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INTELLIGENCE MEMORANDUM

CHINESE COMMUNIST MILITARY CONSTRUCTION  
AND LOGISTIC ACTIVITY  
IN THE EAST CHINA - TAIWAN STRAIT REGION  
THROUGH JANUARY 1956

CIA/RR IM-427

13 April 1956

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FOREWORD

The purpose of this memorandum is to indicate the scope and intensity of Chinese Communist efforts to attain a position of military strength in the East China region, opposite the Nationalist-held off-shore islands and Taiwan, as evidenced by the expansion of logistic capabilities and the construction of airfields in the region. This memorandum is designed to provide basic background material from which to evaluate the continuing development of Communist capabilities in the area, to aid in determining Communist intentions toward the Nationalist positions, and to estimate the impact of the construction effort on the Chinese Communist over-all economic program.

The material and estimates in this memorandum are based primarily on aerial photography as interpreted in the field and by CIA. This memorandum has been coordinated within CIA but not with the other IAC agencies.

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(ORR Project 40.1018)

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CHINESE COMMUNIST MILITARY CONSTRUCTION AND LOGISTIC ACTIVITY  
IN THE EAST CHINA - TAIWAN STRAIT REGION\*  
THROUGH JANUARY 1956

Summary and Conclusions

The Chinese Communists in 1953 undertook a well-organized and carefully conceived long-term plan to overcome the traditional isolation of the East China coastal region and to attain a position of military strength on the mainland opposite Nationalist-held Taiwan (Formosa). The important factors in this plan have been road and railroad construction and the construction of a string of 10 airfields to extend capabilities for jet aircraft operations over the entire length of the China coast. Road construction was largely completed by early 1955; construction of the Ying-t'an - Amoy (Hsia-men) railroad may be completed by the end of 1956 (the northern section of the line, which will significantly improve present logistic capabilities, probably will be completed by mid-1956); and the 10 airfields should all be serviceable by mid-1956 at the latest.

The Ying-t'an - Amoy railroad is apparently being pressed to completion because of its importance for support of major military operations. Although the basic road net linking the coastal area with the Shanghai (Shang-hai) - Canton (Kuang-chou) railroad is virtually complete, further improvements, especially in bridging, would be necessary if primary dependence for major logistic support were to be placed on the roads. The intensity of the railroad construction effort indicates that this is not to be the case.

The Chinese Communists now have the capability to support full-scale air operations out of the completed airfields, and some jet fuel stockpiles may be on hand. It seems evident, however, that the Chinese Communists do not now have in the Taiwan Strait area sufficient stockpiles of military supplies to support a major offensive, such as an attack against Taiwan. An attack, however,

\* The estimates and conclusions contained in this memorandum represent the best judgment of ORR as of 1 April 1956.

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against the offshore islands has been considered within their capabilities for some time. The Swatow (Shan-t'ou) area, located at the southern end of the Taiwan Strait, has been provided with major military encampment facilities, sufficiently extensive to serve as a staging area for large-scale military operations. Although only about 50,000 troops are at present in the area, maintenance of larger forces would not unduly strain internal logistic capabilities, since the port is regularly served by Communist-flag shipping from Canton.

Although the Chinese Communists have not yet based aircraft at the newly constructed and serviceable airfields (except at one field at the northern extremity of the area under consideration), they have the capability to do so at any time. A Communist decision to activate these fields might be designed as a display of force for political and propaganda effect, or it could be part of actual preparations for military action. At a minimum, these fields, when activated, will greatly improve coastal air defenses. Substantial stockpiles of supplies could be brought into the Strait area in a short period of time by coastal shipping under cover of aircraft operating from these new fields.

The over-all cost of the roads and railroads and the airfield and military encampment construction program in the East China - Taiwan Strait region during 1953-56 is estimated at less than US \$200 million, or approximately 812 million yuan. This yuan estimate (although accurate only to the point of indicating general order of magnitude) amounts to no more than 11 or 12 percent of the 1955 defense budget announced by the Chinese Communists. Since the effort has been spread over several years, the magnitude of the program does not appear to have caused a major diversion of investment resources from other Chinese Communist planned programs or to have adversely affected over-all economic development.

The continued expansion of Chinese Communist military capabilities in the Taiwan Strait region places strength behind the frequently announced intention "to liberate Taiwan by force if necessary." Chinese Communist hopes of achieving their goal by means short of war are doubtless based in part on the intimidation effect which the buildup may have on the Chinese Nationalists and on the West. Nevertheless, the capability for a major offensive action, if a negotiated settlement fails, is rapidly being created. The scope and intensity of the effort are of such magnitude that it can only be concluded that the

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Chinese Communists are determined, by whatever means are necessary, to deny the Chinese Nationalists control of Taiwan.

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1. Introduction.

The capabilities of the Chinese Communists to conduct large-scale military and air operations in the East China coastal region opposite Taiwan are being rapidly and significantly improved. Two important factors contributing to these improved capabilities are (a) the intensive road and rail construction effort and (b) the construction of a series of airfields to extend capabilities for jet aircraft operations over the entire length of the East China coast.

An understanding of the geography -- including terrain, climate, and relative isolation -- of the coastal region between Ningpo (Yin-hsien) and Canton is necessary for an appreciation of the critical importance of the development of roads and railroads to the expansion of military and air capabilities of the region. The ruggedness and alignment of the mountains have made communications throughout the region extremely difficult and have resulted in its comparative isolation from the rest of China. The difficulty of land transportation is underscored by the traditional dependence upon water transport.

The mainland area opposite Taiwan, which includes Fukien (Fu-chien), northeastern Kwangtung (Kwang-tung) and southern Chekiang (Che-chiang) consists of 2 major regions of terrain, (a) a narrow coastal belt of hills and mountains and compartmentalized valley flats and (b) an interior belt of hills and mountains extending inland for 150 miles or more. The coastal hills and mountains trend north or northeast, reaching the sea in many places as rocky promontories. Irregularly shaped inlets and bays are numerous, and the combination of hilly headlands and coastal indentations has restricted land movement along the coast. Flat land is restricted to small flood plains of the larger rivers and discontinuous narrow strips along the coast. Numerous rocky

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islets and hilly islands dot the coastal area. The interior hills and mountains are characterized by northeast-southwest trending ridges, averaging between 2,000 and 4,000 feet in altitude but reaching 6,000 feet along the Fukien-Kiangsi (Chiang-hsi) border. Major streams flow from the west to the south or the southeast, thus cutting across the topographic grain at right angles. Consequently, their valleys usually are narrow and constricted with rapids and gorges at many points, a factor which restricts their use as navigable waterways. Possible road alignments are restricted, generally, to deep, narrow river valleys. Most alignments require many short-radius curves, hairpin turns, and steep grades. Space for easily constructed alternate routes or detours is rarely available.

Both overland and water transportation are subjected to considerable interruption by climatic conditions. Average annual precipitation is between 25 and 70 inches, with the heaviest amounts falling during late spring and early summer. Winter months commonly have only light precipitation. The amounts vary considerably within the region, with coastal areas receiving moderate amounts and the heaviest totals recorded on the windward slopes of the higher mountains. Considerable year-to-year variation is experienced. During the rainy months, streams often rise sufficiently to wash out bridges, damage roadbeds, and, in some areas, cause earth slides on steep slopes. Considerable cloudiness and frequent fogs are characteristic of the coast and offshore island area during the cooler months. Several times a year (usually during the period between July and November) the coastal areas are visited by typhoons (severe storms average two a year). High winds, heavy rains, and abnormally high tides disrupt navigation and may cause considerable damage in restricted coastal areas. Variable and rather large tidal ranges, strong tidal currents, and pronounced seasonal variations in the amounts and direction of sea and swell characterize the coastal waters of this region.

Details and significance of the Chinese Communist efforts to overcome the traditional isolation of this region by extensive road and railroad construction and improvements, by the construction of military camps and supply facilities, and by military airfield construction extending jet aircraft capabilities over the entire coastal region are discussed in the following sections of this memorandum.



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2. Road Development.

In 1953 the Chinese Communists undertook an intensive program for reconstruction and repair of the basic road network in the East China coastal region, which has chronically lacked adequate overland connections with the rest of the Chinese transportation system. By early 1955, reconstruction of the road net, including roads linking the coastal area with points on the Shanghai-Canton Railroad, was largely complete.\* Many of the roads formerly classified as fair-weather one-way routes were improved to two-way roads capable of supporting limited all-weather operations.\*\* The 125-mile section of the Foochow (Fu-chou) - Wenchow (Yung-chia) coastal route from Ning-te north to Jui-an was formally opened on 1 January 1956, thus completing the entire coastal road from Ningpo to Canton.

Improvements to the main road network have included widening, surfacing, straightening, reduction of grades, drainage, and construction of bridges. On a few routes these improvements have amounted to a complete rebuilding of the roads. Bridges have been constructed at numerous ferry sites, but as yet the only completely bridged routes into the coastal region are the overland routes from the rail terminals at Shang-jao and Chiang-shan to Chien-ou, from Chien-ou to Foochow, and from Chien-ou to Chin-chiang and Lung-ch'i via Nan-p'ing, Yung-an, and P'eng-k'ou. Construction of the 900-foot, two-way bridge at Nan-p'ing completed in April 1955, eliminated the last ferry crossing on any of these roads. Although some bridge construction has been done on the coastal route and elsewhere, many ferry crossings remain. Unbridged water gaps severely limit the present logistic capacity of routes into both the Lu-ch'iao and the Swatow airfield areas.

In addition to undertaking construction of the Foochow-Wenchow coastal road, the Chinese Communists have been heavily engaged during 1955 in the construction of military access and service roads.

\* For detailed description and locations of the primary road network, see Appendix A and the map, Figure 1, following p. 67.

\*\* The term "limited all-weather" is used to describe those roads over which traffic may be disrupted by washouts, landslides, and other effects of unusually severe weather conditions but are normally motorable during all seasons.

