

~~TV~~
~~30/54~~ PD-AAF-880
~~DS13~~

493-0284
4101

HG-003



REVIEW OF
BANG PLEE-BANG BOR
NEW COMMUNITY PROJECT

NOVEMBER 1979

**AGENCY
FOR
INTERNATIONAL
DEVELOPMENT**



OFFICE OF HOUSING

**REVIEW OF
BANG PLEE-BANG BOR
NEW COMMUNITY PROJECT**

**FOR
OFFICE OF HOUSING, US/AID, and
NATIONAL HOUSING AUTHORITY, THAILAND**

AID/otr-C-1634

DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D.C. 20523

FOREWORD

This review was conducted during October and November 1979 by DeVoy Collaborative and the National Savings and Loan League under the auspices of the Office of Housing of the Agency for International Development and through funding provided by this office. The review team included Robert DeVoy of DeVoy Collaborative; Frank Senold and Royce Lanier from the National Savings and Loan League.

The findings and recommendations included in this report have been reviewed in detail and discussed with representatives of the National Housing Authority of Thailand.

While the report results from close cooperation of the team and its counterparts, it is not to be interpreted as an official position of either the National Housing Authority or the Agency for International Development.

We hope, however, that the Authority will find the report and its recommendations useful as it formulates and implements this project and future shelter programs.



Peter M. Kinn
Director
Office of Housing

TABLE OF CONTENTS

| | <u>Page</u> |
|--|-------------|
| 1.0 Terms of Reference | 1 |
| 1.1 Purpose of Review | 1 |
| 1.2 Participants | 2 |
| 2.0 Summary of Primary Conclusions and Recommendations | 4 |
| 3.0 Progress to Date | 8 |
| 3.1 Actions Completed | 8 |
| 3.2 Actions Underway | 9 |
| 4.0 Overview of Specific Issues | 14 |
| 5.0 Discussion of Key Issues | 25 |
| 5.1 Project Conformance to NHA Policies and the NHA/AID | 25 |
| 5.2 Project Financial Plan | 33 |
| 5.3 Government Subsidy and Cost Recovery | 38 |
| 5.4 Housing Affordability | 44 |
| 5.5 Employment, Business Opportunity and Personal Income Impacts | 52 |
| 5.6 Balance of Employment Opportunities and Housing Demand | 56 |
| 5.7 Environmental Soundness Analysis | 64 |
| 5.8 Project Implementation & Management Review | 76 |
| Annex A Project Description | 87 |
| Annex B Proposed Industrial Survey and Promotion Program | 107 |
| Annex C Estimation of Low-Cost Housing Components for for Lad Krabang and Songkhla Projects | 113 |

1.0 TERMS OF REFERENCE

1.1 Purposes of this review

NHA and AID have agreed to regular monitoring and evaluation of NHA activities to be funded by the HG loan. This review of the Bang Plee- Bang Bor New Community Project is part of this process. The specific purposes of this review are to:

- ensure project soundness (physical, economic, financial, social, environmental)
- check compliance with NHA policies and AID Project Paper
- see if plans for project management and construction management are adequate
- suggest ways to improve project planning and implementation
- ascertain potential HG funding in context of project Financial Plan and overall NHA program
- identify specific issues which need to be addressed, including but not limited to potential conditions precedent for Implementation Agreement
- coordinate AID and ADB activities, perceptions, expectations and recommendations
- provide technical assistance to NHA useful in

Phase I and subsequent phases of this community as well as future projects.

1.2 Review Participants

This review has been under the direction of Mr. Sean P. Walsh, RHUDO/Bangkok and Mr. David Liebson, Office of Housing/Washington. NHA participation has been coordinated by Mr. Pree Burnasiri, Director, Research and Construction Department and Mr. Sidhijai Tanphiphat, Chief, Housing Policy and Planning. Many NHA staff members gave kindly and generously of their time, information and ideas.

Concurrent to this review and coordinated with it has been the review by the Asian Development Bank. The ADB team has been directed by Mr. Chua Peng Chye, Urban Development Specialist. ADB and AID attended numerous joint meetings with NHA, discussed issues daily, exchanged information freely, and exchanged working papers and draft reports.

The consultants responsible for the AID review have included: Robert S. DeVoy, President, DeVoy Collaborative, who served as Team Leader and housing economist/market specialist and writer of the report; F.J. Senold, National Savings and Loan League who served as architect/engineer and made the analyses of project costs and construction management; and

and Royce LaNier, National Savings and Loan League
who served as planner/environmental specialist
and made the environmental soundness analysis.

2.0 SUMMARY OF PRIMARY CONCLUSIONS AND RECOMMENDATIONS

The Bang Plee - Bang Bor New Town Project has been adequately planned in general. Now the task is to translate the plan into a feasible implementation program including construction, marketing and estate management. The most important actions needed now are:

1. NHA needs to secure the financial commitments for this project from the Ministry of Finance and various Government organizations as well as domestic and international lenders. Understandings need to be made, firm agreements entered into and a financial plan prepared reflecting AID, ADB, GOT funding along with downpayments and proceeds from industrial estate sales.
2. NHA should review and revise all project cost estimates to be sure that they are reasonable and that the project can be constructed and marketed within these costs.
3. NHA needs to refine the analysis of housing affordability taking account of most realistic construction costs, overhead, monthly management service costs, and utility rates and distribution of costs between residential and industrial estate

components. These refined costs need to be compared to the best available household income distributions to make a realistic determination of housing affordability.

4. NHA needs to have a well-conceived construction management program which adequately addresses the substantial coordination problems inherent in a project of this scale and complexity. NHA staff and procedures need to be readied and the program defined in appropriately time-phased contract packages.

5. NHA and IEAT must prepare and implement an industrial marketing program at this time to advance the creation of job opportunities as much as possible so that early project residents have on-site employment opportunities.

6. NHA needs to formulate a comprehensive estate management program including: plans and schedule for marketing and sales of houses and commercial and industrial lands; collection of hire-purchase payments and monthly service charges; provision of estate management services; and creation of a Town Government with adequate management and financing.

7. NHA and Town and Country Planning must soon agree upon and have effected development regulations of lands along the highways within several kilometers of the site which influence the feasibility the New

Town Plan for industry and commerce.

8. NHA has devised an implementation schedule which assumes that all will go well according to plan. It is now necessary to undertake sensitivity analyses and prepare contingency plans in order to take account of and adequately respond to a reasonable range of less-than-ideal potentials, including major contractor delays, excessive costs, weak markets and slower than projected sales of houses and industrial land, and the need for more revenues, etc.

9. NHA policies have been adequately followed in the planning of Phase I; now NHA needs to consider how these policies can be furthered in Phases II and III, especially the provision of low-cost housing, reduction in Government subsidies and improved cost recovery.

10. While the physical planning of Phase I is satisfactory, in planning Phases II and III NHA should seriously explore alternative street layouts, residential patterns, housing types, utility provisions (especially sewerage) uses of building materials, and house expansion potentials to ensure the best possible design in terms of development costs, marketability, affordability, recurring costs, and economic life of each component.

13

11. Utility services, i.e., water supply, electricity, telephone, sewerage, are essential to this project and firm commitments are essential now regarding who will provide these facilities, what will be provided, what are the estimated capital and operating costs of various service systems, what the schedules will be, what the current costs will be, and who will bear these costs.

12. Overall project management, including technical assistance, will largely determine the success of this project and NHA's capability to carry out the other projects in its program. Therefore, AID will work closely with NHA and provide monitoring and evaluation assistance to ensure that NHA has the capability needed to further its policies and program objectives through this project.

3.0 PROGRESS TO DATE

The Bang Plee - Bang Bor New Town project is nearing the end of project planning and is preparing to embark on final design and construction of Phase I. While there remains unresolved issues, there has been substantial progress in planning, analysis, and concept design.

3.1 Actions Completed

The feasibility study was completed one year ago for the total project. Land for the entire new town has been acquired by the NHA. A Phase I plan has been prepared including land uses, off-site and on-site infrastructure, community facilities and housing mix. The plan includes a time schedule, cost estimates, and financial analysis.

A summary of this plan is included as Annex A. A preliminary project organization structure and staffing have been determined. An analysis was made of the potential demand for industrial land and housing for industrial workers based on a survey of industrial workers within 20 kilometers of the property for the new town. Preliminary discussions have been held with Government organizations needing to make investments in the new town. Some tentative commitments have made.

The Ministry of Finance has agreed in principle to support this project including Government financing of off-site infrastructure, community facilities, and to subsidize part of the on-site infrastructure cost allocated to the three types of less expensive housing. The Asian Development Bank (ADB) is considering funding approximately 50% of the cost of Phase I and US/AID is considering the use of some of the approved HG loan of \$15 million for low-cost housing in this project. NHA planning is based in large measure on ADB and US/AID HG loans for this project.

The NHA has made satisfactory progress to date in planning this project. There is little need to back up and reconsider actions taken thus far. There are some concerns with the development plan, feasibility studies, and project implementation program, which are identified below. However, the overall new town project has been reasonably well conceived and adequately planned. There are no crucial flaws in the project at this point. Adjustments needing to be made can be made as the project progresses.

3.2 Actions Underway

The most important tasks of the NHA at this time are:

- (1) To secure final financial commitments

for this project from the Ministry of Finance, Thailand water, electric, highway, education, and community facility organizations and domestic and international lenders;

(2) To contract for the construction of dikes and drainage of the site so that development can be commence on schedule. If this effort slips, an entire year of the schedule could be lost because the dikes cannot be built during the rainy season;

(3) To prepare a sales and marketing program including plans and schedules for the industrial estate and housing components. The development of the industrial estate by NHA must be accompanied by an aggressive marketing program by the Industrial Estate Authority of Thailand (IEAT). However, IEAT has yet to undertake a marketing study for the industrial estate to use as the basis for their marketing program. This important deficiency is attributable to lack of financing.

(4) Firmly establish the Project construction management program including organization, staffing and procedures. NHA is taking on its largest and most complex project. The technical aspects of the project are within the competence of NHA staff, but

17

the short time schedule and multitude of participants in addition to NHA present a major challenge of project coordination. To date NHA has yet to devise a comprehensive construction management program for this project to cope with this challenge. Some components have been prepared, e.g., a preliminary project organization structure and staff, but much remains to be done. (See 4.0 below).

(5) Determine the project estate management program. This will become very important in the allocation of houses and land and once households and businesses begin to move onto the site. Since NHA has had considerable difficulty in managing Rangsit, its first core house/site and service project, it is evident that there is a need for a complete estate management program for Bang Plee - Bang Bor. The Estate Management Department recognizes this need, but such a program has yet to be prepared. Since there is not a municipal government serving the site, NHA also will need to undertake such municipal functions (e.g., trash collection, police and fire protection) until a municipal capability exists. Also it is likely that NHA will need to foster the creation and functioning of this municipal government.

Prepare sensitivity analyses and contingency plans.

The development plan, time schedule, cost estimates, and marketing expectations for this project are reasonable, but they are slanted in the direction of "best possible world" assumptions. NHA staff are aware of the need for sensitivity analyses to ensure that the project would be economically and financially viable should undesirable things occur such as long construction delays, large cost increases and slow marketability. Given any such happenings, NHA needs to be prepared to adjust its program to cope successfully. This response needs to be planned in order to be effectively implemented. Beyond recognizing the need for such analysis and contingency planning, NHA has not advanced in these regards.

This project is consistent with NHA housing policies and programs. At least 55% of the houses in Phase I will be affordable by households with incomes below the Bangkok urban median estimated to be ฿3,330 in 1979. Adequate job opportunities are planned on site to provide on effective demand for the residential housing component. Adequate planning needs to be done to assure that on site jobs will be created on schedule with the housing component. Complete infrastructure and community facilities are included. While some subsidies are involved -- mainly cash subsidy part of the infrastructure cost and economic subsidy of interest rate for the less expensive houses -- the level

of subsidy is less than in previous NHA projects. Moreover, the intent is to insure full cost recovery on all costs except for off-site infrastructure, part of on-site infrastructure related to the less expensive houses and community facilities. In order to implement these intentions, NHA needs to prepare housing allocation criteria and procedures. Also, NHA must charge adequately for the products and services it is providing and have the mechanisms and procedures to ensure that hire-purchase payments and monthly service charges are collected.

These provisions need to be included in the overall management program of the Estate Management Department, which has yet to be prepared -- although some preliminary consideration has been given to these needs. The estate management plan being prepared for the Tung Song Hong project probably could serve as a solid foundation for the Bang Plee - Bang Bor project.

4.0 OVERVIEW OF SPECIFIC ISSUES

Beyond the broad project needs identified above, the following specific issues are most worthy of mention at this time.

4.1 Project Design

In general, the design is adequate. However, the rowhouse layouts for the Types A and B houses (least costly) do not lend themselves to inexpensive self-help expansion of the cores. This is partly a function of the need for deep piles, but also partly caused by the location of the houses on the plots and the house designs themselves. Reconsideration of these designs in subsequent phases is warranted. The changes proposed to the road system (especially the reduction in the width of the spine road) and the sizes of school sites also warrant serious consideration by NHA.

4.2 Project Financing

The manner in which NHA will receive funds from the Ministry of Finance and the financial commitments of other Government agencies and Authorities need to be finally determined. How NHA intends to finance the start of construction before ADB and AID HG loan funds are available needs to be clarified as well. In this regard an up-to-date detailed financial plan needs to be prepared.

4.3 Project Costs

The Phase I estimates are reasonable including the 15% physical contingency and 25% price contingency for construction costs if the project is completed as planned. However, should major delays or other changes occur, additional financing would be required.

4.4 Recoverable Costs/Subsidies

NHA service charges need to be reconsidered and justified. Also it is necessary that Estate Management have a management program and budget which are adequate for this project. Furthermore, procedures for collecting hire-purchase payments and monthly service charges are much needed.

Government subsidies as planned in Phase I are limited to part of the cost of on-site infrastructure for the less expensive house. In latter phases reductions in these subsidies should be planned -- as consistent with NHA housing policies. The cross-subsidies planned on overhead and interest to reduce the cost of less-expensive houses are satisfactory as long as they are really cross subsidies and not an actual cost to NHA.

4.5 Project Beneficiaries/Affordability

Based on present cost estimates and the Bangkok household incomes estimates by the World Bank, at least 55% of the houses are affordable by the lower-income households. Even with construction cost increases of 15-45% greater than income rises, this housing would still be affordable. However, at this time the site is relatively isolated from large numbers of jobs for the unskilled. Bus service now comes within seven kilometers on the secondary highway traversing the northern part of the site. It is possible that a substantial number of households with workers now in the general area would move to the site. Nevertheless, the primary housing beneficiaries ought to be workers within the new town. Therefore, it is important that IEAT and NHA devise and implement an industrial marketing program in the near future (see 4.6 below).

