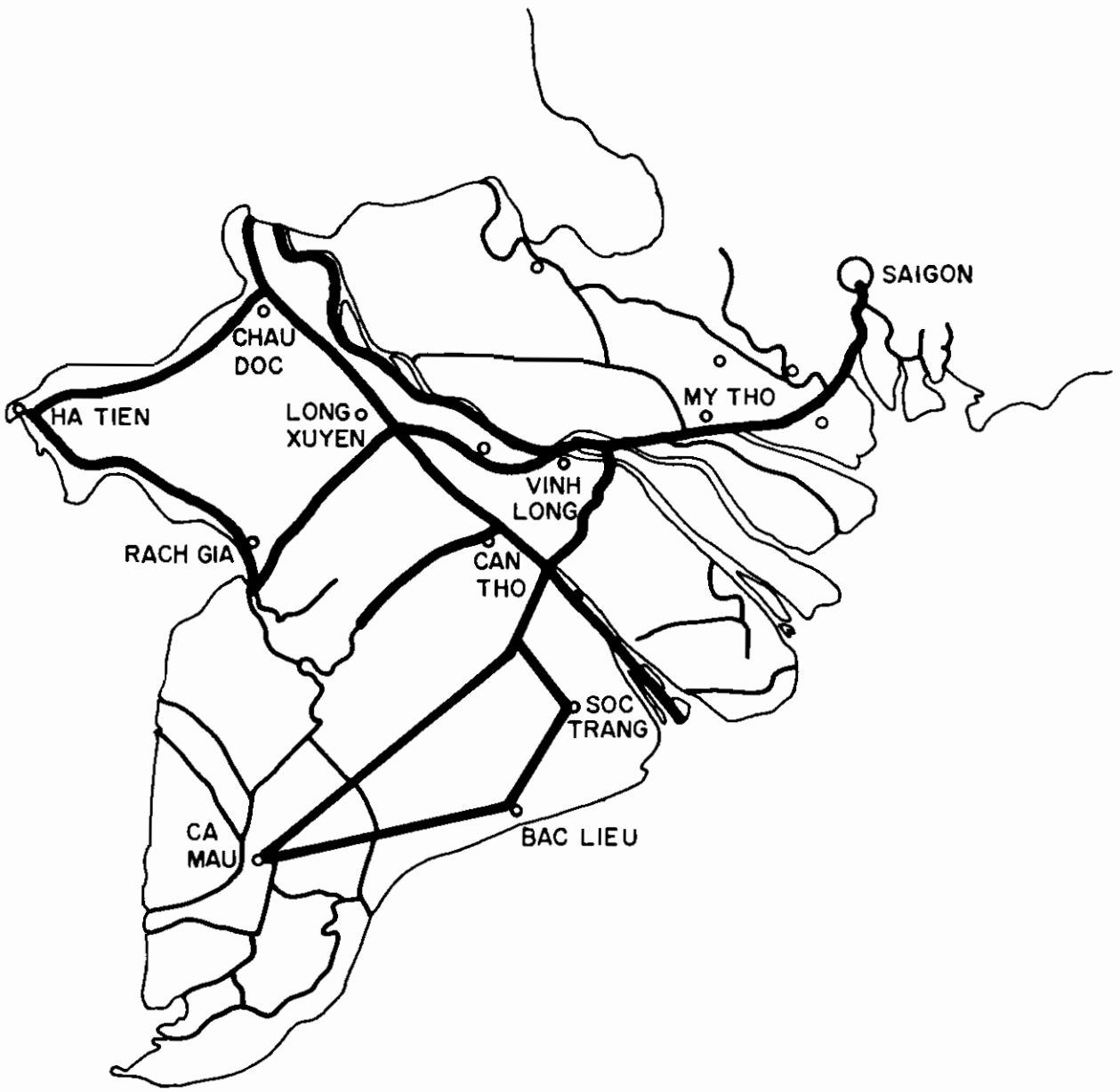
barge transport between the Delta and Saigon is estimated to be only one-fifth the cost of truck transportation. Transportation rates, of course, are now distorted by wartime conditions, but the basic relationship between the two modes in the Vietnam Delta is roughly similar to that obtaining elsewhere in the world.

The project for Mekong Delta water control (Chapter 12) may result in increasing Delta agricultural production to 10 million tons annually. This tonnage will be potential to the inland waterway system. The expansion of agricultural production in the Delta will also give rise to substantially increased opportunities for backhaul traffic from Saigon to the Delta, especially agricultural supplies.