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New road construction on the Pei-ling Peninsula during 1955 has linked all Communist strong points opposite the Nationalist-held Matsus (Ma-tsu) and provided a protected access route across the peninsula from a landing point on Loyuan (Lo-yuan) Bay.\* By September 1955 the construction of a road extending nearly the full length of the peninsula and connecting with the main coastal route had been completed. 1\*\* In the Amoy - Lung-ch'i area a new section of road has been built to serve as part of the main north-south coastal route, and numerous access roads have been extended to artillery positions and strongpoints on the mainland facing the Nationalist-held Quemoy (Chin-men) Islands. 2\*\*\* A causeway has been constructed, connecting Amoy Island with the mainland at Chi-mei, and an additional causeway is under construction between Kao-pu and Chi-mei. With the completion of the latter, it will be possible to bring the new trans-Fukien railroad into Amoy City itself. In addition, a causeway is being constructed to connect Ta-teng Island, directly north of Quemoy, with the mainland. At each new airfield, heavy-duty roads\*\*\*\* have been built to connect the installation with the main road net and with nearby supply facilities. In the Lung-t'ien airfield area, for example, roads have been built to connect with the main coastal highway and also to provide access to deep-water piers located on the southern part of the peninsula opposite Hai-t'an Island. 3

It is apparent that road reconstruction efforts have been concentrated in those areas within East China where overland supply would be of critical importance to the support of military forces and installations. The Swatow and Wenchow - Lu-ch'iao areas are comparatively easy to supply by sea, whereas water-borne movements into the Foochow-Amoy region involve a considerably greater risk of interdiction, both in the present situation of comparative calm and under conditions of combat. The routes which would be of primary importance as overland lines of supply are those on which the greatest amount of improvement effort, including bridging, has been expended. Capacities on all other

\* See the map, Figure 2, following p. 6.

\*\* For serially numbered source references, see Appendix G.

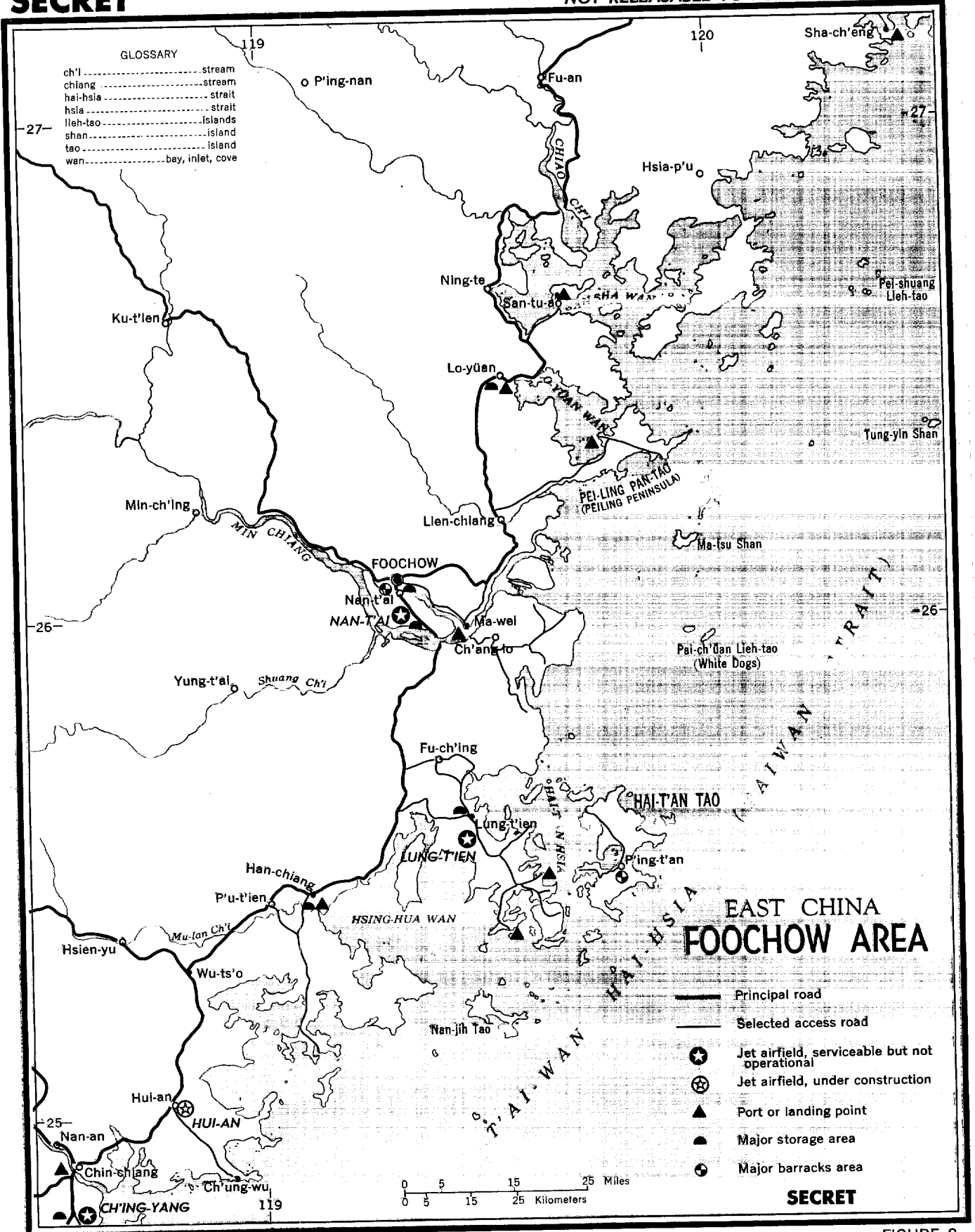
\*\*\* See the map, Figure 3, following p. 6.

\*\*\*\* A heavy-duty road is one capable of sustained two-way convoy-type traffic for periods up to 3 days without maintenance.

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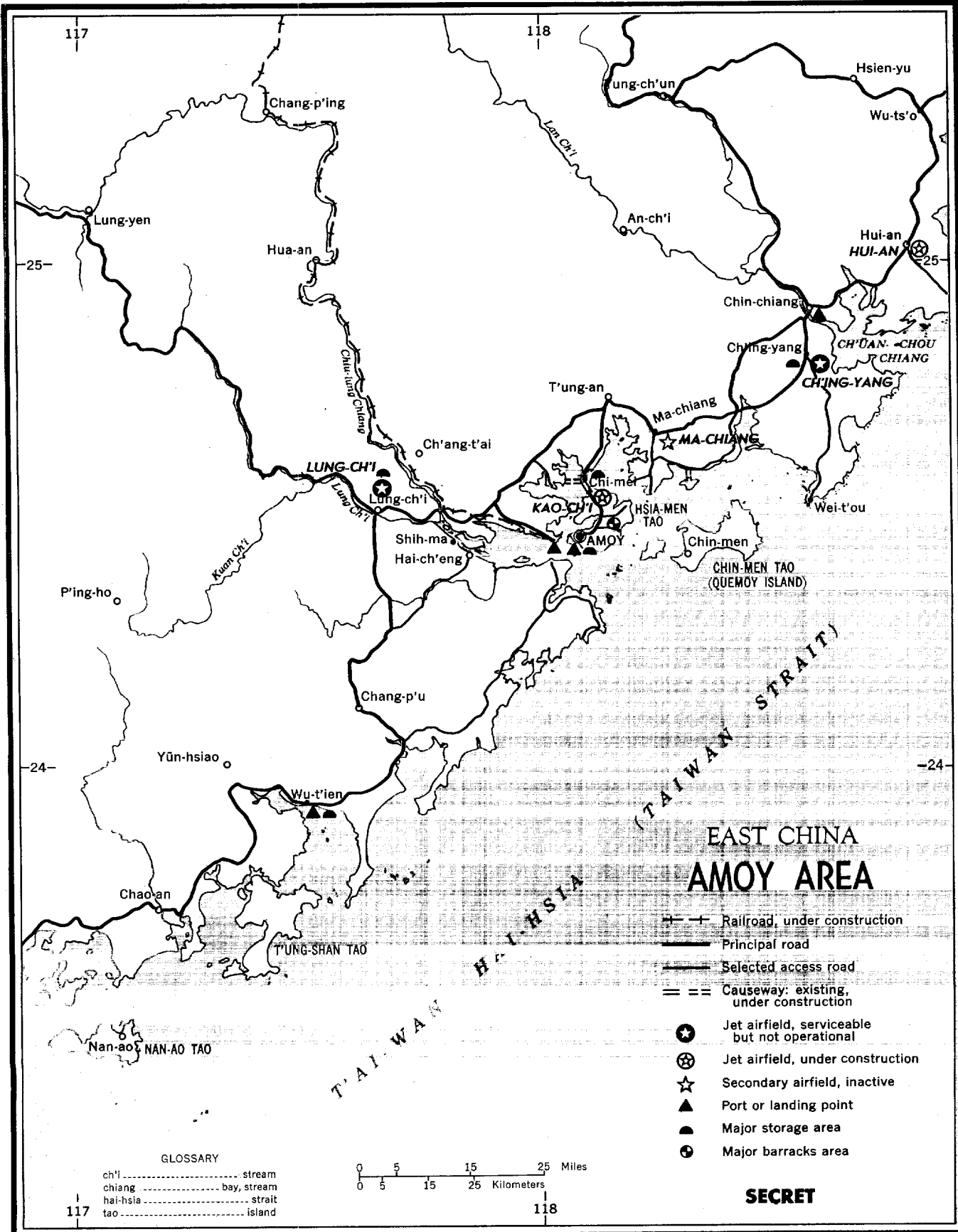


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FIGURE 2

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routes, which are secondary but of potential importance as feeder or alternate roads to the main lines of supply, are severely limited by lack of bridging. It is estimated that these limitations could be largely overcome in a matter of a few days, however, by the use of pontoon bridging or by the concentration of ferry facilities if the Communists determined that they needed the additional capacity of these routes.

The total estimated capacity of the overland routes connecting the Fukien coast with the interior is about 1,800 metric tons\* each way per day (EWPD) for sustained operations.\*\* Capacity of the primary roads connecting the P'eng-k'ou - Chien-ou lateral road to supply areas on the Hangchow (Hang-chou) - Nan-ch'ang section of the railroad, however, is only about 1,300 tons per day. This factor would necessitate the use of the Ch'u-chiang - Peng-k'ou and Nan-feng - Nan-p'ing feeder routes (which are not completely bridged) if the maximum tonnage possible is to be delivered overland to installations in the Foochow-Amoy coastal region. It is estimated that it would require some 1,300 2 1/2-ton trucks to deliver the maximum tonnage over the trans-Fukien routes to the coast, and that it would require an additional 2,000 or more vehicles to stage supplies from the rail terminals into the Chien-ou - Nan-p'ing - Peng-k'ou lateral road. It is estimated that there are about 3,600 trucks assigned to all military units now stationed in Fukien.