4.6 Project Marketability/Marketing

Although there is a substantial need for adequate low-cost housing in the Bangkok urban area in general, there may not be an adequate effective demand for the houses planned for this new town. The general market surveys and analyses which have been made were satisfactory for planning purposes, but more specific marketability surveys and analyses are required now that the project is moving into

implementation. In particular, IEAT should develop a prospect list of industries for the industrial estate and these should be surveyed to ascertain the likely housing requirements of their workers. Also, new and expanding industries within reasonable travel times of the site should be surveyed. (See Annex B)

There are problems inherent in promoting housing, commercial land and industrial estates prior to their physical development, but IEAT and NHA ought to devise marketing strategies which include advertising to obtain expressions of interest in the project before applications are requested. This approach will facilitate the overall marketing of the project as well as ensure better balance of workers and jobs as the project progresses. (see section 5.6)

4.7 Government Commitments to Project

As expressed above, there is a need to firm up the timing of the MOF commitments regarding the GOT financial contribution of £175 million to this project. Also, the specific role of each agency in developing, financing and operating each facility must be determined soon. Formal agreements should be negotiated wherever possible to guarantee full understanding and commitment. These next steps

vary in urgency depending on the timing and importance of each facility, thus the workload demands on NHA staff should be so programmed.

Although the Highway Department has rejected the NHA's request for the Highway Department to fund the off-site road and spine road, continuing effort should be made to reverse this decision. Very importantly, the Highway Department's agreement should be sought on its building and financing the interchange with Bangna-Trad Highway if and when this interchange is necessary.

The Town and Country Planning Board has given general approval to this new town development. Also, an inter-agency committee has been created to determine how to best foster the new town. Some control of the surrounding land area is being considered, including a restriction on commercial and industrial development within several kilometers. It is essential that adjoining and competitive development be controlled to protect the physical, economic and financial integrity of the new town. These controls need to be in place by the time Phase I construction is in its early stages in order to preclude other developments from capturing the market potentials envisioned for the new community.

4.8 Implementation Scheduling /Cash Flows

Phase I is scheduled to be constructed and marketed in the four years 1980-1983. This is a short period for a project of 4,857 housing units, 445 rai (176 acres) of industrial land, 205 rai (81 acres) of commerce and business land, and a full range of community facilities. It is particularly short considering that the site will not be buildable until several months into 1980 and NHA has never undertaken a project of this scale and complexity. Accordingly, it is virtually certain that delays will occur which will upset the tight schedule and cause imbalances in the flow of costs and revenues. While good construction management and effective marketing can limit the problems, the coordination difficulties will not be altogether avoidable by NHA. Therefore, as discussed in section 3.1, above it is important that sensitivity analyses be made and that contingency plans be prepared to take account of and cope with such likely occurrences.

4.9 Project and Construction Management

The NHA planned organization and staffing for the Bang Plee - Bang Bor project are generally consistent with international practices for large scale urban development projects and, as such, are satisfactory. It appears that NHA has qualified staff to fill the many

technical positions required. It is imperative that NHA have a well-conceived project management program for this project which adequately addresses the substantial problems inherent in coordinating the financial, marketing and construction activities of NHA and other agencies and contractors during a tight construction schedule. NHA officials at headquarters will need to commit significant amounts of their time to this project during the early construction years, albeit they will have other responsibilities as well. A substantial effort in preparing the construction management program should yield significant saving in their time as the project develops.

Another important factor is the selection of contractors. NHA has yet to determine the division of Phase I stages into sub-projects for bidding purposes. These determinations should be made carefully, taking account of the capabilities of the potential contractors as well as the functional interrelationships of project components. For example, given the shortage of money and its high costs to contractors, it may be best to award several small contracts in lieu of large ones. Also, while in practice it is difficult for NHA to award contracts to other than the lowest bidders, it would be desirable to break this practice when the likely performance of the lowest bidder would be clearly detrimental to the project schedule and quality.

27

The field office staff, including construction supervisors, largely will determine the efficiency and effectiveness of the construction program once the contracts are let. Their work with individual contractors needs to be coordinated by both field office management and Central office Research and Construction officials. It would be desirable to create a project technical coordination committee headed by the Project Manager and consisting of representatives of all participating departments of NHA, other Government organizations and major contractors. This Committee should meet regularly to make progress reports and determine technical actions to take to implement this project.

4.10 Public Facilities and Services

The planning for community facilities and infrastructure thus far has been satisfactory. Moreover, NHA has had preliminary discussions with the various organizations responsible for developing and operating these facilities. Tentative commitments have been made, but it is now time to detail design requirements for and obtain firm commitments for their construction financing and operation. It is the regrettable common practice throughout the world with large urban development projects such as this to ignore the provision of these facilities until the needs are pressing. By continuing to pursue

the attainment of these facilities on a timely basis NHA will contribute substantially to the early attractiveness of this town to residents and workers.

4.11 New Town Government/Service Delivery

Since there is not a municipal Government in the Bang Plee-Bang Bor area, it will be necessary for the NHA Estate Management Department to provide municipal services in addition to the project services it normally provides. Thus it must prepare to provide for municipal services such as garbage collection and disposal, fire protection, public health, water supply, and police protection.

The new town ultimately will need its own local government. NHA should devise a Bang Plee - Bang Bor New Town Governance Plan which provides for the systematic phasing out of NHA Estate Management activities with the phasing in of a resident - controlled, adequately - financed local government. Since the new town will experience substantial growing pains for many years, it may be that the professional city manager form of Government, such as that in Pattaya, would be most appropriate. The NHA has devoted some consideration to this matter; what is important now is to continue this effort to formulate an effective Estate Management Program for Bang Plee-Bang Bor which precedes and ties into the Governance Plan.

4.12 Environmental Impacts

The new Town development is necessarily converting valuable rice paddy lands into urban land, thereby altering the ecology of the land and klongs. Furthermore, until an adequate sewerage system is operating, residential, commercial and industrial wastewater will further degrade the waterways. Definite plans for a sewerage system need to be determined soon. Despite these environmental consequences, the new community will be environmentally superior to the most likely alternative of scattered, incremental small developments of inadequate design and construction which degrade the natural environment just as severely without the compensation of providing a well-planned, balanced residential, commercial and industrial community with adequate infrastructure and community facilities. This balance of land uses is intended to offer the further advantage of providing housing and jobs in close proximity, thus reducing work travel distances, energy consumption and air pollution. There is the prospect that the ground water supply is inadequate, thus possibly causing salt water infiltration and requiring an alternative water source as the community grows.

NHA is generally aware of these environmental consequences of this project. What is important now is that environmental and energy concerns be explicitly and adequately considered in the detailed design and implementation of this new town.

5.0 DISCUSSION OF KEY ISSUES

5.1 Project Conformance to NHA Policies and the AID Project Paper

The NHA policies which most directly relate to the Bang Plee-Bang Bor project, as extracted from the Draft Policy and Development Plan, 1978-1982 (adopted) are:

- develop new housing communities
- target increasing share of housing to low-income families
- provide housing which is affordable by poor households
- promote owner-occupation and security of tenure
- reduce Government subsidies
- focus subsidies as necessary on infrastructure and community facilities for least costly houses
- provide for cross subsidies
- improve cost recovery
- provide necessary community facilities and services
- provide for employment and business opportunities
- design projects in accord with sound environmental principles

These topics are discussed elsewhere in this report along with specific recommendations for NHA action. The focus here is the conformance of this project with these policies. The findings are:

5.1.1 Develop new housing communities

This project as planned qualifies in scale, mix of housing, inclusion of substantial commercial and industrial areas, and provision of infrastructure and community facilities as a new community.

5.1.2 Target increasing share of housing to low-income families

Using the 1975-76 household expenditure survey results on household incomes, the Bangkok median is $\text{฿}2,500$ per month ($\$125$). In fact, now it is likely to be well over $\text{฿}3,000$ ($\$150$). Nevertheless, using $\text{฿}2,500$ as the median, 55% of Phase I housing units (A and B types) are affordable by lower-income households (see section 5.4 for analysis). The NHA total program for 1978-82 provides for 46%, so this target is met.

5.1.3 Provide housing which is affordable by poor households

NHA policy and the Phase I plan for this project use 20% of incomes as affordable hire-purchase payments for low-income households. With utility costs, management fees, and building material loans, the total increases to 30% in the Phase I project plan. With the exception of the estate management cost, these other costs are not addressed directly in the Policy report. The estimates of downpayments (5-10%) and amortization term (20 years) are the same in the Policy and Project Phase I report. The Project Paper also includes these

same estimates as well as the 30% of income for total housing cost. The estimates of construction cost affordable by owner-occupants has changed from the Policy report as follows:

| | <u>Housing Cost to Household</u> | | | |
|--------|----------------------------------|----------------------|---------------------|-------------------------|
| | <u>Monthly Household Income</u> | <u>Policy Report</u> | <u>Phase I Plan</u> | <u>Percent Increase</u> |
| Type A | ฿1,500-2,000 | ฿32,641 | ฿35,752 | 10% |
| Type B | ฿2,000-3,000 | 47,957 | 50,552 | 5% |

Considering the one year difference in when these estimates were prepared, it is reasonable to assume that household incomes have increased at least as much as these housing costs (the consumer price index increased 15% and per capita gross domestic product has been increasing an average of 0.9% per month)

The Project Paper (p. 32) indicates "sales price excluding infrastructure" for the Bang Plee-Bang Bor project of ฿30,334 and ฿52,028 for Type A and B houses based on preliminary estimates by NHA. While slightly different than present estimates, the conclusions are the same regarding affordability of these units by lower-income households -- both A and B units are affordable. NHA has made substantial progress in planning core housing site and service projects. Should costs increase more than household incomes in the future it will be necessary to reduce the physical housing product to meet the need

for affordable lower-income housing.

5.1.4 Promote owner occupancy and security of tenure

All the housing units in this project are to be sold on a hire-purchase contract basis with title being held by NHA until the amortization payments are completed (20 years), at which time title transfers to the purchaser. NHA intends to enforce provisions requiring the purchasers to live in the houses, at least for a year or more, or NHA can repossess the property.

5.1.5 Reduce Government Subsidies

The Policy is for Government to finance all community facilities and infrastructure for Type A houses (least expensive) and all facilities and 75% of the on-site infrastructure for Type B houses. Since it is considered the normal responsibility of the Thai Government to provide off-site infrastructure and all community facilities, these costs are not subsidies in the sense of special benefits to one group. The Bang Plee-Bang Bor plan is the same as these policies. (See section 5.3 for analysis)

5.1.6 Focus subsidies on necessary facilities for least costly houses

Both the Policy and the Phase I plan provide for greater percentages of Government cost responsibility for on-site infrastructure related to the less expensive houses (100% Type A, 75% Type B and 50% Type C).

The Government shares of total housing cost in the project are 52% of Type A, 41% of Type B, 33% of Type C, and 12% of Type D. However in absolute amounts, the Government is paying more for Type C units (¥40,969) than for Type A (¥38,892) and Type B (¥35,100) because of the distribution of costs by housing type. NHA should revise the planned Government share of Type C infrastructure cost to less than 50% to eliminate this inequity.

5.1.7 Provide for cross subsidies

The Policy calls for profits to NHA from commercial developments (and, one would assume industrial developments) to be used to cross subsidize the lower-income houses. This is planned in Bang Plee-Bang Bor as well, but the procedures for ensuring maximum profits are realized and that cross subsidies occur have yet to be defined.

Neither the Policy nor the Phase I Plan for Bang Plee-Bang Bor propose cross subsidies from more expensive housing to less expensive housing. However, this is something the IBRD and NHA are working out on the Lad Krabang project and regional city projects. NHA should consider this potential for Bang Plee-Bang Bor and implement such cross subsidies in housing sales prices if demanded feasible.

There are cross subsidies implied in the differential overhead rates (0, 5 and 10%) and interest rates (10-12%) favoring low-cost houses in both the Policy and the Project.

5.1.8 Improve cost recovery

Both the Policy and the Project provide for the beneficiaries to directly pay for land and structure costs, NHA project overhead, and interest during construction as well as indirectly for their prorated shares of infrastructure costs not paid by Government. (See section for 5.3 for analysis.) Beyond planning to recover these capital costs, NHA intends to set monthly charges for estate management which are adequate to cover actual costs (not the case now in existing projects). NHA has been experiencing difficulties in collecting rents and management fees which also has contributed to its cost recovery problems. Overcoming these problems is crucial to NHA's financial capability to provide the amounts of housing needed by low-income households.

5.1.9 Provide necessary community facilities and services

The physical plan for Bang Plee-Bang Bor incorporates adequate lands for the needed facilities and preliminary determinations have been made as to who will finance, construct and operate them. These

37
determinations need to be finalized including timely scheduling to avoid delays in having facilities available for early project occupants. While the facilities are planned, it is also important to plan for health and social services. This important need has not yet been adequately addressed in the planning for Bang Plee-Bang Bor.

5.1.10 Provide for employment and business opportunities

The NHA Policy report is silent on this point, although it is becoming a strong objective of NHA projects in both Bangkok and the regional cities. It is particularly important when project locations are remote from adequate employment concentrations. While the Bang Plee-Bang Bor project includes major commercial and industrial estate developments, most project residents will need to work elsewhere. Nevertheless, the timely phasing of housing with job opportunities is crucial to the success of this project (see sections 5.5 and 5.6 for analysis).

5.1.11 Design projects in accord with sound environmental principles

NHA's environmental policies were adopted after the Policy and Development Plan, 1978-82 was prepared and adopted and after the site was acquired for the Bang Plee-Bang Bor project. The AID environmental

consultant in 1978 recommended a negative finding on the environmental impact of this project (per the Project Paper). Because of the sequence of these events, it is understandable and acceptable that the design of Phase I of this project does not fully satisfy NHA's new environmental policies. However there are some proposed NHA actions which would be environmentally beneficial, as described in section 5.8 below.

5.2 Project Financial Plan

The NHA housing program for 1978-82 and the Phase I Plan for Bang Plee-Bang Bor include financial projections which essentially constitute a financial plan for this project. However as the project moves closer to final design and construction, it is important to review and update the financial plan to ensure that project costs are realistic and that adequate financing will be available.

The following tables on costs and financing incorporate the most recent information known to the AID team. Costs for Phase I take account of the capital cost adjustment made by ADB and agreed upon by NHA. The table on financing alternatives includes Alternative A only, since both ADB and AID funding levels are yet to be finally determined.

It is proposed that NHA review these estimate and other factors and prepare its own updated Financial Plan for this project.