Transport by barge of the whole of the Delta's produce and supplies by the existing inland waterway system is not likely. There is no question that highway transportation will continue to capture an increasing share of the Delta's traffic. The speed, convenience and flexibility of truck transport will certainly account for the complete conversion of all general goods traffic from barge to truck. Present plans for reconstruction of the Delta's highway system will encourage this trend. The direct export of commodities from a possible new deepwater port in the Delta, at Can Tho or elsewhere, may also affect the tonnages available to be carried on the traditional canal system.

Ultimately, however, there will remain a substantial movement of freight by barge in the post-war years. To serve this traffic, the inland waterways must be restored to usable depths (at least 2.0 meters on all principal canals). This work can probably be accomplished with the existing dredge fleet of DON, provided steps are taken to ensure dredging operations at full capacity. Some inland waterway improvement is also expected to be undertaken as part of the Mekong Delta water-control project; this would consist of canal deepening for improvement of hydraulic flow characteristics and installation of navigation locks.

For minor realignment of canals, possible construction of new links, and related works, a post-war development budget equivalent to US $5 million is suggested for the ten-year period after the war.



HỆ THỐNG ĐƯỜNG NƯỚC CHÁNH NỘI–ĐỊA
PRINCIPAL INLAND WATERWAY ROUTES

HÌNH
FIGURE 10-8

Approximately one-half of this amount is assumed to be foreign exchange; the distribution of estimated cost is:

Foreign Exchange	-	US $2.5 millions
Local Currency	-	VN $295 millions

SECTION V AIRPORTS

Air transportation has been vital to the war effort in Vietnam and at present the country has over 100 operational airports (Figure 10.9). Many of these are now available only for military or military-approved air operations.