### 3. Railroad Construction.

In late 1954 the Chinese Communists initiated construction of a rail line from Ying-t'an on the Canton-Shanghai Railroad across Fukien to the coastal port of Amoy. The earliest press reference to construction of this line, which will for the first time provide Fukien and the East China - Taiwan Strait region with a rail connection to the rest of the Chinese rail transportation system, appeared in mid-1955. The Chinese Communist Five Year Plan (1953-57) provided for construction of 275 miles of the 400-mile Ying-t'an - Amoy rail line. 4/ More recent announcements have indicated, however, that increased priority is being given in order to complete the line ahead of schedule, and on 30 October 1955 it was stated that the line would be extended as far as Yung-an in 1956. 5/

\* Tonnages throughout this memorandum are given in metric tons.

\*\* See Appendix A.

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It is evident that an intensive effort is being made by the Chinese Communists to complete this rail line, or at least to extend it as far as Yung-an, in as short a time as practicable. Eight of the 11 military engineering divisions of China were working on this section of the line in late 1955. 6/ Two divisions were assigned to the project in the last quarter of 1954, 4 divisions were assigned in the summer of 1955 (after completion of construction on the Fort Bayard (Chan-chiang) line some 6 months ahead of schedule), and 2 divisions were assigned in the fall of 1955. The release of experienced construction divisions from the Fort Bayard line for early assignment to the Fukien project contributes materially to the capabilities for completing this line ahead of schedule. Construction units are located at intervals all along the Ying-t'an - Yung-an section of the rail line on which grading work is in progress and bridge construction is under way. 7/ [REDACTED] construction work, including tunneling, has started below Yung-an and is in progress as far as Chang-p'ing, about 50 miles to the south. 8/

There is considerable evidence that the rail line will be completed as far as Yung-an even ahead of the 1956 target mentioned in the Chinese announcement of 30 October 1955. The large number of experienced construction units on the line and the progress of bridging, tunneling, grading, and track laying (at least 37 miles of track had been laid south from Ying-t'an as of 21 November 1955 9/) strongly suggest that the rail line will be completed to Yung-an as early as June 1956. It is estimated that the Communists have the capability to complete the line to Amoy in late 1956.

Completion of the Ying-t'an - Amoy rail line, or even completion only as far as Yung-an, will substantially increase Chinese Communist logistic capabilities in the East China - Taiwan Strait region. The capacity of roads extending across Fukien to the coast is greater than the existing capacity of routes connecting Yung-an with present rail terminals on the Shanghai-Canton Railroad. Completion of the new rail line to Yung-an would permit a greater tonnage to be delivered over the roads to the coast than is now possible and would also permit the transshipping of supplies to Foochow at the Min River port of Nan-p'ing. Although there is no available evidence as to the number of sidings and facilities that will be built along this line, it is believed that a rail line into this area would not be designed to handle less than 8 trains of 500 to 600 net tons EWPD, a total of 4,000 to 4,800 tons EWPD.

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4. Coastwise Shipping.

The importance of coastwise shipping for support of Chinese Communist military forces and construction activities and for possible stockpiling of supplies and equipment in the East China coastal region between Ningpo and Swatow became increasingly clear during 1955. The nature and location of much of the construction are indicative of the dependence being placed on waterborne supply. Feeder roads have been built to connect the main road network with ports and landing areas located a short distance apart along the entire coast.\* Nearly all of the new airfields have been favorably located with respect to coastal supply, and good road connections have been built to provide the fields easy access to port points.\*\*

Ports are generally primitive by Western standards (few have wharves that can accommodate even coastal-type shipping), but the ready availability of coolie labor and shallow-draft junks and sampans, suitable for use as lighters, permits the Chinese Communists to rely heavily on the coastal shipping route in spite of the very limited development of facilities.

Immediately following the Nationalist evacuation of the Ta-ch'en Islands in February 1955, Communist-flag coastwise shipping services were extended south into Wenchow. <sup>10/</sup> Shortly thereafter, Sha-ch'eng, a protected anchorage area about 75 miles south of Wenchow, emerged as a minor naval base for patrol vessels operating south along the coast, and by early May 1955 the Chinese Communists were running convoys of small (300- to 500-ton) coastal freighters into Foochow. These movements apparently took place mainly under cover of darkness, with the vessels taking refuge during daylight hours in Sha-ch'eng or in the San-tu - Lo-yuan Bay area. New supply areas have been developing near San-tu - Lo-yuan and in the Hai-t'an - Lung-t'ien area. Cargo transshipping operations have been observed in these protected anchorages as well as at Foochow. Thus far no Communist coastwise shipping has been noted moving south of Hai-t'an Island, but the Chinese have for several years conducted northward freighter runs into Swatow from Canton. During the latter part

\* For a brief description of port and protected anchorage points, see Appendix B.

\*\* See Appendix C.

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of 1955 the Communists appear to have placed a small coastal tanker in continuous service between these two ports. 11/

5. Airfields.

A major feature of the Chinese Communist effort to achieve a position of military strength in East China during 1955 has been the construction of a string of airfields extending jet aircraft capabilities over the entire coastal area between Ningpo and Canton. By the end of 1955, construction had been undertaken on 10 jet fields in this region, which was previously without facilities for conducting jet aircraft operations.\* Construction on Lu-ch'iao, the northernmost field of this group, was initiated in late 1954, and the field was completed and in operation by April 1955. Construction on 5 additional fields was started in early 1955 -- 2 in the Foochow area, 2 in the Amoy area, and 1 near Swatow. With the possible exception of Lung-t'ien, these fields were virtually complete and serviceable, although not in operation, at the end of 1955. The remaining four fields were in the early stages of construction or rehabilitation at the end of 1955. Judging from the pace of construction in 1955, one of these latter fields could be rendered serviceable by February and the remainder by April or May 1956.

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each is being prepared as a fully equipped airbase, with a runway 6,500 feet or longer -- capable of supporting either jet fighter (MIG-15 and MIG-17) or jet bomber (IL-28) activities on a sustained basis. Jet-configured aircraft revetments, shops and storage buildings, revetted fuel storage areas, gun-testing ranges, and other operational facilities\*\* have been noted in nearly every case.

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Although the aircraft capacity of each field has not been calculated, Lu-ch'iao is known to have had as many as 78 jet fighters on the field at one time.

Attention has evidently been given by the Chinese Communists in the selection of airfield sites to the problem of logistic support and alternate lines of supply. Each of the coastal fields

\* For a brief description of the airfields, see Appendix C.

\*\* See Appendix C.

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has been located so that it has easy access to waterborne supply facilities and to the main road network connecting with rail facilities in the interior. The new rail line to Amoy will provide additional support to the fields in that area and run within 30 miles of the field under construction at Lien-ch'eng. The Chinese Communists thus appear to have the capability of providing logistic support for full-scale operations out of the newly constructed fields whenever they decide to place them in service.

Activation of the five fields now considered serviceable would give the Chinese Communists the capability of providing effective air cover for Communist shipping in the Taiwan Strait, of more effectively challenging Nationalist overflights of the mainland, and of preventing Nationalist supply movements into the offshore islands. The fields are also within easy jet fighter range of Taiwan and could supply fighter escorts for bombing missions against the island or for defensive support of an actual invasion. The fields at Nan-t'ai and Lung-t'ien pose a particular threat to the nearby Matsus, while the Ch'ing-yang and Lung-ch'i fields and the prospective fields at Hui-an and Kao-chi are in a similar position in relation to Quemoy. The other fields now under construction (Hui-an, Shui-k'ou, and Lien-ch'eng), together with existing jet bases outside the immediate area (at Canton, Ch'ang-sha, Nan-ch'ang, Ch'u-hsien, and in the Hangchow-Ningpo-Shanghai complex), will provide the Chinese Communists with the capability of supporting in depth all operations out of the new East China coastal fields.

#### 6. Military Assembly Areas.

A number of supply and barracks areas of major importance to Chinese Communist military capabilities in the East China region have been developed.\* The principal areas are located along the Shanghai-Canton Railroad and at the more important coastal ports. Swatow, with its relatively easy supply situation, had by early 1955 been built up as the largest military encampment in the region under study. Although only 1 army of approximately 50,000 men is at present located in the area, the total number and average size of barracks known to be located within a 40-mile radius of Swatow indicate that these camps could garrison as many as 280,000 men.\*\* Barracks complexes have also been

\* See the map, Figure 1, following p. 67.

\*\* For details of barracks areas, see Appendix D.

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identified in the Amoy, Foochow, and Hai-t'an Island areas, where troop concentrations of 87,000, 51,000, and 7,000 men, respectively, have been located for some time. Recently constructed camp and supply installations near the railroad have been noted at Chin-hua, Chiang-shan, and Shang-jao. These points are all favorably located on or near the roads leading to the coastal area. Ch'u-chiang, also on the railroad, is a potentially important supply and personnel center for movements to the Fukien coast.

7. Stockpiling.

Available information does not permit an accurate estimate of the total tonnage of military supplies moving into the coastal region. A characterization of the supply effort during 1955 can, however, be made. Road transport capabilities have been improved; some 3,600 military trucks are believed to be organic to military units in the Fukien region; and some truck concentrations have been noted at supply centers along the main roads, but there is no evidence that the Chinese Communists have undertaken a large-scale, intensive, overland supply effort. On the other hand, there is evidence to indicate a rather intensive coastal waterborne supply movement. The increasing importance of storage and supply facilities at port points, particularly within a 50-mile radius of Foochow, is evident.\* It is estimated, on the basis of observed activity, that the volume of Communist-flag small-freighter traffic into this area since March 1955 has amounted to an average of three arrivals per week. <sup>12/</sup> The estimated total tonnage carried by these 300- to 400-ton vessels was over 30,000 tons during the period March-December 1955. In addition, there have been several voyages of 700- to 1,600-ton vessels into Foochow. <sup>13/</sup> It is suggested that shipping activity up to the end of June 1955 was largely in support of airfield construction, but that at least part of the activity since that time represents stockpiling. For example, sufficient tonnage has moved into the area since June to provide extensive FOL supplies at the new airfields, although there is no direct evidence that this has been done.

The estimated level of supply activity, however, is insignificant in comparison with the estimate of 4,200 to 5,600 tons

\* See Appendix B.

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per day required for the early stages of a full-scale Chinese Communist offensive against Taiwan.\* It seems quite evident that stockpiles of a magnitude required to launch and support such a major military operation are not now on hand in the immediate area of Foochow and Amoy.