BANG PLEE - BANG BOR NEW TOWN PROJECT CAPITAL COSTS
BY MAJOR CATEGORIES AND INDUSTRIAL RESIDENTIAL,
LOW-COST HOUSING

| | <u>TOTAL</u> | <u>INDUSTRIAL</u> | <u>RESIDENTIAL AND COMMERCIAL</u> | <u>LOW-COST RESIDENTIAL (A + B Houses)^{1/}</u> |
|---|-----------------------------|-------------------------|---------------------------------------|---|
| | (Millions of Baht) | | | |
| LAND | 65.9 | 19.6 | 46.3 | 3.9 |
| FLOOD PROTECTION | 26.6 | 11.8 | 14.9 | 1.3 |
| INFRASTRUCTURE | | | | |
| ON-SITE | 214.8 | 62.5 | 141.4 | 12.3 |
| OFF-SITE | 15.4 | 3.9 | 19.3 | 1.6 |
| SUB-TOTAL | 230.2 | 66.4 | 163.7 | 13.8 |
| COMMUNITY FACILITIES | 95.2 | 6.8 | 88.4 | 48.6 |
| COMMERCIAL | 4.1 | - | 4.1 | - |
| PRIOR DEVELOPMENT COST | 2.5 | 0.7 | 1.8 | 0.2 |
| SUB-TOTAL | 424.5 | 105.3 | 312.2 | 67.8 |
| CORE HOUSES | 235.7 | - | 235.7 | 80.4 |
| SUB-TOTAL | 660.2 (\$33.0) | 105.3 (\$5.3) | 554.9 (\$27.8) | 148.2 (\$7.4) |
| OVERHEAD(75% OF CONSTRUCTION) | 44.6 | 6.4 | 38.6 | 10.8 |
| INTEREST DURING CONSTRUCTION ^{2/} | 52.1 | 10.5 | 41.6 | 9.9 |
| TOTAL BASE COST | 756.9 (\$37.9) | 122.2 (\$6.1) | 635.1 | 168.9 (\$8.4) |
| CONTINGENCY ^{3/} | | | | |
| - Physical (15%) | 89.2 | 12.9 | 76.3 | 21.7 |
| - Price (30%) | 178.3 | 25.7 | 152.6 | 43.3 |
| SUB-TOTAL | 267.5 | 38.6 | 228.9 | 65.0 |
| SUB-TOTAL | <u>1,024.4</u> (\$51.2) | <u>160.8</u> (\$8.0) | <u>864.0</u> (\$43.2) | <u>233.9</u> (\$11.7) |
| BLD.MATERIAL LOANS | 45.0 (\$2.25) | - | 45.0 (\$2.25) | 26.5 (\$1.3) |
| GRAND TOTAL | <u>1,069.4</u> (\$53.45) | <u>160.8</u> (\$8.0) | <u>909.0</u> (\$45.45) | <u>260.4</u> (\$13.0) |

1/ Derived as 8.41% of residential/commercial land, infrastructure and landscaping costs, based on fact that A & B houses occupy 8.41% of this land; derived as 55% of community facility costs (A & B of total houses); full estimated costs of core houses.

2/ Calculation of Interest During Construction

| | | <u>Total Dev. Cost</u> | <u>Industrial</u> | <u>Residential & Commercial</u> | <u>Low-Cost Housing</u> |
|----------------------|-------------------------|------------------------|-------------------|-------------------------------------|-------------------------|
| | <u>Avg. Time Period</u> | (millions of Baht) | | | |
| Land | 3 yr. | 7.05 | 2.10 | 4.95 | .42 |
| Flood Protection | 2 yr. | 2.61 | 1.16 | 1.46 | .13 |
| Infrastructure | 2 yr. | 22.58 | 6.51 | 16.06 | 1.35 |
| Community Facilities | 1 yr. | 8.57 | 0.61 | 7.96 | 4.37 |
| Commercial | 1 yr. | .37 | | .37 | |
| Prior Dev. Cost | 3 yr. | .27 | 0.07 | .19 | .02 |
| Core Houses | 6 mo. | 10.61 | - | 10.61 | 3.62 |
| | | <u>52.06</u> | <u>10.45</u> | <u>41.60</u> | <u>9.91</u> |

N.B. total and splits include interest during construction on GOT contribution of B175 million which is not a cost to project or NHA.

3/ Contingency allowances as percentage of land development and structure costs.

BANG PLEE-BANG BOR NEW TOWN PROJECT FINANCING ALTERNATIVES 1/

| | <u>TOTAL</u> | <u>INDUSTRIAL</u> | <u>RESIDENTIAL AND COMMERCIAL</u> | <u>LOW-COST RESIDENTIAL (A+B HOUSES)</u> |
|---|---------------------|-------------------|---------------------------------------|--|
| | (Millions of Baht) | | | |
| <u>TOTAL COST</u> (from p. 34) | 1,069.4 (\$53.5) | 160.8 (\$8.0) | 909.0 (\$45.5) | 260.4 (\$13.0) |
| <u>FINANCING ALTERNATIVE A</u> | | | | |
| <u>TELEPHONE ORGANIZATION</u> ^{2/} | 49.7 | 5.2 | 44.5 | - |
| <u>GOVERNMENT</u> ^{3/} | 175.0 | - | 175.0 | 104.3 |
| Down Payments ^{4/} | 123.7 | 58.0 | 65.7 | 9.7 |
| ADB Loans ^{5/} | 500.0 | 70.0 | 430.0 | |
| HG LOAN (30% of Low Cost Housing per NHA-AID Program) ^{6/} | 78.1 | - | 78.1 | 78.1 (\$3.9) |
| SUB-TOTAL | 926.5 (\$46.3) | 133.2 (\$6.7) | 793.3 (\$39.7) | 192.1 (\$9.6) |
| BALANCE TO BE FUNDED BY OTHER SOURCES ^{7/} | 143.0 (\$7.2) | 27.6 (\$1.4) | 115.8 (\$5.8) | 68.3 (\$3.4) |

- 1/ Prepared by Robert S. DeVoy from NHA Phase I plan report with revised cost estimated by ADB (see p. 34 for table on cost details).
- 2/ Telephone Organization will finance all telephone capital costs through its own borrowing and user rates.
- 3/ Government, through Ministry of Finance, plans to provide financing for community facilities and some infrastructure (as detailed in report) as costs are incurred by NHA, thus no debt financing by NHA on these costs.
- 4/ Downpayments include residential downpayments and commercial and industrial downpayments and total cash transactions.
- 5/ ADB loan estimate made by ADB project review team in November 1979.
- 6/ HG loan proceeds used for this project could be different than this overall program target subject to NHA-AID Agreement.
- 7/ Other sources planned by NHA to include domestic and international commercial loans as well as monthly hire-purchase payments made during construction period by purchasers of houses and commercial and industrial land (i.e., \$145.1 total in monthly payments).

5.3 GOVERNMENT SUBSIDY AND COST RECOVERY.

The Phase I report for the Bang Plee - Bang Bor New Town Project provides for Government to pay for all off-site infrastructure, community facilities, and telephone infrastructure. In addition, there are partial subsidies to lower-income households in the form of lower infrastructure cost per plot, lower overhead charges, and lower interest rates on house purchases.

The off-site infrastructure cost pertains to an arterial road connecting the site to the highway to the north and one bridge in that 700 meter distance. While the cost of this off-site infrastructure is relatively small, i.e., ฿1,733,000 (\$87,000) only 10% of this cost has been assigned to the industrial land, which accounts for 27% of the Phase I total land area. Since this highway connection is crucial to potential industrial and commercial development, it would be prudent to recapture all of this cost through the land prices charged to industry and commerce. Should commercial and industrial land sales revenues not be adequate to cover this cost, then it would be best to have the cost borne by the budget of the Highway Department rather than the National Housing Authority since the business taxes from the commercial and industrial activities will accrue to the Government of Thailand in general rather than NHA.

Only as a last resort should NHA finance this off-site road and bridge without recapturing the costs from the commercial/industrial lands and/or Government. This principle is very important considering the possible need for an expensive highway interchange (not included in Phase I) and a potential connecting road to the south of the site (also not included).

Furthermore, it is likely that this northern highway connection, as well as the new town development in general will cause land value increases on nearby lands. Government should devise means of capturing more of the values it creates by such public investments. An effective property tax system would be a good start. Effective land transfer and development taxes are among additional possibilities worthy of consideration. The present House and Rent Tax and Land Development Tax raise little revenue for local governments because of the many exemptions, e.g., single-family houses, small plots, and government lands. In Bangkok these taxes raised only B50 (\$2.50) per capita in each year, 1974-76. The surcharge on the national business tax and the vehicle registration tax are the major local government taxes in Thailand.

The costs of land and on-site infrastructure, consisting of roads, drainage, sewerage systems and water system, will be allocated among residential, commercial and industrial land uses. With the exception of the less expensive houses (i.e., Types A, B and C), these land uses will pay their full shares of these costs. The Phase I plan has the on-site infrastructure costs of ₪198 (\$10) per square meter fully subsidized for Type A houses affordable by households with incomes of less than ₪2,000 (\$100) per month (roughly 30th percentile); 75% subsidized for Type B houses affordable by households with monthly incomes of ₪2,000 (\$100) to ₪3,000 (\$150) (roughly 30-50th percentile range); and 50% subsidized for Type C houses affordable by households with monthly incomes of ₪3,000 (\$150) to ₪4,000 (\$200) (roughly 50-60th percentile range). These subsidies per unit are ₪16,621 (\$831) for Type A, ₪12,466 (\$623) for Type B and ₪15,830 (\$792) for Type C. These subsidies are much less than in earlier NHA projects and they are consistent with present NHA policies. While NHA needs to continue to reduce such subsidies in order to afford to build more low-cost houses, this project represents a major step in the right direction.

Telephone capital costs need not be subsidized since they should be (and probably will be) fully recoverable in monthly service charges paid by telephone users.

NHA overhead cost is estimated at 7.5% of land, land development and construction costs, yielding N44,978,000 (\$2,249,000). Cross subsidies are planned in that zero overhead cost is assigned to Type A houses, 5% to Type B and 10% to other houses and commercial/industrial land uses. While it is not possible to ascertain the adequacy of this estimate at this time, the 1979 study on Financial and Estate Management for NHA by Coopers and Lybrand indicates that overhead costs appear to be high relative to NHA housing units existing and under construction. Coopers & Lybrand presently is attempting to prepare an estimate of overhead cost based on historical data. Should efficiencies not be achieved and/or the NHA housing program substantially increased, the 7.5% overhead cost estimate may not be sufficient to meet actual costs. NHA needs to give priority attention to achieving all possible cost savings and evaluating the accuracy of projects overhead costs.

NHA is projecting monthly service charges of N50 (\$2.50) for house Types A and B and N80 (\$4) for other house types to cover operation and maintenance of street lighting, roads, footpaths, and utility charge for sewerage, excluding water supply and individual power consumption. Garbage and trash collection are to be provided also. Since there is no local government to provide municipal services at this

time, NHA will need to fill this role. It seems likely that the total monthly costs could be substantially greater than projected (perhaps twice as much) thus these rates may need to be increased to avoid an operating subsidy or inadequate services. This matter deserves careful attention at this time to ensure adequate budget for NHA estate management and to ensure that housing costs are affordable by lower-income households.

Housing sale prices, less down payments, are to be amortized over 20 years at 10% interest for Type A houses, 11% for Type B and 12% for other houses. At present interest rates (e.g., ADB at 7.6% and the HG loan at, say, 12%), NHA would be able to mix loan funds from various sources to provide this financing without Government subsidy. However, should the average of the mixed rate not be adequate in the future, higher interest rates may be necessary to avoid subsidies. While the cross-subsidy implied by these differential rates helps lower-income households afford basic housing, NHA should view this project as a major step in the direction of charging market interest rates to all households (i.e., the average interest rate paid by NHA on non-concessionary loans).

The distribution of residential costs by beneficiaries and government are shown below. These costs include raw land, infrastructure, community facilities, houses, overhead charges, and interest during construction, but exclude telephone costs.

Costs Per Housing Unit

| <u>Housing Type/ Income Group per month</u> | <u>Household Cost</u> | <u>Government Cost</u> | <u>TOTAL Cost</u> | <u>Percent Government of Total</u> |
|---|---------------------------|----------------------------|-----------------------|--|
| Type A - below ₱2,000 (\$100) (1,151 units) | 35,752 \$1,788 | 38,892 \$1,945 | 74,644 \$3,732 | 52% |
| Type B - ₱2,000-3,000 (\$100-150) (1,500 units) | 50,552 \$2,526 | 35,100 \$1,755 | 85,652 \$4,283 | 41% |
| Type C - ₱3,000-4,000 (\$150-200) (1,060 units) | 82,008 \$4,100 | 40,969 \$2,048 | 122,977 \$6,149 | 33% |
| Type D - ₱4,000-6,000 (\$200-300) (768 units) | 138,843 \$6,942 | 19,757 \$988 | 158,600 \$7,930 | 12% |
| Type E - ₱6,000+ (\$300+) (79 units) | 154,435 \$7,722 | 19,757 \$988 | 174,192 \$8,710 | 11% |
| Shophouses - 2 story (114 units) | 269,442 \$13,472 | 19,757 \$988 | 289,199 \$14,460 | 7% |
| Shophouses - 3 story (184 units) | 353,124 \$17,656 | 19,757 \$988 | 372,881 \$18,644 | 5% |
| TOTAL (000) (4,857 units) | 418,466 \$20,923 | 163,502 \$8,175 | 581,968 \$29,098 | 28% |

These data clearly reveal that Government subsidies are focused on the housing most affordable by the poor. The general government cost of ₱19,757 is comprised of ₱3,226 for off-site infrastructure ₱11,517 for community facilities ₱3,539 for interest during construction for the off-site infrastructure and community facilities, and ₱1,475 for the related overhead charge. The larger subsidies for the lower-cost houses mostly are for infrastructure and related interest and overhead costs.

5.4 Housing Affordability

Table H-6 from the Phase I report for the Bang Plee-Bang Bor New Town Project summarizes sales prices, down payments, monthly payments and other monthly charges for the various types of housing. The table is included as the following page of this report.

Using the assumptions and data from this table, Types A, B and C houses are affordable by households with incomes up to $\text{฿}3,100$ per month. This is approximately the median household cash income for Bangkok according to a table included in the World Bank's "Aide Memoire of Housing Mission," July 31, 1979 (See following table). That is, as many as 3,712 units out of 4,857 in Phase I are potentially affordable by lower-income households.

In the AID HG Project Paper $\text{฿}2,500$ is used as the median in 1976 thus leading to the conclusion that the 2,652 units of Types A and B would be affordable, but not the 1,060 units of Type C.

Some of the assumptions included in NHA's analysis are obsolete given recent substantial increases in construction costs, financing costs, and water and electricity rates. Also, it seems that the estimates of service charges for NHA estate management and eventual municipal services are quite low. Moreover, the monthly cost of electricity is not included in this analysis.

Estimated Household Monetary Income Distribution
Greater Bangkok, 1976 and 1979
(BHAT per month)

| Decile of Distribution | 1975 - 1976 Survey | | July 1979 |
|---------------------------|-----------------------------|------------------|------------------|
| | Total Income ⁽¹⁾ | Money Income (2) | Money Income (3) |
| 1 | 1,337 | 1,106 | 1,464 |
| 2 | 1,995 | 1,707 | 2,260 |
| 3 | 2,158 | 1,880 | 2,489 |
| 4 | 2,592 | 2,268 | 3,003 |
| 5 | 2,815 | 2,480 | 3,283 |
| 6 | 3,258 | 2,890 | 3,826 |
| 7 | 3,572 | 3,141 | 4,158 |
| 8 | 4,130 | 3,593 | 4,747 |
| 9 | 4,583 | 3,991 | 5,284 |
| 10 | 7,748 | 6,902 | 9,138 |

- (1) World Bank analysis of N.S.O. data
- (2) Estimate based on ratio between total and monetary income reported by deciles of per-capita expenditure groups for Bangkok.
- (3) Assumes average incomes in each group increased 0.7% per month - same rate as growth in GNP per capital in current prices during 1974 - 1977.

SOURCE: "Aide Memoire of Housing Mission," July 31, 1979, IBRD.