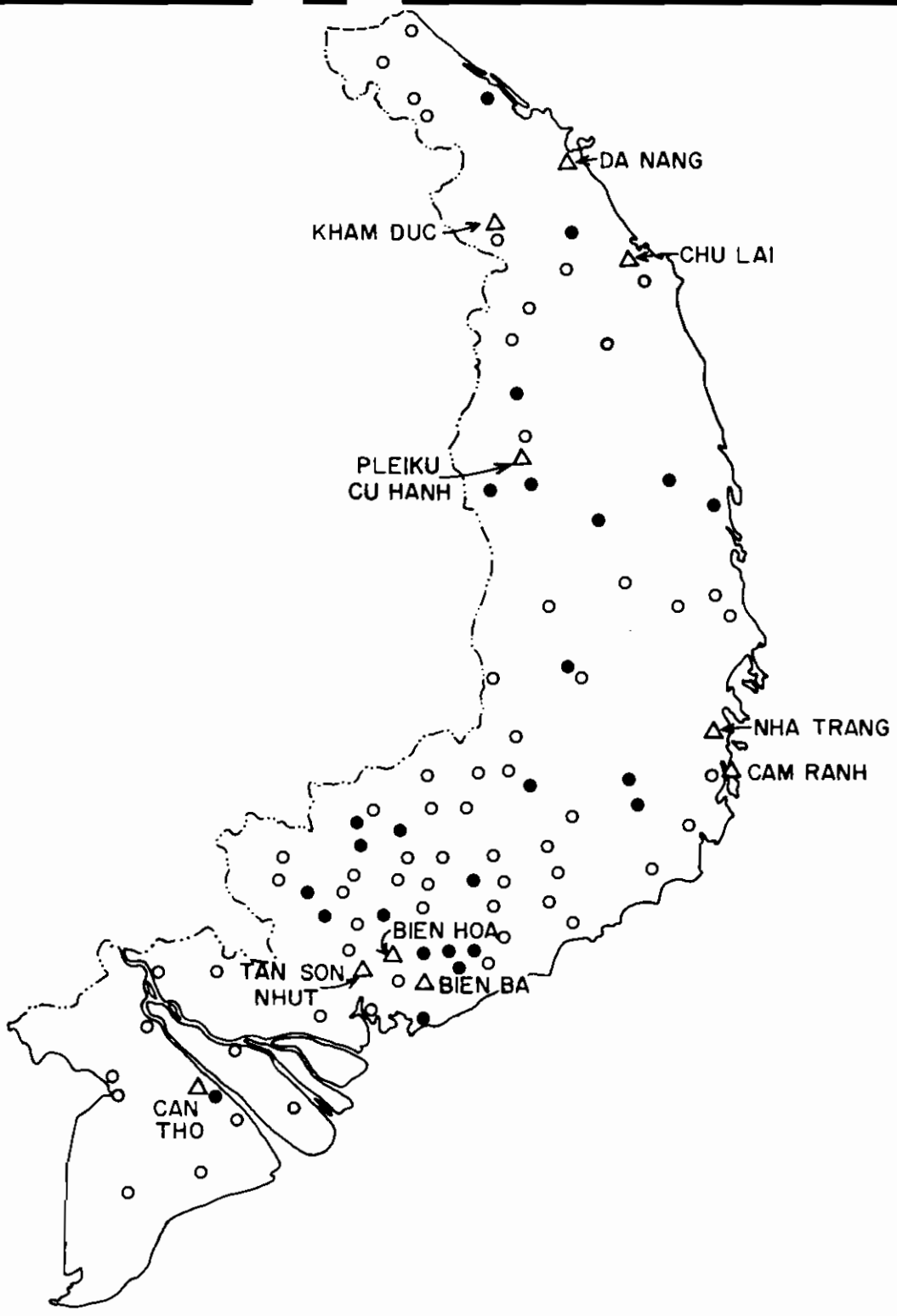
Present Programs

Because of the military significance of air transport, most of the current improvements to airports are being accomplished with military funding. Planning for civil aviation requirements is directed primarily to programs for improved operation and maintenance. The Directorate of Civil Aviation (DCA), Air Bases (DAB), and Meteorology (DOM), are active in this effort. The USAID-DOD funded programs are directed through a Civil Aviation Advisory Group (CAAG). Primarily advisory programs, they provide for training, air traffic control, navigational aids and general technical assistance.

Post-War Development of Airports

Having already a very well developed system of airports, Vietnam will probably require no further airport construction for a long time, and certainly none in the ten years immediately following the war. In fact, present yearly passenger air travel (one million passengers) and civil air freight shipments (10,000 tons) will probably diminish in the post-war period.

As military activities decrease, Vietnam must decide on the ultimate disposition of the airport system. Some airports may require substantial modifications for their conversion to full-time civil use; others may need only minor improvements, especially runway lengthening, to meet the needs of modern civil aircraft. Others will not be wanted at all. The Joint Development Group recommends the formation



GHI CHÚ
LEGEND

△ 6000' VÀ HƠN
6000' AND OVER

● TỪ 4 ĐẾN 5000'
4 TO 5000'

○ DƯỚI 4000'
UNDER 4000'

PHI CẢNG VIETNAM
VIETNAM AIRPORTS

HÌNH
FIGURE 10-9

of a post-war airport development group with representatives of DCA, DAB, DOM, Air Vietnam and ARVN to select a manageable system of existing airports for post-war development. The planning of this system will require definition of standards for airports of varying sizes and consideration of expected future patterns of air travel and domestic air freight.

A major question will concern Tan Son Nhut. It is recognized that in the distant future the continued growth of Saigon may conceivably dictate relocation of this facility. In the immediate post-war period, however, it can continue to operate as a joint civil-military airport similar to Don Muang International Airport in Bangkok.

As an airport program is developed, funding requirements can be determined. For budgetary purposes an investment equivalent to US $5,000,000 is assumed. This might comprise 60% foreign exchange as follows:

Foreign Exchange	-	US $3,000,000
Local Currency	-	VN $236,000,000

A companion study to plan for alternative peacetime uses of those airports which are not needed for air operations is also desirable. While some airports may be abandoned, others may be usable for industrial sites, equipment depots and similar purposes.

SECTION VI SANITATION

This section concerns programs for sanitation infrastructure as distinct from the broader subject of public health which is treated elsewhere (Chapter 11). Adequate sanitation is essential for the prevention and elimination of disease and is a key element in assuring acceptable standards of public health. The Joint Development Group, in cooperation with the Ministry of Health, the Directorate of Water Supply and other agencies has begun preliminary consideration of the whole complex of the physical improvements, organization and personnel requirements for an effective sanitation program in the post-war period*.

Physical Improvements

The principal elements of sanitation infrastructure are the provision of adequate potable water supplies and the construction of sanitary sewerage systems.

1) Potable water supply - The priorities for expansion of potable water supplies in Vietnam are the principal cities and towns. Saigon has a new supply capable of providing 500,000 cubic meters of potable water per day. This is sufficient to provide 125 liters per day for a population of over 4,000,000 persons.

The Directorate of Water Supply has plans and priorities for the improvement of potable water supplies in six provincial towns at an estimated cost of US $36 million. The Joint Development Group is in accord with this program and recommends that this amount be budgeted for post-war development of water supplies in the ten-year period after the war. The estimated foreign exchange component is 60%, or about US $22 million. The Joint Development Group also recommends the

* Sanitation Development, JDG Working Paper No. 37.

dissemination of information to rural areas on correct methods for development of rural potable water supplies from rivers, wells and rain water catchment.