8. Estimated Cost of Transportation and Military Construction.

The military construction effort in the East China region has apparently required no major diversion of Chinese Communist investment resources from other economic or military development programs. The estimated costs of transportation and military construction in East China, by category of construction, through January 1956 are shown in Table 1.

Table 1

Estimated Costs of Transportation and Military Construction  
in East China, by Category of Construction a/  
Through January 1956

<u>Category</u>	<u>Costs (Thousand Yuan)</u>	<u>Costs (Thousand US \$)</u>
Roads	270,735	60,500
Railroads	420,000	100,000
Causeways	13,050	2,610
Airfields	77,500	15,500
Barracks	32,275	9,922
Total	<u>813,560</u>	<u>188,532</u>

a. For detailed breakdown, see Appendix E.

\* Estimated on the basis that the Chinese Communists would employ 7 armies of 50,000 men each (3 divisions and support units) in the initial offensive and that under combat conditions each army would require 600 to 800 tons of supplies per day.

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These estimates, so far as possible, cover the costs of the completed facilities and reflect investment over a period of 3 or more years. Even if the entire construction costs for the items listed are considered against the national defense budget for a single year (1955), however, they amount to only 11.3 percent of that budget. As a percentage of the total budget expenditure for 1955, the cost of this construction is about 2.7 percent. Thus the effort in East China can be characterized as requiring a substantial, but by no means inordinate, proportion of the investment resources of Communist China. The availability of manpower and the large-scale use of local materials has contributed to the capability of the Communists to carry out this activity with a minimum effect on their long-term economic programs. Even in the case of the trans-Fukien railroad, which is requiring 8 of the 11 military engineering divisions of China, there has been no apparent diminution of effort on the ambitious railroad construction program in other parts of China. The East China construction effort, moreover, has not been a drain on the foreign exchange resources of Communist China. The estimated cost of military equipment imports from the USSR (US \$500 million in 1955), for example, has far outweighed the cost of military construction in East China. It is concluded that, although the magnitude of the effort to develop a position of military strength opposite Taiwan is reaching impressive proportions, this is being achieved without adversely affecting the course of the industrial development program of Communist China.

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APPENDIX A

ROADS

This appendix provides a list of the roads which would be of primary importance to the overland supply of Communist military forces and installations in the East China region between Ningpo and Canton. Information such as length, classification (fair or all-weather, one- or two-way), estimated capacity, condition of road, type of terrain, and time of major improvements (if any) are given for each section of road. <sup>14/</sup> All roads have gravel surfaces, and it is evident that there is a fairly heavy maintenance requirement. The maintenance requirement would be exceptionally heavy during continuous military convoy use.

Capacity of roads is estimated in the number of vehicles that could be put over the road each way per hour.\* Estimates of the

\* The determination of road capacity in vehicles per hour (vph) each way has been made as follows: multiply the basic figure of 280 vph (capacity for sustained military usage of a two-way limited all-weather road in excellent condition over level terrain) by (1) the appropriate percentage figure (see the tabulation below) for the condition of the road and (2) multiply the figure thus obtained by the appropriate percentage figure -- for the type of terrain (see the tabulation below). <sup>15/</sup> Take one-half of this figure for capacity each way.

For example, the estimated capacity in vph each way of a road in good condition traversing mountainous terrain would be as follows:

$$\frac{280 \times 0.60 \times 0.30}{2} = 25 \text{ vph each way}$$

<u>Condition of Road</u>	<u>Percent</u>	<u>Type of Terrain</u>	<u>Percent</u>
Good	60	Undulating	80
Fairly good	40	Hilly	60
Bad	30	Mountainous	30
Very bad	10	Alpine	20

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individual road sections have been calculated on the assumption that all water gaps would be bridged. At present, however, only the routes connecting the rear area along the Hangchow - Nan-ch'ang section of the railroad with Foochow and Amoy are fully bridged. Pontoon bridging or additional ferry facilities could probably be made available within a short period of time on these other routes considered by the Chinese Communists to be of major importance. It is apparent, also, that the capacity of all routes would decline somewhat during the heavy rainy season. Under sustained military use, the heavy maintenance requirement on these roads would limit the time allowed for through truck traffic to about 8 hours per day, although for short periods of time this could be considerably increased. Capacity estimates are given in vehicles per hour rather than tons per day in order that tonnage estimates can be made to reflect varying operating conditions. To determine capacity in tons each way per day, multiply the number of vehicles per hour by the number of hours of operation per day by the number of tons per vehicle (an average of about 2.5 tons in China). Note that for one-way operations, as might be the case over a very short period of time, the tonnage estimate can be doubled.

For purposes of describing the main overland lines of supply, the coastal area is divided into three main regions, the most important of which is the Foochow-Amoy region, followed by the Swatow and the Lu-ch'iao - Wenchow regions.

I. Routes into the Foochow-Amoy Region.

A. Primary Routes, Overland to Interior, All Water Gaps Bridged.

1. Shang-jao - Chien-ou (105 miles).\*

Classification:

Limited all-weather, two-way.

Estimated Capacity:

33 vph each way.

\* All road distances are approximate.

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Remarks:

This road is well-maintained and well engineered. It traverses hilly to mountainous terrain, and some heavy grades are encountered. All water gaps are bridged by two-way structures. The bridge at Chien-ou on the road to Nan-p'ing, however, is one-way.

2. Chiang-shan - Chien-ou (130 miles).

Classification:

Limited all-weather, limited two-way.

Estimated Capacity:

33 vph each way.

Remarks:

This section of road appears to be in good condition. It traverses hilly to mountainous terrain with some heavy grades. All water gaps are believed to be bridged, possibly with one-way structures. There is strong evidence that this road actually extends into Chien-ou rather than into Chien-yang, as shown on some maps. The Chien-yang - Chien-ou section has heretofore been considered a potential bottleneck.

3. Chien-ou - Foochow (125 miles).

Classification:

Limited all-weather, limited two-way.

Estimated Capacity:

25 vph each way.

Remarks:

This road has undergone extensive reconstruction since 1953, including widening, straightening, and

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bridging. There are no ferry crossings, but some of the bridges appear to be one-way structures. The terrain is very mountainous, and the road is winding, with heavy grades. This road will require continued heavy maintenance to keep it in its present good condition.

4. Chien-ou - Nan-p'ing - Yung-an - P'eng-k'ou (140 miles).

(Yung-an - P'eng-k'ou, 55 miles)

Classification:

Limited all-weather, limited two-way.

Estimated Capacity:

33 vph each way.

Remarks:

This road, which generally follows the course of the Sha River south of Nan-p'ing, is winding, with some heavy, mountainous grades in the southern portion. The road received major improvements in 1954 and early 1955, including widening, straightening, and the improvement of drainage and bridging. A 900-foot, two-way bridge was completed at Nan-p'ing in April 1955. The road is in good condition, and all water gaps are bridged. The bridge at Chien-ou is one-way.

5. Yung-an - Chin-chiang (150 miles).

Classification:

Limited all-weather, limited two-way.

Estimated Capacity:

25 vph each way.

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Remarks:

This road has been completely rebuilt since 1953, and all water crossings are now bridged. The mountainous terrain renders the road very tortuous, with heavy grades. The road bifurcates at Yung-ch'un, and the northern leg extends to the coastal road near Sha-ch'i; the southern leg terminates at Chin-chiang. The road will require heavy maintenance to keep it in good condition.

6. P'eng-k'ou - Lung-ch'i - Amoy (170 miles).

Classification:

Limited all-weather, limited two-way.

Estimated Capacity:

33 vph each way.

Remarks:

Reconstruction on this road since 1953 has placed it in good condition. It traverses hilly to mountainous terrain, involving some winding sections with heavy grades. All water gaps are bridged.

B. Secondary Routes Which Feed into Primary Routes to Foochow-Amoy Region.

1. Nan-ch'ang - Nan-ch'eng (80 miles).

Classification:

Limited all-weather, limited two-way.

Estimated Capacity:

50 vph each way.

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Remarks:

Limited coverage indicates that this road is in good condition. It traverses undulating to hilly terrain. The capacity estimate assumes that all water gaps would be bridged; the status of bridges is uncertain.

2. Nan-ch'eng - Chien-yang (140 miles).

Classification:

Limited all-weather, limited two-way.

Estimated Capacity:

16 to 25 vph each way.

Remarks:

This road traverses very difficult terrain, and grades are steep and winding. The road is assumed to be in fair to good condition. Several ferry crossings were necessary in 1953. The capacity estimate assumes that water gaps would be bridged.

3. Nan-ch'eng - Yu-tu (170 miles).

(Nan-ch'eng - Nan-feng, 25 miles)

Classification:

Limited all-weather, limited two-way.

Estimated Capacity:

33 vph each way.

Remarks:

The most recent information available, in 1953, showed this road to be in fairly good condition. The road traverses undulating to hilly terrain. Bridges are believed to be one-way structures. The capacity

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estimate assumes that all water gaps would be bridged. The status of bridges is uncertain.

4. Nan-feng - Sha-ch'i-k'ou (165 miles).

Classification:

Limited all-weather, limited two-way.

Estimated Capacity:

16 vph each way.

Remarks:

This very winding road with difficult grades was in fair condition in 1953. Numerous ferry crossings are required. The capacity estimate assumes that water gaps would be bridged.

5. Ch'u-chiang - Yu-tu - P'eng-k'ou (280 miles).

(Ch'u-chiang - Yu-tu, 155 miles)

Classification:

Limited all-weather, limited two-way.

Estimated Capacity:

16 to 25 vph each way.

Remarks:

This road has received some improvements and is in fair to good condition. A few sections were limited to one-way traffic in 1953, but it is believed that the road can now handle limited two-way traffic. The road traverses very mountainous sections, and ferry crossings are required in at least two locations. The capacity estimate assumes that water gaps would be bridged.

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C. Secondary Routes, Coastal, Not All Water Gaps Bridged.

1. Wenchow-Foochow (240 miles).

(Jui-an - Ning-te section under construction December 1955)

Classification:

Limited all-weather, limited two-way.

Estimated Capacity:

33 vph each way.

Remarks:

The section of road between Wenchow and Jui-an was under construction in March 1953. The road between Jui-an, Fu-ting, and Lo-yuan was in a destroyed condition as of April 1955 but has since been reconstructed, and the entire road was formally opened on 1 January 1956. The Wenchow-Foochow road is a well-engineered, heavy-duty road. The terrain ranges from flat and undulating to very hilly. It is assumed that at least one major ferry crossing is still required. The capacity estimate assumes that water gaps would be bridged.