The following table is a limited sensitivity analysis of housing affordability. Using the NHA cost estimates, Type A houses are readily affordable by the 20th percentile based on July 1979 household income estimates by IBRD and roughly the 25th percentile using the 1976 household incomes. Type B houses are affordable below the 50th percentile using even the conservative 1976 household income estimates.

However, when cost increases are assumed, the affordable results change significantly. Should construction cost increase 15% (the physical contingency factor) and monthly service charges and water and electricity bills increase 100% over the NHA estimate (this increase is now considered likely), Type A houses are just affordable by 20th percentile households assuming 1979 incomes estimates, 20% of incomes for hire-purchase payments and 30% of incomes for total housing cost. Using 1976 incomes, Type A houses are affordable at the 30th percentile and above.

When the assumptions are that construction costs increase 45% (15% contingency and 30% price) and monthly service and utility charges increase 100%, the conclusions are: Type A houses are affordable at the 40th percentile using 1976 incomes and Type B houses are not affordable by the poor. Using 1979 income estimates, Type A houses would be affordable slightly below the 30th percentile and Type B houses just below the 50th percentile.

54

**SENSITIVITY ANALYSIS OF HOUSING AFFORDABILITY WITH VARIATIONS
FOR HOUSE PURCHASE PRICES AND MONTHLY CHARGES**

| NHA Target Income Groups: \$2,000 or less | | \$2,001 - 3,000 | | | | | |
|---|-------|-----------------|---------------|-------------|----------------------|---------------|--------|
| Number of Units | | TYPE A: 1,152 | | | TYPE B: 1,500 | | |
| PRICE OF PLOT AND CORE | BASE | BASE + 15% | BASE + 45% | BASE | BASE + 15% | BASE + 45% | |
| | | 35,752 | 41,115 | 50,053 | 50,552 | 58,153 | 70,773 |
| Down Payment (A=5%;B=10%) | 1,788 | 2,056 | 2,502 | 5,055 | 5,813 | 7,077 | |
| Monthly Hire- Purchase Paymnet (A=10% interest; B=11% interest; 20 years) | 330 | 380 | 479 | 470 | 540 | 682 | |
| | BASE | BASE +100% | | BASE | BASE +100% | | |
| Monthly service charge | 50 | 100 | 100 | 50 | 100 | 100 | |
| Water,Electricity | 70 | 140 | 140 | 70 | 140 | 140 | |
| TOTAL MONTHLY PAYMENT | 450 | 620 | 719 | 590 | 780 | 922 | |
| HOUSEHOLD INCOME REQUIRED | | | | | | | |
| 20% Hire-Pur- chase Payment | 1,650 | 1,900 | 2,395 | 2,350 | 2,700 | 3,410 | |
| 20% Total Monthly Payment | 2,250 | 3,100 | 3,595 | 2,950 | 3,900 | 4,610 | |
| 25% Total Monthly Payment | 1,800 | 2,480 | 2,876 | 2,360 | 3,120 | 3,688 | |
| 30% Total Monthly Payment | 1,500 | 2,067 | 2,397 | 1,967 | 2,600 | 3,073 | |
| HOUSEHOLD INCOME ESTIMATES (MONTHLY) | | 1976 RTG | 1979 IBRD | 1976 RTG | 1979 JULY IBRD | | |
| 20th Percentile | | 1,500 | 2,000 | X | X | | |
| 50th Percentile | | X | X | 2,500 | 3,300 | | |

SOURCES: Base data from Bang Plee-Bang Bor New Town Project, Phase I Report, NHA; 1979 income estimates from IBRD; other estimates by R. DeVoy, November 20, 1979.

Since it is not precisely known what the actual household income distribution is, what it will become year by year and what shares of their incomes households can afford and will pay for housing and housing related costs, the sensitivity analysis table is structured to provide answers to the affordability question given various assumptions.

For example, the international "norm" for the share of household incomes by the poor affordable for total housing cost is 25% which, incidently, is a reasonable estimate for Bangkok as well, based on the 1975-76 household survey and changes in the consumer price index (i.e. roughly 23% for total housing cost). Using this factor, and the 15% construction cost increase, it can be seen that the $\text{฿}2,480$ income required for a Type A house is roughly at the 45% percentile for 1976 incomes. The $\text{฿}2,876$ is nearly the 40th percentile of 1979 incomes. Type B houses are well above the 50% percentile of 1976 incomes and slightly above using 1979 incomes.

It should be mentioned that the July 1979 household income estimates by IBRD are based on increasing the 1976 survey results by 0.7% per month (average increase in per capita gross domestic product). In November 1979, the IBRD prepared a new estimate of household income distribution based on a factor of 0.9% per month

since 1976 (the average of both the per capita gross domestic product and consumer price increase). Using these new estimates (which intuitively seem high) both A and B types houses would be readily affordable by lower-income households, even with the largest cost increase shown in the sensitivity analysis.

In this regard, it is important to remember that the 30% price contingency is for inflation factors over four years for this project. Incomes may or may not increase as much as construction costs, but incomes will increase some. Higher household income estimates in future years can be realistically assumed, thus types A and B houses (55% of total) should continue to be affordable by lower-income households.

5-2

However, these are core houses which are meant to be expanded as the family's needs and finances dictate. The 30% of incomes for housing is the maximum that most lower-income households could afford, thus precluding their financial ability to make a permanent addition of a room or two to their houses. By keeping initial total cost to the households under 30% of income, the capability to add permanent rooms is enhanced. Without this modest additional financial capacity, households have the option to continue to live in the core house only, add an inexpensive "temporary" addition, or add a permanent addition which increase their total housing costs well above the comfortable level, thus requiring cutbacks in other expenditures.

It would be possible to reduce the costs of the core houses in several ways, including building smaller cores, reducing design specifications for building materials, eliminating electric service, etc. All of these options have been rejected by NHA as being socially unacceptable and unmarketable. Since the 1,152 units of Type A houses (24% of all houses in Phase I) are affordable by households with incomes down to the 20th percentile, such reductions do not seem necessary or desirable at this time. Nevertheless, if housing costs rise more rapidly than household incomes, it may be necessary to plan for such reductions in Phases II and III.

5.5 Employment, Business Opportunity and Personal Income Impacts

The new town industrial estate has the potential to create 3,800 to 4,750 jobs, say 4,000, based on the observed density of 8-10 workers per rai in newer industrial estates in the Bangkok urban area. The actual industrial development potential will, of course, depend on the industries actually locating in the Bang Plee-Bang Bor industrial estate.

Other planned job opportunities in the new town include the following:

| | | |
|---|--|-------------|
| - | Commercial area and central area | 4,000 |
| - | Education | 1,500 |
| - | 60-bed hospital, health service and clinic | 150 |
| - | Government | 400 |
| - | Labour hired by higher income people | 2,000 |
| | Sub-Total | <hr/> 8,050 |
| | Industry | 4,000 |
| | TOTAL | 12,050 |

These 12,000 jobs assume the complete new town is realized with a population of 130,000 (i.e., 21,536 units x 6.0) and 39,000 workers (30% of the population, or 1.8/per household). Thus, an estimated 27,000 workers residing in the new town would need to have employment elsewhere.

The Phase I plan includes all of the industrial area, most of the commercial area, 4,847 of the 21,536 housing units (22%), and related schools. It is conceivable that all of the industry could be completed concurrent with the four years of residential developments (i.e., 1980-83), but it is likely that much of the industrial employment will materialize later even if all the land is sold during Phase I. Experience with the Lad Krabang project illustrates this point, i.e., the L.K. industrial estate land was sold in 1978 and, with a few plants now under construction, there will not be much employment there until late 1980 at earliest. In Bang Plee-Bank Bor, it may be that 25-50% of full industrial employment will be attained by the end of 1983, or 1,000-2,000 jobs.

Other jobs (i.e., in education, health, government, domestic, commerce, self-employed) also will lag population growth, i.e. at most 22% of the total new town potential of 8,000 jobs, or a maximum of 2,000 jobs, will be available by 1984.

Thus, on-site permanent employment opportunities will at best reach 3,000-4,000 by the end of Phase I, when there is the prospect of 8,743 workers residing in Phase I

houses (i.e., 4,857 units x 6 persons x 30% workers). So at least 5,000 to 6,000 new town residents will need to have off-site jobs. Since a large share of new town jobs are likely to be held by workers living elsewhere, even more off-site jobs will be needed by new town residents.

This new town will provide thousands of new jobs and business opportunities. Nearly all these will be in addition to existing jobs and businesses, since there is likely to be little relocation of existing businesses (except for industry, where relocation is expected to account for a major share of the new development).

The rapid growth of the town is likely to create rapidly growing commercial businesses, thus causing personal incomes to grow more than they do in stable or declining areas. However, should the creation of businesses exceed demand, many businesses could suffer losses. The proper balancing of businesses with a dynamic market is difficult in the short-term. It is desirable for NHA in cooperation with other Government agencies to study this matter carefully and devise a commercial development program which meshes the inherent optimism of businessmen with market realities.

5.6 Balance of Employment Opportunities and Housing Demand

Phase I provides for 4,857 housing units and a derived 8,743 workers. Housing demand for the new town will be comprised of (1) workers residing on-site, (2) workers with employment within convenient commuting distance of the town who would wish to reside there (mostly now renting) (3) workers with employment further away who select the new town for housing reasons, and (4) people who move to the town seeking employment. Primary concerns regarding each of these groups are described in the following paragraphs.

The phasing of the construction program has the Type A and B houses (2,652 units) and the industrial estate being constructed at the same time, April 1980 through March 1981. Thus it may be that a large share (perhaps all) of the lower-income houses would be sold

before there is any significant amount of industrial employment on site. Moreover the commercial facilities are not planned until the A and B houses are complete and concurrent with the construction of Type C houses (1,060 units). Therefore, if these poorer households decide to move into the new town, they will need to work and shop elsewhere for a year or so after they obtain their Bang Plee-Bang Bor houses at least. There are three possibilities:

(1) workers will have jobs in the

general area; (2) they will commute to central Bangkok or elsewhere in the metropolitan area; and (3) they will be unemployed until opportunities are created in the new town.

Analysis of These Three Alternatives

(1) Workers will have jobs in the general area

In Samutprakarn Province, which includes the new town site, industrial factories increased from 710 in 1971 to 1,300 in 1976 while workers increased from 78,523 in 1973 to 107,145 in 1976. That is, the number of factories grew for the whole province an average of 120 per year and workers grew roughly 10,000 per year. There are several plants under construction near the new town now and several more planned. Industrialists consider this general location to be good, except for the present shortage of housing for workers.

The Industrial Estate Authority of Thailand (IEAT) last year sold 1,000 rai (about 400 acres) of industrial estate land at Lad Krabang for an average of B300,000 (\$15,000 per rai or \$37,500 per acre) for improved land, but before the sites actually were improved. The estate is being expanded by 200 rai (80 acres) to satisfy some of the strong demand. A few plants already are under construction although access to the site is only by dirt roads for several kilometers and on-site infrastructure

is just being installed. IEAT officials indicate that the demand for Bang-Plee-Bang Bor industrial land (i.e., 475 rai or 190 acres) also will be strong for the following major reasons: (1) the location is good; (2) many industries in Bangkok need to relocate in order to expand; (3) industrial growth in Bangkok metropolitan area averages 7% per year; and (4) there is an acute shortage of suitable industrial land in the Bangkok area.

In March and April 1978, NHA surveyed workers in industries located within 20 km. radius of the site. The 35% of the respondents who are married and living in rental housing are prime prospects for the new town. Only 18% of the total respondents own a house and land or own a house on rented land. Most of the workers now live in the general area -- only 17% commute from Bangkok and nearby provinces. About one-half the total respondents indicated an interest in living in the new town, primarily to take advantage of home ownership.

Thus, there are substantial numbers of industrial jobs in the general area now, with strong prospects for many more in future years--some very convenient to the site, but others quite far removed in terms of travel time. While the preference survey indicated as many as one-half would be interested in Bang Plee-Bang Bor houses, the effective demand--considering locations of employment, workers incomes, household characteristics, competition from other housing, and general propensity to relocate--is likely to be a small fraction of the total expressed demand, say 10% at most. On the other hand, this project could capture a much higher share of households whose workers are relocating to jobs in the area at the time the housing becomes available. Some of these may be attracted first by the houses and then immediately find employment in the area, but the number of these is likely to be small. In any event, it is optimistic to assume that the housing demand from workers in the area but off-site will be adequate to market the large amount of housing now scheduled.

(2) Workers will commute

Commuting from the new town to jobs in central Bangkok industrial and commercial areas will require an average of an hour or more during rush hours and will be expensive for lower-income households. The experience with the Rangsit project indicates that people will continue to live in more conveniently located slums rather than commute to distant jobs.

(3) Unemployed will move in, then seek work.

People moving to the new town in search of work mostly will already have jobs (as discussed above), since unemployed household heads will not qualify for hire-purchase contracts. Nevertheless, many households will have second and third workers (including renters) who will be seeking local employment. In the early years of the project, their prospects will not be good.

The key point of this analysis is that NHA must schedule its project construction and marketing activities to maintain reasonable balance between population growth and employment opportunities. Review of the Phase I plan and progress to date reveals that on-site jobs are likely to significantly lag behind housing delivery, thus causing severe physical and economic adjustment problems for many households -- particularly the lower-income whose houses are being built first and who have the least capacity to economically cope with the potential problems. It is imperative that the industrial estate program be expedited and/or the delivery of Types A and B houses be scheduled to phase into the likely availability of on-site jobs. Given the general shortage of both housing and industrial land, the strong preference is to expedite the industrial program.

One of the main attractions of the new town industrial estate to industrialists will be the availability of a large labor force in the town and housing for factory workers. For this potential to be realized, there must be labor force available to the factories and houses available to the workers. One approach to ensure availability of housing for workers is to reserve houses for the industries which decide to locate in the industrial estate. The major problems with doing this is that it is virtually impossible to accurately forecast the numbers, types and timing of the houses to reserve and, more importantly, such reservations disrupt the sensitive market supply and demand relationships. Assuming an extraordinary strong demand for housing at Bang Plee - Bang Bor, this market intervention might be acceptable, however there is no assurance that the market is that strong. Accordingly, it is desirable to market the houses and industrial land aggressively and sell them on a first come basis. Within this context, it is possible to emphasize the promotion of housing to workers of nearby industries and factories preparing to move to the industrial estate, but a formal quota system is not desirable.

67

The housing market prospects for the new town have been addressed above in economic terms. The basic conclusion is that if industrial and commercial growth in the general area continue at present rates and if the Bang Plee - Bang Bor New Town industrial and commercial schedules are realized, the housing market should be adequate for the housing planned in Phase I. The key concern, as expressed above, is the perceived imbalance of on-site jobs and workers in the first two years, i.e., 1980-81.

Another approach to assessing housing market prospects is by demographic analysis. The population of Samutprakarn Province is projected to grow at a rate of 3.5% per annum through 1987, resulting in growth of 195,734 persons and 32,622 households (6 persons per household) over ten years. This is consistent with the 1970-75 period, when the annual growth in households averaged 3,165.