Not included in this budget estimate are current USAID programs for improvement of the Saigon water distribution system of US $3 million in FY-69, USAID programs for provincial towns of US $1.3 million, and USAID programs for rural water supplies of US $2.2 million.

Longer range plans for water supply development of the Directorate of Water Supply contemplate the expenditure of the equivalent of US $47 million in ten other provincial towns. Until operating and administrative improvements within the Directorate of Water Supply are effected, and until technical staff now serving with the Armed Forces are returned or replaced, this program should be deferred.

2) Sanitary sewerage and storm drainage - The sanitary disposal of human wastes is critical to the success of a national sanitation program. In Vietnam there are few sanitary sewers and those sewers which exist are old and inadequate to meet modern demands. Standing water is common in residential areas, and during rains storm drains are wholly inadequate to carry the heavy run-off.

There has been no comprehensive consideration of these problems in Vietnam but USAID is about to undertake an examination of the sanitary sewerage and storm drainage requirements of Saigon. The Joint Development Group recommends that similar studies be undertaken for all major towns. These will include inspection of present drainage systems, and preparation of plans to carry out urgently needed sewerage and drainage improvements. The estimated cost is US $1.5 million. As part of this effort, simple methods of removing sanitary wastes should be developed. These might include cesspools, large septic tanks and stabilization ponds.

The large-scale construction of sewage treatment plants is not contemplated during the immediate post-war period. Vietnam's first primary treatment plant is being built at Cam Ranh City, but the country

has not yet acquired the expertise to operate major sewage treatment systems.

Sewage treatment requires systems of sanitary sewerage piping, almost non-existent in Vietnam at the present time. It has been estimated that basic sanitary sewerage for the larger towns and cities might cost around US $500 millions. But sanitary pipe systems would be superfluous until waterborne sewage is practical and until urban domestic water supplies are more fully developed. A more modest program, estimated to cost the equivalent of US $40 millions, is suggested as appropriate and feasible for the ten-year period after the end of the war.

3) Other improvements and activities - There are a range of other sanitary service improvements and activities needed in Vietnam. These include:

a) The establishment of a revolving fund for purchase of garbage removal trucks by provincial cities, to be recouped by a tax for the service.
Initial cost: US $3 million.

b) Strict application of Decree No. 10 concerning the sanitary storage and disposal of garbage.

c) Mass education on sanitary garbage handling and disposal.

d) The use of garbage for agricultural manures and animal (hog) food.

e) Construction of simple public latrines in congested areas of cities and towns.
Estimated cost: US $1 million.

f) Development of standards and dissemination of construction information for family latrines in rural areas.

g) Education on sanitary food handling at public eating places.

h) Continued programs of pest and insect eradication, especially anopheles mosquitos (malaria), and fleas and rats (plague). Widespread public education programs are important in this effort.

i) Slum clearance and refugee resettlement (treated in a separate section: Housing).

j) Public health education.

k) Sanitation for emergency (war, flood) conditions.

Legal and Organizational Improvements

The principal legal bases for sanitation are:

- Decree No. 10 (16 May 1954) which defines regulations for urban sanitation.

- Decree No. 59 (25 October 1956) which defines standards for rural health.

- Decree No. 559YT (28 April 1954) which establishes the Public Sanitation Service.

- Decree No. 560YT (28 April 1954) which establishes the Provincial Sanitation Services.

There is some duplication between the prescribed activities of the sanitation services as defined in Decrees 559YT and 560YT and the Public Health Service. These overlapping functions should be eliminated.

Personnel

None of the sanitation programs suggested can be effective

until adequate sanitation personnel become available. Personnel requirements are estimated to be as follows:

14 Public Health engineers (graduate engineers with one year of training abroad).

320 Sanitary technicians (second baccalaureat degree and graduation from the health training course).

500 Sanitation cadres (first baccalaureat degree and graduation from sanitation cadre training course).

To provide this staff, the Ministry of Health is planning a National Health Institute to be built at a cost of US $2.5 million. This investment is included in the ten- year post-war development program. The Ministry estimates that under its proposed training programs each year two health engineers can be trained abroad, and 32 health technicians and 50 sanitation cadres can be trained in the Health Institute. The estimated annual cost of training is VN $4 million.

Summary of Cost

The components of sanitation infrastructure included in post-war development estimates are as follows:

	Foreign Exchange (millions)	Local Currency (millions)	Total (millions)
Water Supply	US $ 18.0	VN $ 212	US $ 36.0
Sewerage	15.0	295	40.0
Sanitary Plans	1.5	-	1.5
	US $ 34.5	VN $ 507	US $ 77.5