2. Foochow - Lung-ch'i (190 miles).

Classification:

Limited all-weather, limited two-way.

Estimated Capacity:

67 vph each way.

Remarks:

This road received major improvements in 1954 and early 1955, including widening, straightening, and surface improvement. It traverses flat to

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undulating terrain and appears to be in good condition. There are good ferry facilities for crossing the Min River south of Foochow. There are several one-way bridges on this road. The capacity estimate assumes that the Min River would be bridged.

3. Lung-ch'i - Swatow (180 miles).

Classification:

Limited all-weather, limited two-way.

Estimated Capacity:

44 vph each way.

Remarks:

This road has received some improvements, including bridge construction, and appears to be in fairly good condition. However, several ferry crossings remain and one-way bridges exist. The terrain is flat to moderately undulating. A bypass around Swatow is provided by a road which branches off the main coastal route at Chang-lin north of Swatow and passes through Ch'ao-an and Chieh-yang and back to the coastal road at K'uei-t'an-hsu south of Swatow. This bypass has several ferry crossings. The capacity estimate assumes that all water gaps would be bridged.

II. Routes into the Swatow Region.

A. Canton (Lien-p'ing) Teng-t'a-h'su - Lao-lung - Hsing-ning - Mei-hsien (285 miles).

(Hsing-ning - Mei-hsien, 30 miles)

Classification:

Limited all-weather, limited two-way.

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Estimated Capacity:

25 vph each way.

Remarks:

This section of road traverses undulating to mountainous terrain. It appears to be well maintained, and all water gaps may be bridged. At Teng-t'a-hsu a secondary road branches off the main route and extends southward to Canton, connecting with the coastal route between Tseng-ch'eng and Hui-yang.

B. Hsing-ning - Swatow (115 miles).

Classification:

Limited all-weather, limited two-way.

Estimated Capacity:

25 vph each way.

Remarks:

This section of road traverses undulating to mountainous terrain. It appears to be in good condition. There is evidence that one ferry crossing is required. A branch of this road extends from Ch'ao-an to Chang-lin on the main coastal road north of Swatow. The capacity estimate assumes that all water gaps would be bridged.

C. Canton-Swatow Coastal Route (280 miles).

Classification:

Limited all-weather, limited two-way.

Estimated Capacity:

33 vph each way.

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Remarks:

This road appears to be maintained in a fair condition. There are numerous ferry crossings and one-way bridges. The terrain is flat to undulating. The capacity estimate assumes that all water gaps would be bridged.

D. P'eng-k'ou - Mei-hsien (135 miles).

Classification:

Limited all-weather, one-way.

Estimated Capacity:

10 vph each way.

Remarks:

Information available for 1953 indicates that this road was in large part a one-way, poorly maintained, extremely winding road with several ferry crossings. There is no evidence that this road has received major improvements, as have other roads in this region. The capacity estimate assumes that water gaps would be bridged.

III. Routes into Lu-ch'iao - Wenchow Region.

A. Ningpo - Lu-ch'iao (160 miles).

Classification:

Limited all-weather, limited two-way.

Estimated Capacity:

66 vph each way.

Remarks:

This section appears to be a well-engineered, well-maintained road, traversing flat to undulating terrain. It is believed that at least two ferry crossings are required.

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The capacity estimate assumes that water gaps would be bridged.

B. Chin-hua - Li-shui - Wenchow (140 miles).

Classification:

Limited all-weather, limited two-way.

Estimated Capacity:

33 vph each way.

Remarks:

This road has been under extensive reconstruction and repair since 1953 and now appears to be in fairly good condition with all bridges in, although there is a major ferry crossing at Wenchow. Some of the bridges are capable of one-way traffic only. The road passes through hilly to mountainous terrain and is very winding in sections. The capacity estimate as given is to a point across the river from Wenchow.

C. Lu-ch'iao - Wenchow (85 miles).

Classification:

Limited all-weather, limited two-way.

Estimated Capacity:

66 vph each way.

Remarks:

This section of road appears to be a well-engineered, well-maintained road, traversing flat to undulating terrain. At least two ferry crossings, including the crossing at Wenchow, are required. The capacity estimate assumes that water gaps would be bridged.

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APPENDIX B

TRANSPORT CENTERS AND MAJOR SUPPLY AREAS

Following is a list and brief description of those ports and minor landing points, railroad yards, and major highway centers (including storage facilities and supply areas), which would be of primary importance to logistic support of military forces and installations in the East China area between Ningpo and Canton. In view of their potential importance, some very minor coastal landing points are listed. Where possible, indications of the nature of supply activity observed are included. Although no attempt is made to list the location of all known truck pools and road depots, the key highway centers are given.

I. Ports and Landing Points.

These locations are arranged geographically, beginning with Hai-men on the north and progressing south along the coast to include Swatow.

A. Hai-men (28°41' N - 121°27' E).

Hai-men is a minor port with harbor depths sufficient to accommodate coastal shipping. Depths of water alongside the five pontoon wharves reported are sufficient only for small craft, and coastal vessels must work cargo in the stream. 16/ Warehouse facilities and an active truck pool are located in the port area. 17/ Near Lu-ch'iao airfield, about 9 miles south of Hai-men, aviation fuel and other storage facilities have been identified. Heavy-duty-type roads connect the port installation with the main coastal road and the airfield installation.

B. Wenchow (28°01' N - 120°39' E).

Wenchow is an established port with harbor depths sufficient to accommodate coastal shipping, although cargo must be worked in the stream. 18/ Existing wharves are suitable only for small-craft traffic. Warehouse facilities are available. Since February 1955, large coastal freighters (2,000 to 3,000 tons) have been running into this port from Shanghai. 19/ There is a good two-way road to Lu-ch'iao and Hai-men, although two ferry crossings are required.

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C. Sha-ch'eng (27°10' E - 120°24' N).

Sha-ch'eng, located south on the coast midway between Wenchow and San-tu (San-sha) Bay, has during 1955 become important as a protected anchorage for small coastal cargo ship movements along the coast and into the Foochow area. 20/ It is also serving as a minor naval operating base and possible transshipping point. The port installation is limited to a single small pier and breakwater and a small number of warehouses. 21/ Access to the main coastal road at Fu-ting is primarily by water at present, but a road connecting Sha-ch'eng with the coastal road is now being constructed. 22/

D. San-tu and Lo-yuan Bays (26°30' N - 119°50' E).

These bays are located just north of the Pei-ling Peninsula and opposite the Matsu Islands. Both bays have large areas suitable as anchorages for coastal-type shipping. There are minor pier facilities on San-tu Island and near the town of Lo-yuan. 23/ At Lo-yuan there is sufficient water depth to handle small coastal vessels alongside the wharf. Lo-yuan is also the site of a newly developed well-dispersed storage and warehouse installation. 24/ Branch roads from the main coastal highway have been extended to the water's edge to connect with beaching sites on both San-tu and Lo-yuan Bays, and on the south shore of Lo-yuan there is a landing where the newly constructed road crossing Pei-ling Peninsula extends to the water. Freighter activity was first noticed in these waters in the spring of 1955, following the initiation of regular shipping services into Wenchow. It is considered that these two protected bays are likely staging areas both for supply movements and for possible amphibious operations.

E. Foochow (26°05' N - 119°18' E).

Foochow is an established coastal city but is only a minor port. The principal harbor area is at Ma-wei (Lo-hsing-t'a - Mao-ti) (25°59' N - 119°27' E), on the Min River about 10 miles from Foochow. There is a good anchorage at Ma-wei, and larger coastal-type vessels regularly anchor here. There is also a small-craft anchorage near Nan-t'ai (26°03' N - 119°18' E), and a good deal of activity is normally evident. 25/ Coastal shipping must work cargo in the stream, but the availability of lighterage and junks is not a bottleneck to an expansion of shipping activity. Good roads connect all port facilities with the main road net and

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with nearby military installations, including the airfield on Nan-t'ai Island. Well-developed water/road transfer facilities also exist on the south bank of the Min River, immediately adjacent to the main coastal highway, thus providing for ease of truck shipments into the area between Foochow and Amoy, despite the lack of a bridge across the Min River.

Extensive warehouse and open storage facilities exist in and around Foochow, and an expansion of facilities has been evident. For example, there is a large installation, including some 200 buildings and an open storage space on what was a burned out area on the water's edge at Nan-t'ai. 26/ There is a large supply area on Nan-t'ai Island, including many warehouse buildings. 27/ As many as 182 vehicles have been reported in the immediate area of Foochow during the most intensive airfield construction effort 28/ and, more recently, 100 trucks have been noted in a warehouse area 10 miles west of Foochow on the road to Chien-ou. 29/ With respect to POL storage facilities, pre-Communist storage installations are either destroyed or inactive, but major facilities have been constructed at the airfield. 30/

There is a regular pattern of coastwise ship movements into Foochow. British-flag coasters provide nonstrategic shipping connections to Shanghai, and since early 1955, Communist-flag coastal vessels have operated between Shanghai and Foochow. 31/ The recent appearance of a dredge at Ma-wei may indicate that some improvement of harbor or naval facilities is contemplated. 32/

F. Hai-t'an Strait (25°27' N - 119°38' E).

This strait is located between Hai-t'an Island and the mainland peninsula extending southeastward from the Lung-t'ien area and provides a protected anchorage for shipping engaged in waterborne supply of Lung-t'ien airfield and of military forces on Hai-t'an Island. There is a small-craft beaching point immediately opposite the airfield site, and south of the airfield on the strait is a deep-water pier and two warehouses. A second deep-water pier juts out in Hsing-hua Bay on the south side of the peninsula. A newly constructed, heavy-duty road extends the length of the peninsula to connect with the main coastal highway, and feeder roads extend out to the pier sites. 33/ As many as 50 trucks have been seen in the Lung-t'ien area during construction of the airfield. 34/ A major aviation fuel-storage facility has been built near the airfield, and ammunition and warehouse installations have been identified.

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The first evidence of shipping in these waters, other than small naval patrol craft and junks, was noted in September when 6 vessels, including 3 merchant-type ships, 1 patrol craft, and 2 smaller patrol-type vessels were seen anchored near Hai-t'an Island. 35/

G. Han-chiang (25°27' N - 119°06' E).

Han-chiang, on the main coastal road south of Foochow, has a very small port installation located about 2 miles south of the town. There is a small tee-shaped pier and a 240-foot wharf with 2 warehouses at this location. 36/ At least 25 major warehouses are known to be located within a 10-mile radius of this minor landing point. 37/ It is believed that water depths would limit wharfside operations to very shallow-draft craft, but coastal-type vessels could anchor and work cargo in the stream.