In Ampur Bang Plee and Ampur Bang Bor, combined average growth rate was 311 households per year, while growth in the maximum year was 602. Since population growth in small, largely underdeveloped areas at the edge of the metropolitan region is substantially affected by housing and employment availabilities, growth prospects on the basis of demographic factors alone are not very useful. Nevertheless, in

the Bang Plee-Bang Bor area, NHA concludes that the area demand is for 300-600 units per year based on this information. NHA is planning to provide 4,857 units in four years (1980-83), i.e., 1,200 per year while its demographic analysis of potential total demand is only 300 to 600 units per year, based on the judgment that demand will be adequate given the new town housing, employment and other attractions as well as accelerated employment growth in the general area. As discussed above, area employment growth is substantial, but the effective demand for project housing from off-site workers may not be adequate to market the planned housing in the four years to the target groups.

Conclusion and Recommendation Re Housing Construction
Schedule Related to Employment Opportunities

It is evident from the above analysis that there is likely to be an imbalance in the delivery of houses and the availability of on-site jobs. This imbalance would be a special hardship to the lower-income households if all their Phase I houses are completed first (as now planned) before there is likely to be a significant amount of industrial and commercial jobs in the new town. In fact there would not be this demand for the low cost units until industry is in place and jobs created. There will be expanding job opportunities in nearby industrial areas and commercial developments. Moreover many workers in existing factories are likely prospects for housing in the new town -- particularly those who live far from their work, are renting or are living with another family. Nevertheless, the NHA assumption of employment opportunities seems unduly optimistic. Accordingly, it is proposed that NHA: (1) expedite the industrial development program (as proposed elsewhere in this report); revise the housing construction program to provide a reasonable balance of housing types each stage of Phase I, thereby spreading the provision of A and B type houses over three or four years; and (3) closely monitor the balance of houses and jobs throughout the construction program and adjust the housing delivery schedule as necessary to maintain a reasonable balance.

5.7 Environmental Soundness Analysis of Bang Plee-Bang Bor New Town Project

The NHA project at Bang Plee-Bang Bor is planned to be an autonomous new community offering employment opportunities in industry, business and commerce; shopping, medical, educational, and other community facilities; administrative and social services; with provision for recreation, entertainment and a range of low and moderate cost housing options. In addition to serving the basic NHA objectives of providing housing for lower income families the Bang Plee-Bang Bor New Town (BPBBNT) is intended to reduce growth pressures on Bangkok by providing viable housing alternatives outside the central city. The Government of Thailand in its most recent five-year development plan identified decentralization as a primary objective. A regional cities program has been developed by NHA in response to this policy. The Bangkok Metropolitan Authority (BMA) has devised a plan for the region around Bangkok which calls for the development of a ring of autonomous new communities which will attract people from the congested central city as well as offer an alternative to newly arriving families. BPBBNT is one of these satellite new towns.

5.7.1 Purpose of BPBBNT Analysis

This analysis has been done to assist NHA develop guidelines and procedures for environmental reviews of their own projects during the design process. BPBBNT has been chosen

71
as a case study to illustrate the issues involved in environmental planning and soundness analysis. The review also serves to assure USAID that no major environmental problems go undetected in this specific project.

5.7.2 Site Selection

While the land acquisition process used by NHA has a number of limitations the BPBBNT site is a reasonably good choice with regards to its relationship to the overall growth patterns of the region, particularly its proximity to major transportation routes and to newly developing employment areas.

5.7.3 Site Suitability/Capability

While from a locational standpoint the site appears to have been a good choice, the actual site characteristics impose a number of developmental constraints. The principal physical constraints are the hydrological system and the soils. As these conditions are common throughout the floodplain of the Chaw Phraya River they must be accepted as constraints on any site and dealt with at the planning and design stage. The proposed BPBBNT plan does deal with both conditions adequately from an engineering point of view, from the environmental perspective better solutions may have been possible but the present solutions are considered acceptable. Potential alternatives are discussed elsewhere in this report.

The adequacy of groundwater supply for industry and domestic needs appears to have been a major consideration in developing the site. While it appears that the deep aquifer can provide an adequate supply for Phase I there is some doubt

that the recharge rate is sufficient to indefinitely support the level of demand projected. The consequence of drawing groundwater at a rate which exceeds recharge can be serious from the standpoint of both water quality and soil subsidence. Recharge areas lie outside the immediate area and are not presently protected. The rate of recharge does not appear to be keeping pace with the rate of utilization in the Bangkok area. As a result, salt water intrusion is an increasing problem in some areas and ground subsidence is becoming a major concern. Consulting engineer William Guy in his technical report to the Asian Development Bank (ADB) has analyzed data on soil subsidence and concluded that it may well be related to a rate of removal of groundwater in the order of magnitude of 11,000 cubic meters per day which is well below the rate of 12,500 cubic meters per day projected for BPBBNT by the end of Phase I. The National Environment Board has contracted with the Water Resources Engineering Division of The Asian Institute of Technology to study groundwater resource management in the Bangkok area. Presently the Bangkok Metropolitan Water Work (BMWW) supplies metered service to 330,000 connections throughout the city. In 1976 the total capacity of the BMWW system was 800,000 cubic meters per day which will serve about 4 million people. Bangkok's populations in 1978 is estimated at 4.8 million, and domestic water consumption is generally less than half of total water required in an urban area. Thus, the

estimates made by AIT staff researchers that 70% of Bangkok's water is presently being drawn from deep wells may be reasonably accurate. If this is true, potable water supply may well be a limiting factor requiring enormous public investment to support projected growth. While the broad question of public water supply for the Bangkok region is beyond the jurisdiction of NGA, this issue is presented in order to alert project planners to the possibility that BMWW may not be able to provide an alternative source of potable water within the timeframe required by the project schedule, thus forcing BPBBNT to rely on the underground aquifer and face the consequences of deteriorating water quality and soil subsidence.

While the site chosen for BPBBNT is well-suited for development given the general conditions which prevail in the region, a complete assessment of the natural capabilities of the BPBBNT site would indicate its relatively high potential for agricultural production. The removal of prime agricultural land from production is probably the major negative environmental aspect of the particular site selected. It is clear, however, that some agricultural land will have to be abandoned to provide for the growth of population in the Bangkok area. As a matter of policy, however, it would be advisable to identify and preserve the most productive lands. Productivity of the soil varies greatly, with some areas yielding as much as 60 kl. of rice per rai while others yield less than 15. There are

also orchards and citrus groves in other parts of the city which should be protected and possibly other locations suited to specific types of agricultural production. The Ministry of Agriculture has detailed maps indicating agricultural capability of the land, and the Bangkok Master Plan does designate large areas for agricultural purposes, but existing land use control mechanisms are weak. NHA in its own site selection process should include the principal of protecting prime agricultural land. In the case of BPBBNT, NHA has acquired a large piece of highly productive agricultural land and should recognize this potential in site planning and land use allocation by maintaining as much of the now-designated open areas as possible under active cultivation. A review of the existing plans may reveal opportunities to incorporate this principal. However, a site plan based on the agricultural potential of the site would probably contain a very different plot layout and unit design, one which would minimize lot coverage and provide for cultivation of small private gardens. While redesign of the site is not considered necessary at this stage, a reassessment of the potential for retaining agricultural production in some areas of the designated open space is suggested, particularly for Phases II and III of the project.

5.7.4 Site Planning/Design

Based upon an analysis of the natural characteristics of the BPBBNT site there are several issues which

95

have been made. From an environmental perspective the flood protection system has the most pervasive impact on the existing ecological systems. The disruption of the hydrological regime will alter all aspects of the ecological system from the microbiology of the soils to the plant communities and the fauna they support. While none of the effects are considered significant in their own right, it may not be necessary to artificially protect the site from the damage of floods in such a permanently disruptive manner. It may be possible to obtain similar results, i.e., a community secure from flood damage, building within the floodplain at a safe elevation above the highwater level. Traditional building methods in Thailand offer some guidance but modern adaptation would be necessary to accommodate urban densities and the need for services. A study of water-oriented communities in Florida, on the coast of Alaska and elsewhere would be helpful in planning for the needs of a modern community which takes advantage of the relatively low costs and great flexibility of water transportation. The system proposed for BPBBNT is in common usage in Thailand and elsewhere. It is not considered to have significant environmental impacts and the project should not be delayed in order to reconsider the flood protection system. It is suggested, however, that future projects give consideration to alternative systems which may in fact be less costly to build and to maintain. One such alternative would be building within the floodplain

a canal oriented community as described above, but other alternatives should also be explored. The present flood protection scheme involves building a 20-meter wide bund including a dike and ditch around the entire perimeter of the site. This major earthwork occupies about 10% of the site and serves no function other than flood protection. A revised plan might allow for multi-purpose use of the dike which would probably require eliminating the ditch to make the dike accessible and increasing the capacity of the lake and streams on the interior of the site to accommodate the lost storage capacity of the ditch. The recreational or agricultural potential of such a scheme would be considerably greater than the present one, possibly allowing a reduction in the area of open space presently allocated for recreational purposes. Another alternative might be to reduce the width of the dike by using a combination of a concrete retaining wall and a small earth dike. Income for the additional land available for sale should be considered when comparing this alternative with the present one. A variation of this concept would be to incorporate shop houses or other buildings into the dike with the structural frame of the buildings providing support for a narrow earth dike built along the back wall of the structures.

The discharge of untreated sewage from BPBBNT could significantly affect the water quality of canals surrounding the project site. At the present time these waterways appear to

provide a considerable harvest of fish as well as water used for irrigation of adjacent rice paddies. The present project design includes a treatment facility which will produce effluent having a BOD count of 20 ppm. While this is an excellent system, its operational costs are expected to be excessive due to anticipated increases in electrical utility charges. NGA engineers have designed a number of other systems for treating domestic sewage and are certainly capable of developing a suitable alternative to the system currently proposed. Consideration should be given to life cycle costing of alternative systems and to trade offs between operational costs, capital costs, quality of effluent, and additional land requirements of the various schemes evaluated. Among the systems commonly used in Bangkok is the individual septic tank. The design consists of a series of shallow tanks with liquid wastes overflowing into the storm drainage system. The tanks require emptying every one to two years depending on their size and the absorptive capacity of the soils. In BPBBNT this type of system is not advisable due to the soil conditions and a small plot size which increase the risk of serious contamination of the surface water ways around the site. An alternative would be to install individual composting toilets such as the Swedish designed Clavis Malstrum which produces an odorless humus fertilizer from toilet and kitchen wastes. The disposal of "gray" water, i.e., the water from cooking and washing remains a problem, however, as does the waste from commercial and

industrial sites. A central collection system is therefore recommended. The present design could be modified to reduce operating costs by using wind-powered pumps at the lift stations and by eliminating the mechanical aerators from the system. Windmills are being produced in Thailand. Their use in place of electrical-powered lift pumps would require redesigning the sewage system somewhat to allow for greater storage capacity at each station. Eliminating the mechanical aerators would require a more extensive land area to accommodate natural oxidation lagoons. Additional treatment may be required as BPBBNT grows. A central system of collection makes incremental improvements in the treatment system possible. Additional treatment could be considered for Phase II including the use of partially treated effluent for fish cropping or for growing algae to be used as cattle feed. The Department of Technical and Economic Cooperation recently announced an 80 million baht (4 million dollar) grant for the Government of Japan to establish an aquaculture center at Kao Seng in Songkhla Province. The potentials of aquaculture as a productive industry as well as a sewage treatment process should be explored. Calcutta has one of the best examples of this type of system.

5.7.5 Unit Layout/Design

The site plan for Phase III of BPBBNT is laid out so that the prevailing breezes blow down the streets, perpendicular to the houses rather than through the open ends of the row houses. The project planners have agreed to reconsider this orientation.

79

Modifications of the design for units A and B have been recommended to improve ventilation of the toilets and to facilitate expansion of the units. The toilet would be relocated at the front of the core unit of type A and B as it is in the higher-priced units. By also relocating the core unit five meters back from the front property line it will be possible to expand both to the front and rear without enclosing the toilet and restricting ventilation. This recommendation, which was also made by the ADB Mission, has already been incorporated into the project plan for Phase I.

For Phases II and III an additional change in unit design should be considered. The plot size is quite small considering the normal floor area of houses in Bangkok. On the smaller plots a one-story core unit design has been proposed. If the one-story scheme is maintained virtually the entire plot must be covered in order to build a reasonable-sized house. With slight modifications to the piling and foundation design upward expansion of the core unit would be possible; and the option of retaining a small open garden on each plot would be feasible. This change may require reducing the construction standards or other costs in order to maintain affordability but the alternatives should be explored.

5.7.6 Summary of Recommendations

If acceptable bids are received and work can begin on the dike and ditch by January 1980, the present plan should be retained for Phase I with the exception of the system proposed for collection and treatment of domestic sewage and the

minor unit design changes already incorporated.

Sewage Collection/Treatment

At least two alternative systems should be evaluated for cost and environmental consequences. The use of individual self-contained composting toilets such as the Swedish-designed Clavis Malstrum and a modified version of the central collection system now proposed. The present system could be modified to reduce operating costs by using wind-powered lift station pumps and by eliminating the mechanical aerators. While this latter alternative would require a more extensive lagoon to achieve desirable reduction in BOD count before discharge, this system could be combined with some form of aquiculture process which would provide additional benefits and further reduce costs.

Unit Layout/Design

The following changes should be considered:

1. Re-evaluate sun and wind orientation of houses for Phase III to improve comfort. The NHA handbook provides guidance in this area.
2. Relocate toilet in the A and B unit design to improve ventilation. This change has already been adopted in Phase I.
3. Revise core unit design to allow upward expansion in order to facilitate maintaining outside space on the smaller plots. Foundations of the type used in self-built units in Songkhla should be studied.

Water Quality/Soil Subsidence

Off-site water supply will become increasingly essential as Phases II and III are completed. By the end of Phase I the water utilization of the project will exceed estimated recharge of the aquifer which could have serious consequences including salt water intrusion and ground subsidence. Connection to the metropolitan water supply network should be assured before commencing Phase II.

Agricultural Productivity

The present site plan should be re-evaluated in terms of the potential for using some of the designated open space for agricultural purposes. Possible modifications to the plan for Phases II and III should also be explored to further increase this potential.

5.8 PROJECT IMPLEMENTATION AND MANAGEMENT REVIEW

● PRESENT STATUS

The NHA advertized for bids on the first part of the work identified as "flood protection," and part of the off-site infrastructure. This work includes:

- the ditch and dike around the part of the project site located south of the Teparak Road;
- pumping station and pump to remove the water from the site;
- filling of some areas;
- approximately 700 m off-site road;
- connecting the project site with the Bang Na-Trad Highway; and
- a bridge crossing the Samrong Canal at the northern tip of the project site.

The total cost of this work is estimated at 30 million Baht (US\$ 1.5 million) and has been advertized as a total package to be undertaken by one contractor. The bids are expected in mid December 1979, and commencement of the work is scheduled for early January 1980. There is apparently some concern among the NHA technicians that contractors may not be able to bid on this work because of critically tight money market conditions and difficulties in obtaining the bank bonds. In a case of an unsuccessful attempt to secure the contractor for the first increment of the work at this time, a considerable delay (as much as one year) in starting the project might have to be realized. According to the NHA technicians, the January 1980 start is most critical. It is mandatory that the project site be secured against flooding before the beginning of the rainy season in June. Otherwise, no other construction work can be considered until after the rainy period (4 months), flooding (another month) and sufficient drying, which would put the next possible start of the work at about January 1981. It is estimated that the chances for securing the contractor at this time are about 50/50.

The in-house design work, i.e., the construction drawings and specifications for the housing units, public facilities, infrastructure and utilities, scheduled to go into construction in April 1980, are in progress and are expected to be completed in December 1979 to allow for sufficient time for bidding, selection of contractors and work mobilization.

● Bidding Procedures and Construction Contracts

- All bidding of NHA projects is handled by the Coordination Division of the Governor's Office.
- The NHA does not maintain a list of pre-qualified contractors; therefore, each project is open for all interested bidders.
- The invitation for bids is published in local newspapers and announced on local television. The NHA has allocated television time each week.

- 83
- The interested bidders receive a complete set of construction drawings, specifications, quantity, survey, and contractor's qualification requirements. It is understood that quantities of work quoted in the bid documents are for general information and that each bidder has to verify them or prepare his own take-off. The contractor's quantities, if accepted by NHA, are then considered as maximum, and the contractor will not be reimbursed for any work (unless specifically authorized by NHA) exceeding the quoted quantities.
 - It is common that contractors charge 25-30% of direct project costs to cover their overhead, profit and taxes. The NHA technicians, however, anticipate an escalation of this rate due to currently higher costs of fuel, electric power, water and interest on interim financing.
 - The bidder must be capable of providing a bank bond in the amount of 5% of the contract price which will extend for one year beyond the completion of the work. If advance to contractor for materials and mobilization is considered (generally up to 20% of the contract price), he must be capable of securing a bank guarantee for that amount.
 - Normally three to six weeks, depending on the size of the project, are allowed for submission of the bid.
 - The bids are submitted to the Coordination Division for registration.
 - Review and evaluation of the bids and selection of the winning bid and contractor is accomplished by a committee appointed by the NHA Governor. It is NHA policy to complete the review and select the contractor not later than 15 days after the submission of the bids. The Governor approves the selection of the contractor for the project. In accordance with the applicable government procurement regulations, the lowest bidder is generally selected. There is a provision under which the second lowest or other proposal could be accepted if, for some reason, the committee concludes that the lowest bidder is not acceptable as the contractor for the project. Then NHA must call for new bids; however, because of the complicated process and cumbersome justification, it is rarely used.
 - If the selected contractor is approved by the governor, he is so notified and instructed to prepare his construction schedule.
 - The schedule is discussed, reviewed and, if needed, adjusted in coordination with the Construction Management Section.
 - The final and agreed-upon construction schedule is then incorporated into the construction contract. Contract price is always lump sum.
 - Penalty rate for delays due to contractor's negligence, stipulated in the contract, is the standard 0.01% of the contract price per day, and is to be deducted from progress payments to the contractor.
 - The NHA Governor signs the contract, and the contractor is allowed 15-30 days for mobilization and to start the work.

- The payments to the contractor are based on completion of previously agreed segments of the project (stated in the contract). He, therefore, presents his vouchers not monthly but at the time when each such segment is completed. The contractor presents his vouchers to the Coordination Division for registration and copies to the NHA appointed manager on the project site.
- The Site Manager verifies the billed work, its quality and quantity and forwards the voucher to the Construction Management Section at the NHA Headquarters. The Chief Inspector and the Head of the Section verify the validity of the payment amount and forward it to a special governor's committee for approval. It is common that the committee will inspect the work on the site before it approves the payment.
- The approved voucher is then forwarded to the finance and accounting department for payment. The entire process takes approximately 30 days.
- Five percent (5%) is withheld as retention from each contractor's payment by NHA.
- Contractor carries a one-year warranty after completion of the work.

Marketing and Sales -- Housing

- Promotion, marketing and sales are the responsibility of the NHA Estate Management Department, which is also responsible for maintenance of completed work where applicable.
- The Estate Management Department receives a copy of the construction contract which contains the construction schedule and is therefore familiar with the anticipated completion dates of various parts of the project.
- The Governor appoints a committee which is to discuss and to determine the marketing strategy.
- The promotion is generally done through newspaper and television.
- Interested purchasers have to fill out standard NHA applications, provide required references and submit them to the Estate Management Department.
- The Department will process the application by verification of the statements, applicant's income, credibility and credit rating and other checks common in processing purchase/mortgage application.
- One not so practical feature in the NHA marketing process is that NHA does not attempt to pre-sell the housing units. Although it is a common approach exercised by private developers, the NHA officials claim that the public will not accept such an attempt by the government. It was said that in the case of a government housing project, the purchasers insist on seeing the completed unit before they are prepared to buy.

- The down payment is paid in full at the time the contract of purchase/mortgage is ready to be signed. Deposits or pre-sale agreements prior to down payments are not customary.
- When purchase is completed, all documents are transmitted to the Finance/Accounting Department which is responsible for collecting the payments and other charges.
- Normally, charges for the electric power consumption and water are separate from the mortgage payments and are administered by the M.E.A. and M.W.W.A. respectively. In the Bang Plee-Bang Bor Phase I case, the water supply will be provided from on-site wells and charged by NHA's temporary community management to the users. Electric power will be M.E.A.'s responsibility.
- The NHA will hold the titles to the units until the mortgage loans are fully repaid.
- Insurance
 - The project contractor is required by government regulations to carry insurance covering injuries and accidents of the laborers.
 - The contractor does not carry any insurance against damage of his work.
 - The home owner does not carry any fire or other type of home insurance, and no mortgage or home owners' life insurance is required.
 - NHA carries insurance covering damages to the structures on which they hold the mortgages.

▶ NHA Project Construction Management System

Construction management is the responsibility of the Construction Supervision Section within the NHA's Research and Construction Department. The responsibilities and function of this section primarily relate to on-site supervision and inspection of the construction work and contractors' performance. Its work starts after the construction contract(s) are signed and the contractor(s) begin the preparations of the work. The supervision is conducted by full-time, on-site personnel in size and qualification dependent on the type of project and its size. The field staff is coordinated and supervised by and reports to the assigned management personnel at the NHA Headquarters Office. The chain of command may extend, for various functions, up to the NHA Governor's Office.

● Project Management Team

The NHA is prepared to designate and assign a management team to manage and coordinate the implementation of the Phase I of the Bang Plee-Bang Bor New Town Project. NHA stated that all personnel assigned to this project will be selected from the present NHA staff.

As shown on the attached organization chart, a full-time Project Director/Manager (Coordinator, Supervisor) is to be assigned the responsibility of securing the physical implementation of the project. He will be stationed at the NHA Headquarters Office.

The NHA will establish an office on the project site as soon as practical. It will be staffed by a senior site manager and necessary administrative personnel and shared by a number of site supervisors and their assistants.

It is anticipated that each type of work, or even each larger sized contract, will have an assigned supervisor with the necessary qualifications and experience in that particular type of work. The site supervisors will be assigned as the work progresses and the contracts are activated.

The primary function of the site manager and supervisors shall be supervision and coordination of contract work to assure its quality, timely progress and efficient management.

It is common practice that site supervisors keep daily logs (a diary) of all events and work progress. Entries are made daily (with copies) after the close of work. Once a week, the Site Manager sends a copy of the week's logs to the Project Director/Manager at NHA Headquarters. At the end of each month, the Site Manager prepares a written progress report summarizing the volume and nature of work accomplished during the month; lists all events and/or problems which may have affected the rate of progress, and projects the type and volume of work scheduled for the following month. This report is forwarded to the Project Director/Manager at the NHA office. The accuracy of progress reporting and the Site Manager's and Supervisor's performance is periodically verified and checked by the Project Director/Manager or his assistant, or by the staff of the NHA Chief Inspector.

It is anticipated that the verification of contractors' vouchers will follow the established NHA practice and will be initiated by the site supervisors through the Site Manager. The contractor presents his voucher to the Coordinating Division, primarily for registration and sends a copy to the Site Manager. The Site Supervisor checks the quantity of work, and the Site Manager transmits it with his comments to the Project Director/Manager's office at NHA. There, the voucher will be reviewed and verified by the Chief Inspector, Project Director/Manager and will be forwarded

87
 through the departmental channels to the Director of the Research and Construction Department, who, having reviewed it, will send it with his recommendation to the special committee appointed by the NHA Governor for final review and approval. During its review, the committee may (as commonly happens) field-verify the validity of the charges. When approved, the committee forwards the voucher to the Finance and Accounting Department for payment.

The Finance and Accounting Section keeps the project expense accounts and reports monthly to the Governor on the financial status of the project. Copy of such report will be forwarded to the Project Director/Manager.

The Project Director/Manager will be responsible for coordination of all aspects of the project implementation, physical and financial, and for period progress reporting.

Marketing of the units and sale of the industrial and commercial land will be assumed by the Estate Management Department in coordination with the Project Director/Manager.

● COMMENTS AND RECOMMENDATIONS

In general, the NHA project implementation system is not basically different from any other and can be considered adequate.

It does have, as may be expected from a governmental institution, certain bureaucratic features which do not add to speed of action and efficiency, but which may be considered as certain safeguards. It requires more personnel than may be otherwise necessary, but that is the general tendency of governments. It is obviously an established system, parts of which are based on government regulations, perhaps laws, and accepted practices, and any attempt of a major or sudden revision of the system would have to face a long and cumbersome process, possibly resistance.

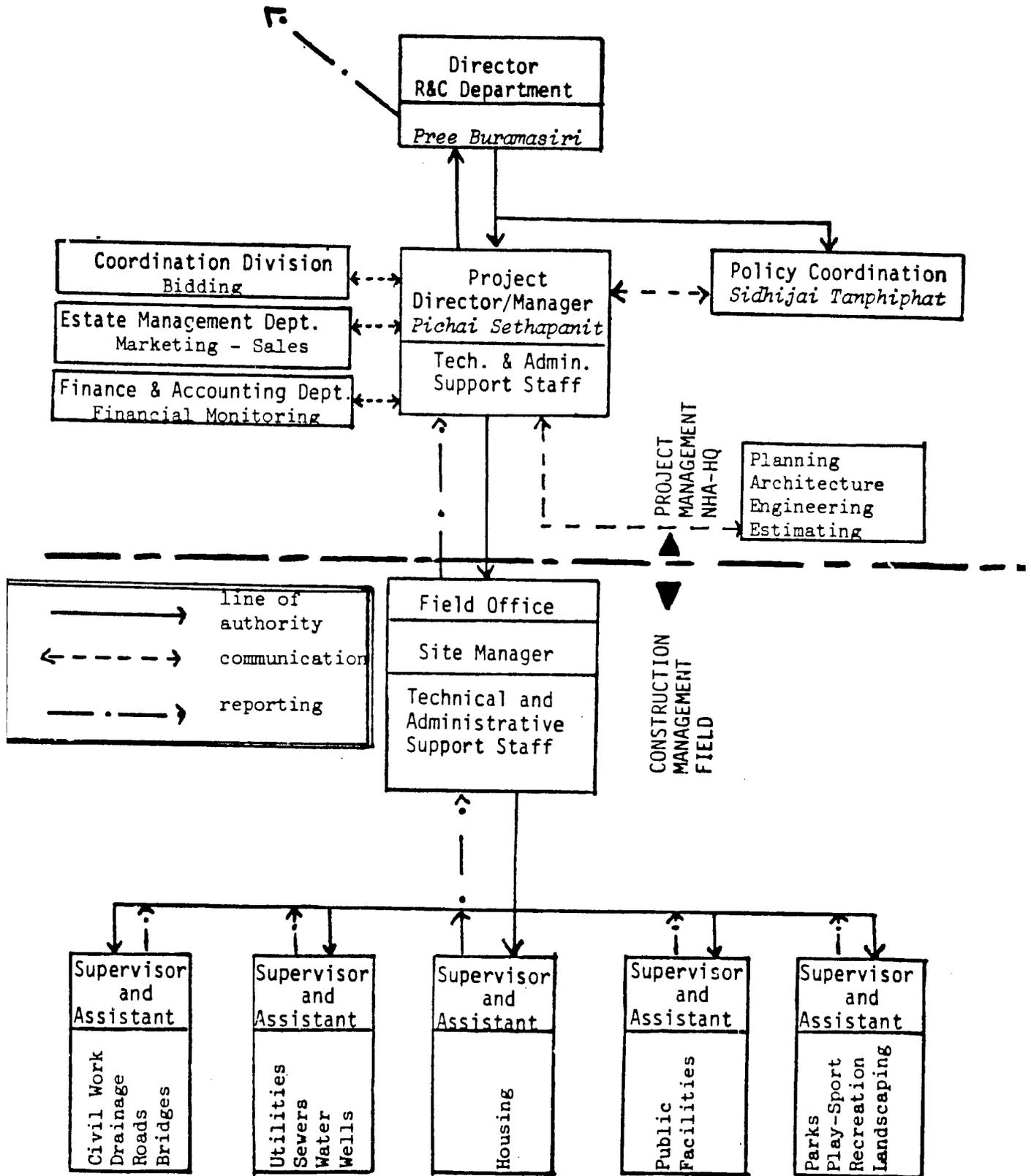
In the following, however, I would like to identify some areas in the NHA implementation system where some adjustments and/or modifications could be suggested for NHA consideration.

Present Status

The Phase I implementation schedule indicates a three-stage approach. Each stage represents about twelve months effort with a prior three-month period for preparation of the site and a six-month period afterwards for finishing work, a total of 45 months.

Although not overly critical, certain comments were voiced during the course of this review concerning the site plan and unit design.

MANAGEMENT ORGANIZATION CHART



NHA is in the process of finalizing the construction drawings, etc., for the facilities scheduled to start in April 1980. The documents are to be finished in December 1979 to allow for bidding, contractor(s) selection and mobilization. Any changes in this stage of work obviously result in a critical delay.

Recommendation:

There should be sufficient time to consider and initiate the desirable revisions in planning and unit design for the second and third stages of Phase I.

There will be more than sufficient time to consider a more extensive study and alternate solutions to Phase II and III.

It would seem that a considerable amount of practical improvements could be accomplished during the construction process without affecting its progress. This possibility was discussed during the review at NHA with the NHA architects and engineers who acknowledged the advantages of such action. A senior city planner, experienced in new town planning principles, extensive work in less developed countries, preferably in Southeast Asia, and knowledge of concepts related to low-income settlements, and a senior architect, experienced in low-cost housing design, work in less developed countries, preferably Southeast Asia, with knowledge in application of appropriate construction technology, use of alternate construction materials, and cost control. Time schedule: 5 months beginning July 1980 for Phase I; 6-8 months beginning March 1982 for Phases II and III.

It is logical to expect that the proposed implementation schedule will be modified and adjusted in accordance with the contractors' schedules and work plans. The present schedule, however, puts the construction and installation of the electric power sub-station towards the end of Phase I.

Recommendation:

The NHA should discuss the power system for the Phase I with MEA as soon as possible and assure themselves that the projected schedule for the sub-station is correct and parallels the MEA plan and that completed structures on the Phase I site will have electric power supply available when they are ready for occupancy.

Bidding Procedures and Construction Contracts

Basically, the NHA bidding procedures follow the widely accepted standards. There are, however, some areas which proved to be cumbersome in the past, and where revisions should be seriously considered.