H. Chin-chiang (24°54' N - 118°35' E).

Chin-chiang is a minor port located about 8 miles north of Ching-yang airfield. Navigation as far upriver as Chin-chiang City is limited to comparatively shallow-draft craft, but there is a good deal of this activity. 38/ Much use was made of canals connecting the field area with the river during airfield construction. Suitable anchorage is available for small coastal vessels in Ch'uan-chou Harbor, and cargo operations would be facilitated by the availability of barges and small craft. There are good road connections between the river landing points, the airfield site, and the main coastal road. Major POL storage facilities have been constructed at Ch'ing-yang airfield, and other types of storage facilities, including warehousing, are available. As many as 40 trucks and 3 tank-trucks have been seen in the Chin-chiang area. 39/

I. Amoy (24°27' N - 118°05' E).

Amoy is an established port with an extensive deepwater protected anchorage and well-developed cargo-handling facilities, including wharves with water depths sufficient to accommodate large coastal-type vessels alongside. There are at least 3 wharves and 2 quays on Amoy Island opposite Ku-lang Hsu 40/ and a deepwater petroleum pier and adjacent tank farm on the mainland on Sung-hsu Peninsula. 41/ This pier and tank farm are known to be in good condition. Adequate warehouse and storage facilities are available

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on Amoy and at mainland locations, such as Chi-mei, across from the northern tip of Amoy Island. <sup>42/</sup> A good system of all-weather, two-way roads connects all port installations with the main coastal road and the airfields at Lung-ch'i and Ch'ing-yang. Roads on Amoy Island are connected with mainland roads by means of the newly constructed causeway at the northern tip of the island. <sup>43/</sup> An active truck pool is located on Amoy, and much truck activity has been noted on the mainland in this area.

There is a large amount of small-craft activity within Amoy Harbor and especially between the small river ports of Shih-ma and Hai-ch'eng and points on Amoy Island and the mainland north of Amoy. Movements of Communist-flag oceangoing shipping into Amoy, however, have been effectively blockaded by the Nationalists occupying Quemoy Island, which commands the approaches to Amoy Harbor.

J. Wu-t'ien (23°56' N - 117°29' E).

Wu-t'ien is a minor landing point just off the main coastal road to Swatow about 60 miles south of Lung-ch'i. A pier 400 by 15 feet in size and 14 warehouses have recently been noted at this location. <sup>44/</sup> It is believed that water depths would limit wharf-side operations to shallow-draft craft, but that coastal vessels could anchor and work cargo in the stream.

K. Swatow (23°22' N - 116°40' E).

Swatow is a minor port with a good anchorage and with wharf facilities capable of accommodating coastal ships alongside. <sup>45/</sup> Warehouse and storage facilities, including POL storage, are available. Large-scale POL storage has not been identified, but regular small tanker voyages into Swatow <sup>46/</sup> indicate that it is available. The first aviation fuel storage bunker, apparently intended to service Ch'eng-hai airfield, was noted in an advanced stage of construction in late November 1955. <sup>47/</sup> Good roads connect all port installations with the main road net and with nearby military installations, including the airfield. Considerable truck traffic has been noted during construction of the airfield and other military installations.

Swatow is generally considered the northern limit of Chinese Communist coastwise shipping operations out of Canton. A regular pattern of freighter movements has long existed, and during 1955, regular voyages of small tankers between Canton and Swatow were initiated.

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II. Rail-Yard Facilities and Military Supply Areas on the Shanghai-Canton and Canton-Kowloon Railroads Which Appear To Be of Primary Importance to Logistic Support of Installations in the Region between Ningpo and Canton.

A. Chin-hua (29°07' N - 119°39' E).

Chin-hua is an important military camp area and transport center for overland supply of the Wenchow area. An 8-track rail yard and a warehouse installation with 39 buildings averaging 150 by 40 feet in size have been identified. 48/ At Li-shui (28°27' N - 119°54' E), midway on the road from Chin-hua to Wenchow, there is an active motor pool (30 trucks have been seen) and a warehouse area. 49/ Status of the 30-mile spur rail line extending south from Chin-hua to Wu-i (28°53' N - 119°48' E) has not been definitely determined, but the line has not been dismantled. Two new warehouses have been noted at Wu-i. 50/

B. Ch'u-hsien (28°58' N - 118°52' E).

Ch'u-hsien is the site of a 2,700-foot, 6-track rail yard, and extensive warehouse facilities are located along the river front. 51/ There are secondary road and water connections to Chiang-shan, about 30 miles to the southwest at the terminus of 1 of the 2 main roads to Chien-ou and the Fukien coastal region. Ch'u-hsien itself is the site of an important jet airfield installation.

C. Chiang-shan (28°45' N - 118°37' E).

Chiang-shan is an important transport center, military camp area, and supply depot. This is the terminal point of 1 of the 2 main roads to Chien-ou and the Fukien coast. There is a 2,000-foot, 4-track rail yard 52/ with adjacent warehouse facilities. A rail spur off the main line extends into a possible POL storage installation located in a hill area. 53/ A large open storage dump and motor pool site appears active. 54/

D. Shang-jao (28°26' N - 117°58' E).

Shang-jao is an important transport center. It is the road-to-rail transshipping point for 1 of the 2 main roads to the Fukien coast. A 4,000-foot, 10-track rail yard is located here. 55/ Although the size and nature of storage facilities have not been reported, they are believed to be extensive.

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E. Ying-t'an (28°14' N - 117°00' E).

Ying-t'an is the junction point on the Shanghai-Canton Railroad for the new rail line into Fukien Province now under construction. There is no information available as yet on the size of yard and classification facilities under construction or planned for this important rail junction.

F. Nan-ch'ang (28°41' N - 115°53' E).

Nan-ch'ang is near the junction of the Shanghai-Canton Railroad and a branch line extending north to the Yangtze. A rail yard, described as 6,500 feet square, is located about 20 miles south of the town, at the site of the junction point of the 2 rail lines. 56/ Large open storage areas and extensive warehouse facilities have been identified in the vicinity of Nan-ch'ang. 57/ Important road connections permit truck shipments directly into the coastal area from Nan-ch'ang by way of Nan-cheng and Chien-ou, although it is believed that some ferry crossings are required on this motor route.

G. Ch'u-chiang (24°48' N - 113°35' E).

Ch'u-chiang is a potentially important transport center for transshipping military supplies into the Fukien coastal area. Full use of this area for support of the coastal region would depend on bridging all water gaps on the Ch'u-chiang - P'eng-k'ou road. There is a 3,200-foot, 13-track rail yard here 58/ and a military area, 6,500 by 2,200 feet, including many barracks-type buildings, near the railroad about 5 miles south of Ch'u-chiang. 59/

H. Chang-mu-t'ou (22°54' N - 114°03' E).

Chang-mu-t'ou is a railroad station point on the Canton-Kowloon Railroad about 45 miles by road from the new airfield now under construction near Hui-yang. It is possible that supplies will be moved into this airfield by rail shipment to Chang-mu-t'ou and thence by truck to the field.

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III. Internal Highway Centers of Major Importance.

A. Chien-ou (27°03' N - 118°19' E).

Chien-ou is a key highway transport center and staging point for the roads connecting supply areas along the Hangchow - Nan-ch'ang section of the main railroad with the Foochow and Amoy coastal region. As many as 200 trucks have been noted in the town, 60/ and motor pools, including repair shop facilities, have been identified. 61/ New construction during the past year has increased the over-all capacity of warehousing and other storage facilities. 62/

B. Nan-p'ing (26°38' N - 118°10' E).

Nan-p'ing, located on the Chien-ou - Amoy route about 50 miles south of Chien-ou, is becoming an important transport center. On 26 November 1955, approximately 270 trucks were noted assembled in the town. Nan-p'ing is also the site of a cement plant and a military headquarters and barracks area. 63/ There are numerous warehouse installations and a probable petroleum or ammunition storage area. In the latter part of November it was observed that the buildup in the number of semi-revetted warehouses was continuing. Supplies can be trans-shipped at Nan-p'ing from roads -- or from the new railroad when it reaches the area -- down the Min River to Foochow. Heavy river traffic has been noted recently at Nan-p'ing. 64/

C. Lao-lung-ssu (24°06' N - 115°15' E).

Lao-lung-ssu is a potentially important inland water and highway transport center on the main internal Canton-Swatow road. Utilization of the East River for movements upstream from Canton to Lao-lung-ssu would effect a substantial saving in the number of trucks required to deliver the maximum tonnage of supplies over-land to Swatow.

D. Yung-an (25°58' N - 117°22' E).

Yung-an is not only an important highway point but also the officially announced target of the current railroad construction effort for 1956. It will assume greater importance as railroad construction progresses. [REDACTED] the construction

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of a major petroleum storage depot, with an estimated capacity of 17,500 to 21,000 tons, near Yung-an. 65/ This storage facility could provide a protected reserve of jet fuel and other petroleum products for the airfields and military installations in the Amoy area.

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APPENDIX C

AIRFIELDS

This appendix contains a brief description of the location and facilities of the 10 jet-type airfields under construction during 1955 in the East China coastal area between Ningpo and Canton. The field at Lu-ch'iao,\* which was first noted under construction in the fall of 1954, is the only field now fully operational, although four additional fields\*\* constructed entirely within 1955, are now considered serviceable. Five fields are still under construction,\*\*\* and there are a number of secondary fields\*\*\*\* not capable of handling jet aircraft, which might be usable by conventional aircraft or for transport operations.

I. Newly Constructed Jet Field in Full Operational Status.

Lu-ch'iao (28°35' N - 121°24' E). 66/

Location:

Three miles east-southeast of the town of Lu-ch'iao and 8.6 miles south of the port of Hai-men, to which it is connected by both road and canal facilities. About 60 miles north of Wenchow and connected there-to by main coastal road and access roads.

Status as of 10 January 1956:

Fully operational since April 1955; 78 MIG's observed on the field on 7 September 1955.

Size and Alignment:

6,200 by 205 feet north-northeast - south-southeast.

\* See I, below.  
\*\* See II, below.  
\*\*\* See III, below.  
\*\*\*\* See IV, below.

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Surface:

Probably crushed rock with mud and gravel slurry binder.\*

Facilities:

POL Storage:

Facilities noted; no estimate of capacity.