NHA invitations for bids are open to all bidders who meet the relevant experience requirements. In absence of accurate records, the

contractor's qualifications are evaluated basically on the basis of information provided by him and on a limited check of references. Review of such proposals is generally time-consuming and results often questionable.

Recommendation:

NHA should develop a roster of reputable contractors qualified for various categories of work, check their past and present performance for other clients, and periodically review and up-date their records. All invitations for bids on NHA projects should be limited to such pre-qualified firms. The contractor roster should be reviewed from time to time. Firms whose reputation is no longer satisfactory should be deleted and new, acceptable firms should be included.

The construction contractors have a tendency to gamble occasionally by submitting very high or very low cost proposals.

Recommendation:

In order to avoid delays and to select the best suited contractor for the project, the NHA should attempt to obtain the authority to disqualify cost proposals which are excessively above or below the NHA in-house estimates. (Realistic NHA estimates are mandatory). NHA should then concentrate its review and selection on proposals which are within a given range ($\pm 10-15\%$) of NHA estimate. The NHA construction management personnel enthusiastically supported such an approach and suggested that it be recommended to the Director of Research and Construction Department for consideration.

Marketing and Sales

Such methods as pre-sale, pre-sale agreement, buyer's deposit or earnest money are not customary in the NHA marketing process.

Recommendation:

The NHA's Estate Management Department should consider such a marketing approach wherever possible.

The industrial, commercial and residential component of the Phase I Program are highly interdependent. Their successful and timely disposal will largely depend on a well organized and programmed promotion and sales effort.

Recommendation:

The NHA should make every effort to develop an effective marketing strategy; and start the promotion as soon as site activities commence.

91
It is most important to identify the type of industry and commerce to be located on the project site as soon as possible so that the design work of the infrastructure could appropriately accommodate specific needs.

Project Management/Construction Management

It should be pointed out that there is a difference between construction management and project management. While the construction management concentrates on the performance of the contractors, time schedules, cost control, quality, safety, appearance and functional performance of the structures, project management is concerned with the project's overall economy and financial viability.

Construction Management

The NHA construction management system and procedures, as shown on the NHA organization organization chart and as described in an earlier part of this report, should be adequate and effective, provided that personnel with suitable experience are assigned to the identified positions.

Recommendation:

The NHA should carefully consider its choice of the person for the Site Manager position. He should be a senior construction engineer, familiar with all phases of large-scale construction projects, with sound technical and personnel management capability. He should have a minimum of 10 years of related experience.

Project Management

The project management, i.e., the coordinating mechanism between bidding, scheduling, production, financing, and marketing is the most important element in the project implementation process. This performance parallels the quality of the Project Director/Manager and his staff.

Recommendation:

The Project Manager should be a senior architect or engineer with a minimum of 15 years of project management experience. He has to be thoroughly familiar with the technical as well as financial aspects of project development; he must have sound planning, programming and scheduling skills; he must understand the project economy, and the relationship between all development activities; he must have sound professional experience and a capability to manage operations and personnel. He should be allowed to choose his assistants and support personnel.

The NHA is presently preparing a detailed organization chart of the project and construction management team and personnel assignments.

Project Delivery Plan

One of the project Director/Manager's first duties should be preparation of an integrated implementation plan, or "a Project Delivery Plan" which will reflect the physical and financial interrelationship of all components of the project implementation process. The Project Delivery Plan will serve as the controlling and monitoring mechanism during the project implementation period.

Recommendation:

An initial external assistance to the appointed Project Director/Manager would be beneficial.

An advisor, assigned for 8-12 months would assist the Project Director/Manager in preparation of the delivery plan, organization of the project and construction management team, in coordination of bids, scheduling and marketing, development of reporting and monitoring systems and financial control.

Beginning February 1980, the selected advisor should be a senior professional architect, engineer, planner or developer with a minimum of 20 years of experience in large-scale community development projects, extensive foreign housing, and experience in Third World countries is mandatory.

DESCRIPTION AND ANALYSIS OF PROJECT DESIGN AND COSTS

This description and analysis is based on the Phase I report and discussions with NHA staff during late October and early November, 1979. The changes in design and costs which have been made as a result of the review by the Asian Development Bank (ADB) are not included in the following description and in the cost tables. However, the Phase I project costs table included in section 5.2 Project Financial Plan does include the cost revisions as calculated by ADB. The major cost revisions reflect a reduction in the arterial highway from six to four lanes, increased costs of sewers in the industrial area and additional water wells, pumps and tanks. Also, the revised estimates include a 30% price contingency rather than the 25% used previously. The cost of building material loans has been added as well.

A. BANG PLEE-BANG BOR NEW TOWN PROJECT

1. Review of Proposed Concept

● LOCATION

The project site is located approximately 40 km south-east from the city of Bangkok with the Teparak Road cutting across its northern tip. It covers a total area of 4,469 rai or approximately 1,765 acres, generally wetland, bordered by Charoen Rat Canal on the west side and Hua Klua Canal on the east side. The site is sparsely populated by a few settler families, primarily along the canals which presently provide the only access to the Teparak Road. The northern tip of the site, partially bordered by the Samrong Canal, reaches within approximately 700 m of the Bang Na-Trad Highway. The proposed spinal road across (south-north) the project site is to connect the new town with the Bang Na-Trad Highway on the north and eventually with the Sukhumvit Road on the south. The land is valued at approximately 131 million Baht and is owned by the National Housing Authority (NHA).

● SCALE

The proposed project is expected to provide a total of 21,536 housing units of different sizes accommodating about 130,000 persons. The residential area is estimated to occupy approximately 1,556 rai (614.53 acres) or about 34.82% of total land.

The general plan indicates the following distribution of the housing units:

| | | |
|-------------------|---|-------------------------|
| <u>Type "A"</u> - | single story, one-room shelter with sanitary unit; 26.88 m ² on 84 m ² lot; for families with income of 1,500 - 2,000 Baht per month..... | 5,616 units (26.08%) |
| <u>Type "B"</u> - | two story, two-room shelter with sanitary unit; 43.42 m ² on 84 m ² lot; for families with income of 2,000 - 3,000 Baht per month..... | 7,004 units (32.52%) |
| <u>Type "C"</u> - | two story, two-room shelter with sanitary unit; 49.92 m ² on 160 m ² lot; for families with income of 3,000 - 4,000 Baht per month..... | 4,764 units (22.12%) |

95

| | | |
|----------------------|--|-------------------------|
| <u>Type "D"</u> - | two story, two-room shelter with sanitary unit; 83.12 m ² on 200 m ² lot; for families with income of 4,000 - 6,000 Baht per month..... | 2,408 units (11.18%) |
| <u>Type "E"</u> - | urbanized lots of 519 m ² each to be sold to private developers; required income in excess of 6,000 Baht per month..... | 994 units (4.62%) |
| <u>Shop/houses</u> - | two story: 118.88 m ² of ground floor shop and second floor living area on 84 m ² lot, and three story: 169.76 m ² of ground floor shop and second and third floor living area on 84 m ² lot; minimum income required 9,200 and 11,800 Baht per month..... | 750 units (3.48%) |
| <hr/> | | |
| <u>Total</u> ----- | | 21,536 units (100%) |

In addition to the dwelling units the following facilities are expected to be developed:

- 25 kindergartens) in a total capacity to accommodate approximately 31,500 students, and covering a land area of 205 rai, or 81.0 acres;
- 6 primary schools)
- 4 secondary schools)
- 2 vocational schools)
- commercial and business facilities consisting of commercial centers, fresh food market and small shops covering approximately 418.10 rai or 165.13 acres of land;
- community facilities including hospital, fire station, post office, sport and recreation occupying approximately 575.92 rai, or 227.46 acres of land;
- parks and green areas covering 406.46 rai, or 1,029.16 acres;
- roads, walkways and parking areas occupying approximately 704.41 rai or 160.53 acres;
- utilities, dike, ditch, sewage treatment plant, and high voltage transmission line easement will account for 363.2 rai, or 134.44 acres of land; and
- 445 rai, or 175.75 acres of land have been set aside for the Industrial Estate Authority of Thailand (IEAT) to develop.

● **TIME SCHEDULE**

Designed as a long-term program, the Bang Plee-Bang Bor New Town Project is scheduled to be completed in three (3) phases:

- Phase I - area of 1,665 rai, or 657.66 acres - 1979-1983
 Phase II - area of 1,309 rai, or 516.98 acres - 1984-1986
 Phase III - area of 1,495 rai, or 590.36 acres - 1987-1989

Commencement of construction of Phase I has been scheduled for January 1980.

● **ESTIMATED COSTS AND DISTRIBUTION**

At Current Prices (August 1979)

| PHASE | BENEF. BT. | G.O.T. BT. | T.O.T. BT. | COMMERCE BT. | IEAT BT. | TOTAL BT. |
|-----------|---------------|---------------|---------------|-----------------|-------------|---------------|
| I | 418,465,777 | 163,502,489 | 49,696,824 | 103,695,910 | 93,862,000 | 829,223,000 |
| II | 480,861,261 | 175,424,874 | 53,297,625 | 78,842,640 | - | 788,426,400 |
| III | 568,638,243 | 200,351,558 | 68,434,689 | 63,031,950 | - | 900,456,440 |
| ESTIMATED | | | | | | |
| TOTAL: | 1,467,965,281 | 539,278,921 | 171,429,138 | 245,570,500 | 93,862,000 | 2,518,105,840 |

ALLOWED CONTINGENCY:

| | |
|-----------|------------------|
| Phase I | -----241,801,000 |
| Phase II | -----157,685,000 |
| Phase III | -----180,092,000 |

TOTAL PROJECT: Baht 3,097,683,840
 At \$1.00 = BT 20.00 \$ 154,884,192

2. Comments

● **LOCATION**

The location seems to be well selected within the path of growth towards the anticipated and generally supported major development program and new harbor at the eastern seaboard about 40 km southeast from the city of Bangkok. The project site is readily accessible by the Bang Na-Trad Highway and the Teprarak Road connecting the Bang Bor community with the capital city. It can be therefore realistically assumed that with the proposed road extension and bridge over the Samrong Canal, no serious problems with transportation of construction materials, equipment and personnel will develop during the construction period.

97

- SCALE

Bang Plee-Bang Bor New Town is a large project, and although proposed to be developed in three phases, it must be regarded as such. Very skillful coordination and management will be mandatory to assure its successful completion physically and economically. Presently some concerns have been raised considering the difficulties NHA has been having with completion of some of its projects. It has been questioned whether or not the NHA staff has sufficient experience in effective handling and managing of such a program, or whether or not the problems experienced may have been caused by other circumstances. This question will be discussed, however, in detail in a separate section of this report.

The three proposed phases are approximately equal and appear to be self-contained in respect to the supporting facilities.

- TIME SCHEDULE

At this time the ten-year implementation schedule appears to be a reasonable estimate. However, the Phase I construction progress should provide a more realistic basis for confirmation or adjustments.

- ESTIMATED COSTS

The NHA estimated the total project costs at the level of current prices and allowed for physical and price contingencies for each phase of the project. Considering the fact that more than 80% of the required construction materials are from domestic sources and the foreign purchase/exchange will have only slight effect on the construction costs, it is conceivable that the actual project costs may remain within a reasonable range of the estimate. Furthermore, since the current rate of wage and salary increase closely parallels Thailand's rate of inflation, it may also be expected that if the present conditions remain, the selling prices of the units will stay within the affordable range of the target population.

3. Conclusion and Recommendation

The Bang Plee-Bang Bor New Town Project can be considered acceptable as proposed, although there may be some possibility for physical and economic improvements through better planning, land use, and unit design.

Considering the advanced stage of the design work for Phase I, it would not be practical to delay the construction start

by insisting on some major revisions at this time. It is, however, recommended that such a review study of Phase II and III be initiated with the assistance of external experts as soon as possible.

B. PHASE I - BANG PLEE-BANG BOR NEW TOWN

1. Review of Proposed Concept

● LOCATION

The Phase I site, in the total area of 1,665 rai, or 657.66 acres, is presently a swampland bordered by the Samrong Canal on the north, the Hua Klua Canal on the east, the Ha Sib Canal on the south, and the Charoen Rat Canal on the west.

A few squatter families are scattered along these canals which currently provide the only access to the Teeparak Road crossing the northern tip of the site. The NHA stated that the squatter families have been advised of the forthcoming project and will be given the priority in selection of suitable shelters within the project.

● LAND USE

The Phase I Development Plan indicates the following land distribution and occupancy:

| | | | |
|---------------------------------------|--------------|----------------|--------|
| ● residential area----- | 385.90 rai-- | 152.43 acres-- | 23.18% |
| ● industrial area----- | 445.00 rai-- | 175.70 acres-- | 26.73% |
| ● commercial area----- | 205.11 rai-- | 81.05 acres-- | 12.32% |
| ● community facilities----- | 154.92 rai-- | 61.19 acres-- | 9.31% |
| ● parks, open areas, canal----- | 108.46 rai-- | 42.84 acres-- | 6.51% |
| ● roads and walks----- | 207.41 rai-- | 81.96 acres-- | 12.45% |
| ● other utilities and installations-- | 158.20 rai-- | 62.49 acres | 9.50% |

Total: 1,665.00 rai--657.66 acres--100.00%

Residential Area

The following dwelling units are programmed for the allocated 152.43 acres of land:

| | | |
|---------------------------------------|-----------------|--------|
| Dwelling Type "A"----- | 1,152 units---- | 23.72% |
| Dwelling Type "B"----- | 1,500 units---- | 30.88% |
| Dwelling Type "C"----- | 1,060 units---- | 21.82% |
| Dwelling Type "D"----- | 768 units---- | 15.81% |
| Dwelling Type "E" ^{1/} ----- | 79 units---- | 1.63% |

^{1/} Only land cost and lot development costs are included in the budget for this phase. It is intended that the lots will be offered to private developers to construct the Type "E" units.

99

| | | |
|-----------------------------|---------------|-------|
| two-story shop/house----- | 114 units---- | 2.35% |
| three-story shop/house----- | 184 units---- | 3.79% |

Total: 4,857 units----100.00%

Industrial Area

The 175.50 acres of land set aside within the Phase I of the project are proposed to be developed, administered and maintained by the Industrial Estate Authority of Thailand (IEAT). The NHA anticipated that the development costs of the industrial area would be the responsibility of the IEAT and the interested industry. The Industrial Estate would pay NHA for the land and proportionately share the installation costs of certain Phase I infrastructure from which it will benefit.

Commercial Area

The 81.05 acres of commercial and business area is programmed to provide space for a business center, fresh food market, plaza and open-air restaurant. It is anticipated that the development costs of this area, including cost of land and a share of the infrastructure costs will be fully carried by the commercial sector.

Community Facilities

The land area of 61.19 acres allocated for community facilities is programmed to contain education, sport and recreation, and health facilities as well as library, post office, community center, training center and telephone. The development costs of these facilities are to be distributed, as appropriate, between the beneficiaries, various sections of the G.O.T. and the telephone company.

Parks and Open Spaces

A total area of 42.84 acres will provide space for major park, green areas (for future development), and open spaces. It also includes the easement for the existing EGAT's high voltage transmission line and the canal. The cost of this land and its development will be prorated to all users.