Revetments:

31

Navigational Aids:

Omnidirectional homing and marker beacon installation provides a limited all-weather approach landing system.

II. Newly Constructed and Completed Jet Fields, Serviceable but Not Operational.

A. Nan-t'ai (26°00' N - 119°19' E). 67/

Location:

Nan-t'ai Island, about 5 miles south of the city of Foochow. Adequately served by roads to the city and boat landings on Wu-lung Chiang.

Status as of 10 January 1956:

Runway serviceable; other facilities nearly complete; not in use.

Size and Alignment:

6,800 by 200 feet east-northeast - west-southwest.

\* Although the slurry binder may include some lime materials, the surface does not appear to be concrete by Western definition.

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Surface:

Probably crushed rock with mud and gravel slurry binder.

Facilities:

POL Storage:

19 bunkers, each with 12 to 14 tanks on loop road,  
3,500 feet north of field; estimated capacity,  
1,025 tons.

Ammunition Storage:

No information available.

Revetments:

29

Navigational Aids:

Omnidirectional beacon-type landing system; 9,000  
to 10,000 feet west of west end of runway.

Other:

Numerous buildings and sheds; 2 truck parks, each  
with 12 to 15 trucks; probable gun-testing range.

Remarks:

This is an old field on which reconstruction activities  
were first noted in March 1955; surfacing appeared com-  
plete on 18 June 1955. Considerable use of waterborne  
supply was noted during construction.

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B. Ch'ing-yang (24°48' N - 118°35' E). 68/

(Also known as Sha-ti)

Location:

About 5 miles south of Chin-chiang on the main coastal highway; about 40 miles northeast of Amoy.

Status as of 1 January 1956:

Runway serviceable; other facilities nearing completion; not in use.

Size and Alignment:

7,200 by 180 feet north-northeast - south-southwest.

Surface:

Probably crushed rock with mud and gravel slurry binder.

Facilities:

POL Storage:

45 bunkers, each with 10 to 12 tanks (5 by 10 feet) on loop road beginning 7,000 feet west of runway; estimated capacity, 2,100 tons.

Ammunition Storage:

Revetted building 1,500 feet south of control tower.

Revetments:

32

Radio and Navigational Aids:

Omnidirectional homing and marker-beacon installation; landing light system.

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Other:

2 hangers, numerous barracks, sheds, shops, and miscellaneous buildings; gun-testing range.

Remarks:

Construction probably begun in February 1955; estimated to be serviceable in October 1955.

C. Lung-ch'i (24°44' N - 117°39' E). 69/

Location:

About 3 miles north of Lung-ch'i and 27 miles west of Amoy; connected with Lung-ch'i by a newly constructed road.

Status as of 1 January 1956:

Runway serviceable; other facilities nearing completion; not in use.

Size and Alignment:

7,200 by 200 feet east-west.

Surface:

Probably crushed rock with mud and gravel slurry binder.

Facilities:

POL Storage:

14 bunkers, each with approximately 15 tanks 5 by 10 feet on loop road 2,500 feet north of runway; estimated capacity, 950 tons. An additional storage area is located approximately 3 miles north of the field, with 26 bunkers; estimated total capacity at field, 1,900 tons.

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Ammunition Storage:

Two revetted buildings.

Revetments:

31

Radio and Navigational Aids:

Omnidirectional homing and marker beacon, approximately 11,000 feet west of runway.

Other:

Numerous barracks, shops, and storage buildings; also administration and operational buildings.

Remarks:

Construction was probably begun in February or March 1955, and the field appeared serviceable in October 1955.

D. Swatow Northeast (23°26' N - 116°46' E). 70/

(Also known as Ch'eng-hai)

Location:

Seven miles northeast of Swatow, 1-1/2 miles east of the main coastal highway, to which it is connected by a new road; also supplied by small craft.

Status as of 1 January 1956:

Runway serviceable; most other facilities appear complete; not in use.

Size and Alignment:

6,700 by 200 feet northeast-southwest.

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Surface:

Probably crushed rock with mud and gravel slurry binder.

Facilities:

POL Storage:

POL bunkers for probable airfield use were noted under construction in November 1955.

Ammunition Storage:

3 covered bunkers and 3 small buildings northwest of runway.

Revetments:

25

Radio and Navigational Aids:

Landing lights appear to be installed and operable; 5-mast radio installation near control building at midfield.

Other:

Numerous buildings, including a hangar, under construction on 11 January 1956.

Remarks:

No estimate of date when construction started. Considered serviceable by late summer 1955.

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III. Jet Fields Now under Construction.

A. Lung-t'ien (25°34' N - 119°28' E). 71/

Location:

About 10 miles due east of the main coastal highway and 35 miles south of Foochow; first-class road connections to the highway and to waterborne supply points in the Hai-t'an Strait.

Status as of 29 January 1956:

Resurfacing of runway; other facilities nearing completion.

Size and Alignment:

6,600 by 185 feet northeast-southwest. Recent activity indicates possible extension to 7,300 feet.

Surface:

Possibly asphaltic macadam with gravel cover as originally surfaced; new surface material unidentified.

Facilities:

POL Storage:

Two storage areas with a total of 25 bunkers, each with a number of tanks, located on loop roads 600 and 3,000 feet northwest of field; estimated capacity, 1,350 tons. Additional ammunition or POL storage is located 1 mile northwest of Lung-t'ien.

Ammunition Storage:

Identified about 1-1/2 miles north by northeast of the center of the runway.

Revetments:

27

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Radio and Navigational Aids:

Omnidirectional beacon-type navigational aid, southwest of field; also a probable VHF communications system for local use.

Other:

Numerous buildings and sheds, including administration building, barracks, and shops; gun-testing range; bombing and strafing range, 7 miles north of airfield.

Remarks:

Construction was first noted here in April 1955; surfacing work appeared suspended from 5 August 1955 to 1 December 1955; during this period small white rectangular objects dotted runway. These had been cleared away by 4 December 1955, and resurfacing appears to be in progress.

B. Hui-an (25°02' N - 118°48' E). 72/

Location:

This field is adjacent to the coastal road just southeast of the town of Hui-an. It is about 17 miles by road from the port of Chin-chiang to the southwest and about 15 miles northwest of a possible seaborne supply point at Ch'ung-wu.

Status as of 10 January 1956:

Under construction; runway estimated to be 20 percent complete.

Size:

6,400 by 195 feet.

Surface:

No information available.

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Facilities:

POL Storage:

15 bunkers, each with 12 tanks, 2,800 yards northwest of runway; estimated capacity, 810 tons.

Ammunition Storage:

No information available.

Revetments:

34 (some under construction).

Radio and Navigational Aids:

Under construction.

Other:

2 probable hangars, operational building, and tower under construction; probable gun-testing range under construction.

Remarks:

Construction first noted on 11 October 1955. It is estimated that this field could be serviceable by April or May 1956.

C. Lien-ch'eng (25<sup>0</sup>40' N - 116<sup>0</sup>40' E). 73/

Location:

About 7 miles southwest of the town of Lien-ch'eng, to which it is connected by a 30-foot-wide road. The town is on the main road from Chien-ou to Amoy and near the junction of this road with the road from the rail point at Chu-chiang. The field is about 50 miles southwest of Yung-an on the projected Trans-Fukien Railroad.

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Status as of 28 January 1956:

Under construction; preliminary grading and leveling  
90 percent complete.

Size and Alignment:

No information available.

Surface:

No information available.

Facilities:

POL Storage:

34 bunkers under construction; estimated capacity,  
1,850 tons.

Ammunition Storage:

Probable storage area under construction 4,000 feet  
southeast of the south end of the runway.

Revetments:

27 under construction.

Radio and Navigational Aids:

No information available.

Other:

Barracks under construction. Gun-testing range under  
construction.

Remarks:

Construction first noted on 3 October 1955. On the basis  
of progress on other fields during 1955, it is estimated  
that this field could be serviceable by April or May 1956.

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D. Shui-k'ou (23°04' N - 114°37' E). 74/

(Also known as Hui-yang)

Location:

This airfield is about 8 miles northeast of Hui-yang and 5.5 miles southwest of Liang-hua-hsu on the coastal road between Canton and Swatow. It can presumably be served also by waterborne supply on the East River or from Chang-mu-t'ou, a station on the Canton-Kowloon Railroad about 30 miles by road from Shui-k'ou.

Status as of 11 January 1956:

Under construction; nearing completion.

Size:

6,200 feet long when completed; width unknown.

Surface:

Probably asphalt over crushed rock.

Facilities:

POL Storage:

No information available.

Ammunition Storage:

No information available.

Revetments:

25 under construction.

Radio and Navigational Aids:

No information available.

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Other:

2 hangars, control tower, gun-testing range.

Remarks:

Construction first noted in October 1955. It is estimated that this field could be serviceable by February 1956.

E. Kao-chi (24°32' N - 118°07' E). 75/

Location:

On northern end of Amoy Island, about 5 miles from the city.

Status as of 1 January 1956:

Probably being rehabilitated and expanded to accommodate jet aircraft. Resurfacing of runway was in evidence in December 1955.

Size and Alignment:

2 runways, 5,460 by 270 feet northeast-southwest.

Surface:

Unknown.

Facilities:

POL Storage:

7 bunkers under construction; estimated capacity, 315 tons.

Ammunition Storage:

Under construction.

Revetments:

13 under construction.

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Radio and Navigational Aids:

No information available.

Other:

No information available.

Remarks:

On the basis of available information, no estimate of completion is possible.

IV. Locations of Inactive Airfields Only Capable of Handling Conventional-Type Aircraft.

A. Swatow (23°23' N - 116°44' E) (Old Swatow).

B. Chin-hua (23°40' N - 120°05' E).

Size:

4,760- by 150-foot surfaced runway; work on field under way.

C. Chien-ou (27°03' N - 118°18' E).

D. Ma-chiang (24°39' N - 119°15' E).

Status as of 1 January 1956:

5,500-foot gravel runway.

E. Ch'ang-t'ing (25°54' N - 116°20' E).

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APPENDIX D

MILITARY ENCAMPMENT AREAS

I. Major Military Barracks Areas.

A. Swatow Area.

At least 6 major military camp areas with a total of over 1,900 buildings, including barracks, supply, and administration buildings, have been noted within a 40-mile radius of Swatow. About 75 percent of the buildings appear to be barracks, averaging roughly 130 by 30 feet in size. Assuming an allowance of 20 square feet per man, this would give an approximate barracks capacity of 280,000 men. Construction of these barracks areas is believed to have been largely completed by early 1955. 76

B. Amoy Area.

Eleven military camp areas with a total of 135 barrack-type buildings have been noted on Amoy Island. An additional area with a headquarters building and seven barracks is located on Wei-t'ou Peninsula northeast of Quemoy. Several hundred temporary-type barracks buildings have been built at the airfield construction sites in the Amoy area. 77/

C. Foochow Area.

Nine military camp areas with a reported total of over 700 buildings, including barracks and headquarters, have been noted in the immediate area of Foochow (excluding Nan-t'ai Island). 78/

D. Hai-t'an Island.

140 barracks buildings with 10 underground storage areas have been noted near Ping-t'an. 79/ (An earlier report of 100 barracks buildings probably refers to the same area. 80/)

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E. Chiang-shan Area.

A major military camp area with over 450 buildings was noted under construction in May 1955. The camp is strategically located at a junction of the Shanghai-Canton Railroad and one of the two main roads leading south to Chien-ou and Foochow. 81/

F. Ch'u-chiang Area.

A major barracks area 6,500 by 2,200 feet containing "many" buildings has been noted at an important junction of the main Canton-Hankow railroad and a primary road connecting at P'eng-k'ou with the main road to Lung-chi and Amoy. 82/

G. Shao-wu.

(On new railroad construction)

Some 200 barracks and shop buildings were noted in October 1955. Although these undoubtedly are related to the railroad construction effort, they could be retained for military use after the railroad is completed. 83/

H. Chin-hua Area.

A new major military barracks area was revealed on 24 November 1955 in photography at Chin-hua. The area consists of over 400 barracks and over 100 support buildings. One major and 2 secondary headquarters are evident. Chin-hua is on the Shanghai-Canton railroad and is an important transport and supply center for the Wenchow area. 84/

II. Other Significant Barracks Areas.

(Less than 50 buildings)

- A. Mei-hsien 85/
- B. Chien-ou 86/
- C. Wenchow 87/
- D. Fu-ting 88/
- E. Lung-t'ien 89/

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F. Chin-chiang 90/  
G. Hui-an 91/  
H. Lo-yuan 92/

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APPENDIX E

COSTS

The calculation of costs is based on minimum estimates of construction cost for the major items noted in this memorandum. It does not include direct military expenditures such as the construction of gun positions or the maintenance of the military forces in the area. Costs in yuan and in dollars have been arrived at independently. The yuan figures are based on Chinese Communist announcements of costs for various types of construction. Consideration has been given to the factors of location and terrain as they may have contributed to the difficulty of construction. The dollar figures are based on estimates of US costs for the same type of construction undertaken under similar conditions with a similar labor situation, that is, dependence on large amounts of manpower at Chinese pay scales. Although it has not been possible to arrive at figures which can be considered to be highly accurate, it is believed that the estimate does reflect in some degree the magnitude of the military construction effort in terms of Chinese Communist over-all economic resources. A detailed breakdown of the estimated costs of transportation and military construction in East China, by category of construction, is shown in Table 2.\*

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\* Table 2 follows on p. 56.

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Table 2

Breakdown of Estimated Costs of Transportation and Military Construction  
in East China by Category of Construction  
Through January 1956

Category	Costs (Thousand Yuan)	Costs (Thousand US \$)
<u>Roads</u>		
Chien-ou - Foochow	35,000	8,000
Chien-ou - Nanping - Yung-an - P'eng-k'ou	37,000	9,000
Yung-an - Chin-chiang	40,000	9,500
P'eng-k'ou - Lung-chi - Amoy	45,000	10,000
Wenchow-Foochow	48,000	10,500
Foochow - Lung-ch'i	19,000	4,000
Lung-ch'i - Swatow	15,000	3,500
Chin-hua - Wenchow	21,000	4,000
Lu-ch'iao - Wenchow	8,500	1,500
Local roads	2,235	500
Total	<u>270,735</u>	<u>60,500</u>
<u>Railroads</u>		
Ying-t'an - Amoy Railroad	420,000	100,000
<u>Causeways</u>		
Amoy Island - Mainland Causeway	5,000	1,000
Chi-mei - Kao-pu Causeway	7,250	1,450
Ta-teng Causeway	800	160
Total	<u>13,050</u>	<u>2,610</u>

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Table 2

Breakdown of Estimated Costs of Transportation and Military Construction  
in East China by Category of Construction  
Through January 1956  
(Continued)

Category	Costs (Thousand Yuan)	Costs (Thousand US \$)
<u>Airfields</u>		
Lu-ch'iao	7,500	1,500
Nan-t'ai	8,000	1,600
Lung-t'ien	9,000	1,800
Ch'ing-yang	7,500	1,500
Lung-ch'i	8,250	1,650
Ch'eng-hai (Swatow)	7,500	1,500
Hui-an	7,250	1,450
Lien-ch'eng	8,000	1,600
Shui-k'ou	9,500	1,900
Kao-chi	5,000	1,000
Total	<u>77,500</u>	<u>15,500</u>
<u>Barracks (new construction)</u>		
Swatow	20,858	6,412
Hai-tan	820	252
Chiang-shan	4,937	1,518
Chin-hua	5,660	1,740
Total	<u>32,275</u>	<u>9,922</u>

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APPENDIX F

GAPS IN INTELLIGENCE

Several intelligence problems within the scope of this memorandum remain unanswered because of lack of information. These include the following:

1. Level of actual supply activity on major motor routes.
2. Availability and assembly of pontoon bridging and ferry facilities.
3. Status of bridging on roads as indicated in Appendix A.
4. Degree to which storage and stockpiling of supplies has been carried out.
5. Extent of POL storage facilities at Swatow and Lu-ch'iao airfields.
6. Extent of Soviet participation in planning, directing, and advising in the buildup of the area.

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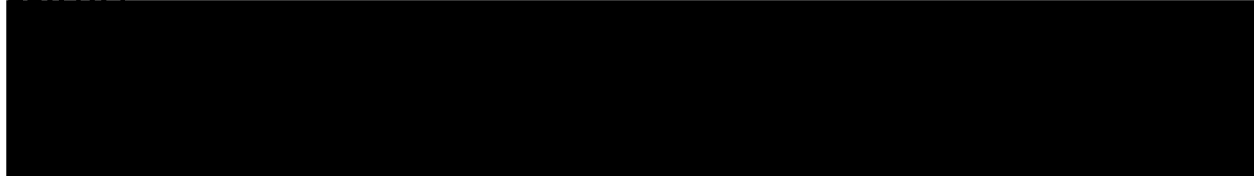
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APPENDIX G

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<u>Source of Information</u>	<u>Information</u>
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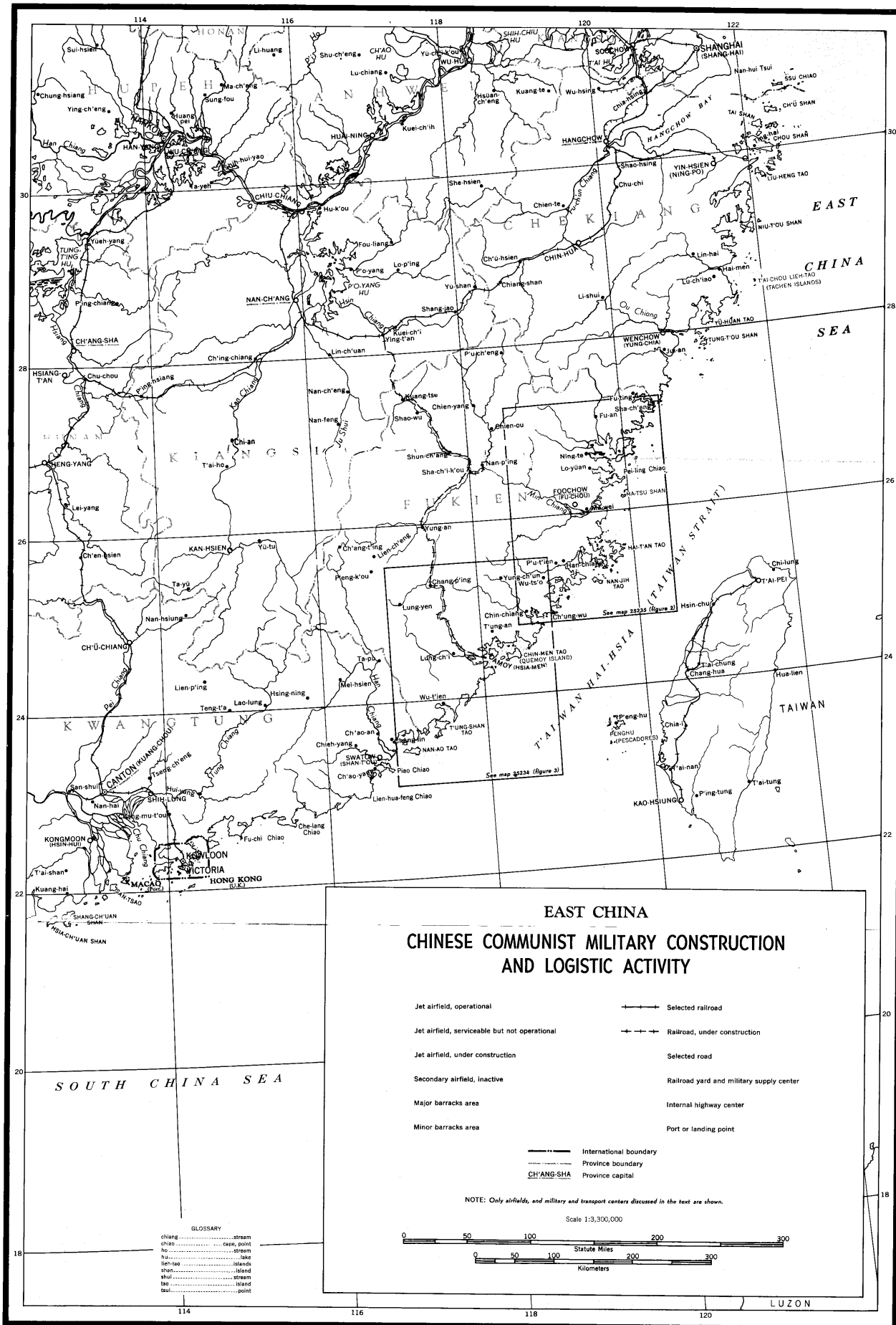
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