Roads and Walkways

The 81.96 acres of land account for all roads, pedestrian walkways, bicycle trails and parking areas. The cost of land and the works is to be shared by all users.

Other Utilities and Installations

A dike and ditch around the Phase I project site, areas set aside for the sewage treatment plant and the electric power sub-station account for 62.49 acres.

● PLANNING

The project site is separated at the north end by the existing Teparak Road into two parts with about 15% of land north and 85% south of the road. A dual arterial road (3 lanes each way) with sidewalks and 5 m green median is planned in the south-north direction separating the entire site into two basic zones: industrial and residential. It is anticipated that this road will eventually extend to and connect with the Bang Na-Trad Highway on the north side and Sukhumvit Road on the south side.

The industrial zone located along the entire length of the arterial road in the east section of the site is only interrupted by two strips of business area along both sides of the Teparak Road. Residential, public structures and additional commercial structures occupy all land west of the arterial road. In this section the major commerce is again located along both sides of the Teparak Road. An area for the sewage treatment plant is located in the southeast corner of the site. The residential section, laid out in a grid pattern and with blocks running in east-west direction, contains minor shops, kindergartens and playgrounds while the main public and education facilities are adjacent to the west side of the arterial road.

The entire perimeter of the project site is formed by existing open water canals. A dike is proposed around the part of the project site located south of the Teparak Road and pumping and drying out the land is anticipated as the first part of the project's implementation process.

EGAT's high voltage transmission line crosses the southern end of the site in west-east direction.

● DWELLING UNIT DESIGN

Five types of dwellings and two types of combination of shop/dwellings are planned for the project.

The proposed structural system consists of reinforced concrete perimeter ground beam supported by reinforced concrete friction piles driven approximately 6 - 8 m deep. Reinforced concrete columns and beams support the hardwood purlins and corrugated asbestos sheet roofing. The front and back of the unit is open and the side walls are constructed to full height of 7 m with concrete blocks.

101
 No plastering or painting is included in the unit price. Each unit is provided with an enclosed lavatory equipped with turkish toilet and wash basin. Electric power and piped water to the wash basin are provided, and the toilet is connected to the sewer system.

Type "A" one-story units and Type "B" two-story units are designed as row houses; the "C" and "D" as two-story duplexes. The two- and three-story shop/houses have living areas on the second and third floors and shops on the ground floor.

Note: NHA did not present any concept design for the Type "E" dwelling unit.

- ACCESS-EXIT CIRCULATION

An arterial dual collector road with 40 m right of way, three paved lanes (12.00 m) in each direction, one 4 m walkway on either side and a 5 m median is proposed to cross the project site in the south-north direction. It is further proposed that the road extend beyond the extreme northern boundary and connect to the existing Bang Na-Trad Highway, approximately 700 m away.

Secondary roads of various widths (9.00, 8.00, 6.00, 4.5 and 3.6 m) are proposed to accommodate the traffic and circulation within the project site. Pedestrian and bicycle lanes are designed to provide for local circulation.

Three types of road are suggested for the industrial estate development (19.0, 14.0 and 9.0 m right of way). All roads are to have hard, asphaltic concrete; pedestrian walks and bicycle lanes, concrete tile paving.

- STORM WATER DRAINAGE

The proposed storm water drainage system is a combination of drain and pipe along both sides of the primary, secondary and distributor roads and open ditch on both sides of the neighborhood roads. A pumping station will dispose of the storm water into the perimeter canal.

- WATER SUPPLY AND DISTRIBUTION

Six deep wells with submersible turbin pumps (150 m³/hour each) are proposed to supply the residential and commercial consumption in combination with six elevated steel tanks (120 m³ each). Four deep wells and four tanks are proposed to accommodate the water supply for the industrial estate. Cement asbestos pipes ranging from 100 m/m to 400 m/m and steel pipes from 150 m/m to 250 m/m will be used in the distribution network. One inch galvanized steel pipe is proposed for the domestic connections.

- SEWAGE COLLECTION AND DISPOSAL

Concrete pipes from \emptyset 300 to 500 m/m are proposed for the trunk and main collectors and cement asbestos pipe in \emptyset 150 to 200 m/m for secondary lines. Eight lift stations will transport the sewage to the proposed treatment plant. Determination and selection of an economical and efficient treatment plant type is currently in process at NHA. It is anticipated that the plant will accommodate the sewage output from the industrial estate; however, should the quantity exceed the capacity of the treatment plant, the industry will have to install its own pre-treatment facility before discharging the effluent into the main plant.

- ELECTRIC POWER DISTRIBUTION SYSTEM

Electric power supply and distribution is the responsibility of the Metropolitan Electricity Authority (MEA). 220/380 V power supply is anticipated for residential and commercial use and will be delivered at about 24 kv through the sub-station located on the project site.

Street lighting is proposed.

The estimated cost of the electrical installations already includes home buyers' deposits and connection fees.

- OFF-SITE INFRASTRUCTURE

The plan proposes extension of the arterial road beyond the most northern boundary of the project in order to connect with the existing Bang Na-Trad Highway which will also dictate a concrete bridge over the Samrong Canal. The cost of this work is expected to be absorbed by the G.O.T.

- LANDSCAPING

Sodding and tree planting is proposed along the roads, community park, open spaces, recreation areas and playgrounds.

- TIME SCHEDULE

According to the NHA time schedule, the site preparation shall start in January 1980. This work will include the bridge across Samrong Canal at the northern tip of the site, the connecting road to the Bang Na-Trad Highway, dike and ditch system around the Phase I site and the pumping station and operations to dry out the land.

103

Start of the major construction activities is scheduled for April 1980. The proposed schedule indicates that the construction will start at the Teparak Road and progress in the direction of the southern boundary of the site in three major increments, each taking approximately 12 months. An additional six months is allowed for the finishing work, thus putting the completion of Phase I at the end of September 1983. The plan, however, indicates the completion of the Type "A" (1,152 units) and Type "B" (1500 units) at the end of March 1981.

SUMMARY OF ESTIMATED PROJECT COSTS - PHASE I

| | | |
|--|------|--------------------|
| Land | BT | 64,475,000 |
| Flood Protection | | 26,650,000 |
| Housing Construction | | 235,684,000 |
| IEAT Office | | 2,000,000 |
| Drainage, Grading, Filling, Compacting | | 23,679,000 |
| On-Site Roads, Walks, Bridges, Parking | | 93,370,000 |
| Water Supply and Distribution | | 32,763,000 |
| Sanitary Sewage Disposal System | | 27,319,000 |
| Electric Power Distribution System | | 15,754,000 |
| Off-Site Road and Bridge | | 17,400,000 |
| Landscaping | | 4,000,000 |
| Education Facilities | | 25,065,000 |
| Community Facilities | | 69,755,000 |
| Commercial and Business Facilities | | 4,107,000 |
| To Date Accumulated Costs | | 2,485,000 |
| NHA Overhead | | 44,978,000 |
| Interest on Construction Financing | | <u>139,739,000</u> |
| Total Direct Costs at Current Prices: | BT | 829,223,000 |
| 15% Physical Contingency | | 77,434,000 |
| 25% Price Contingency | | <u>164,367,000</u> |
| PHASE I ESTIMATED TOTAL COSTS: | BT | 1,071,024,000 |
| | US\$ | 53,551,200 |

REVIEW OF UNIT SALES PRICE, MORTGAGE PAYMENTS AND INCOME REQUIREMENTS.

| Unit Type | Lot | Prorated Infrastructure | Unit Construction Cost | NHA Overhead | Interest Construction Financing | Total Sales Price of Unit | Minimum Down Payment | % of Sale | Monthly Payment ^{1/} Incl. Charges ^{2/} | Minimum Income Required |
|--------------------|--------|-------------------------|------------------------|--------------|---------------------------------|---------------------------|----------------------|-----------|---|-------------------------|
| Unit Type "A" | 2,032 | - | 26,800 | - | 6,920 | 35,752 | 1,800 | 5% | 450 ^{1/} | 1,500 |
| Unit Type "B" | 2,032 | 4,155 | 33,000 | 1,960 | 9,405 | 50,552 | 5,100 | 10% | 590 | 2,000 |
| Unit Type "C" | 3,870 | 15,830 | 41,500 | 6,120 | 14,688 | 82,008 | 12,300 | 15% | 920 | 3,100 |
| Unit Type "D" | 4,838 | 39,574 | 59,200 | 10,362 | 24,869 | 138,843 | 27,800 | 20% | 1,375 | 4,600 |
| Lot Type "E" | 12,555 | 102,695 | - | 11,525 | 27,660 | 154,435 | 30,900 | 20% | 1,510 | 5,100 |
| 2-Story Shop/House | 2,032 | 16,621 | 182,423 | 20,108 | 48,258 | 269,442 | 53,900 | 20% | 2,740 | 9,200 |
| 3-Story Shop/House | 2,032 | 16,621 | 244,872 | 26,353 | 63,246 | 353,124 | 70,700 | 20% | 3,540 | 11,900 |

NOTES:

1/ Mortgage amortization rate: Type "A" - 20 years at 10% per annum
 Type "B" - 20 years at 11% per annum
 Type "C" - 20 years at 12% per annum
 Type "D" - 20 years at 12% per annum
 Type "E" - 20 years at 12% per annum
 Shop/House - 15 years at 12% per annum

2/ See following table for payment breakdown.

BREAKDOWN OF UNIT MORTGAGE AMOUNTS, PAYMENTS AND CHARGES

| Unit Type | Unit Sales Price | Down Payment | Mortgage Amount | Mortgage Payment Per Month | Service Charge | Other Charges | Total Payment Per Month | Income Per Month Required |
|--------------------|------------------|--------------|-----------------|----------------------------|----------------|---------------|-------------------------|---------------------------|
| Unit "A" | 35,752 | 1,800 | 33,952 | 330 | 50 | 70 | 450 | 1,500 |
| Unit "B" | 50,552 | 5,100 | 45,452 | 470 | 50 | 70 | 590 | 2,000 |
| Unit "C" | 82,008 | 12,300 | 69,708 | 770 | 80 | 70 | 920 | 3,100 |
| Unit "D" | 138,843 | 27,800 | 111,043 | 1,225 | 80 | 70 | 1,375 | 4,600 |
| Unit "E" | 154,435 | 30,900 | 123,535 | 1,360 | 80 | 70 | 1,510 | 5,100 |
| 2-Story Shop/House | 269,442 | 53,900 | 215,542 | 2,590 | 80 | 70 | 2,740 | 9,200 |
| 3-Story Shop/House | 359,124 | 70,700 | 288,424 | 3,390 | 80 | 70 | 3,540 | 11,800 |

NOTES:

1/ Includes operation and maintenance of street lighting, roads and walks, and charge for sewage disposal. Does not include individual water and electrical power supply.

2/ Includes estimated expenditure for water supply system and maintenance.

3/ Total monthly payments not to exceed 30% of total monthly income.

109

2. Comments

• THE SITE

The Phase I site is predominantly wetland as is the rest of the land secured by NHA for the New Town Project. Preparation of the site will require considerable effort, time and expense. It appears, however, that most of the land in the Bangkok area and east and south of it towards the seashore is or was this type of land. Low elevation and little or no natural surface drainage seem to be characteristic of it. The major difficulty inherited from such conditions is the low load-bearing capacity of the soil/clay which necessitates costly foundation methods, and because of very low percolation, an elaborate storm water drainage system.

• LAND USE

For economic and marketing reasons the NHA planners set aside a substantial part of the Phase I project site for an industrial development. It was said and has been confirmed that Thailand's growing industry is continuously looking for development and expansion opportunities and suitable land availability is rather limited. The combination of employment opportunities and the availability of housing and other facilities should favorably support the economic viability of the proposed project.

The land use pattern and the general layout of the Phase I site is acceptable although during the review and discussions, some changes were suggested and accepted by the NHA management: It was agreed:

- To reduce the arterial road from the six lanes proposed to four lanes.
- To include the triangular piece of land located in the north-west corner of the project site (shown unused on NHA site plan) in the occupied area. By changing the direction of the CS class road to run along the western boundary of the site and to move westward its intersection with the Teeparak Road.
- To reduce the area set aside for the proposed schools.
- To restudy the access/exit points on the arterial road from and to the residential areas.
- To evaluate the proposed filling of the site north of Teeparak Road against an alternate solution of dike and ditch. This alternate approach will be discussed by NHA with the Highway Department.

Although some minor changes in the project costs may result from these modifications, they were not considered significant enough to appreciably affect the total budget.

- INDUSTRIAL AREA

Although it was originally anticipated that the IEAT would assume responsibility for promotion, marketing, development and maintenance of the industrial estate within the Phase I area, it was determined that such will not be the case. The IEAT seems to be willing to offer help and to participate in the promotion, marketing and coordination, but the development responsibilities, i.e., the total infrastructure and the servicing and maintenance will rest with the NHA. This will represent an additional and significant physical, financial and administrative burden to NHA's already stretched capacity. It will also increase the NHA development budget by amounts yet to be determined by the NHA technicians. However, it will not affect the cost of the housing. Nevertheless, the IEAT indicated that NHA may expect a substantial interest from the industry.

- PLANNING

From the physical and economic viewpoint, there is no major argument against the layout of the Phase I site, particularly when we consider the built-in constraints, such as the unavoidable waterways and the existing easement for the high tension transmission line. Nevertheless, some criticism could be voiced from the viewpoint of aesthetics, livability and functional performance.

In the attempt to secure economic viability for the New Town Project in the early stages, the NHA planners located all of the programmed industrial and major commercial development in Phase I of the project, utilizing over 39% of the site. Adding the areas occupied by public facilities, roads, parks and recreation, and the utilities, the net residential area has been limited to only 23.18% of the total site. It is evident from the residential section that maximum utilization of the land was the major effort which, however, resulted in a rather regimented scheme of blocks in a grid pattern. This approach might not have been objectionable had the planners considered a better balanced mixture of all programmed dwelling types. The isolation of the lowest cost units, types "A" and "B," in the northeast corner of Phase I site suggests an economic and social separation and does not provide the opportunity for integrated social development.

These comments are, however, presented only as an optional approach that could have been considered during the planning process and do not suggest any critical need for a change of the Phase I site plan. The applied planning approach is generally acceptable and does not suggest any potential physical problems.

109

● DWELLING UNIT DESIGN

The type and load-bearing quality of the soil unfortunately limits the choice of construction methods, structural systems and construction materials. Due to a limited supply of quality lumber, the NHA selected reinforced concrete column and beam frame resting on a set of reinforced concrete piles driven approximately 6 m deep. The non-bearing (curtain) side walls are to be built of 7 cm hollow concrete blocks. It is a rather expensive system which does not lend itself well for easy expansion of the basic unit. Wood or other lighter weight materials would, however, increase the cost of the basic unit. The two row-house-type units, "A" and "B," particularly the single story "A" type, are primarily affected by this condition. It was agreed that an additional study will be initiated to develop a more practical and less costly expansion system for the type "A" and "B" units. It is unquestionable that a different design of the "A" and "B" units could have offered better conditions for expansion, provided direct access to the back yard and possibly improved the livability of the dwellings. Also, without a doubt, the NHA time schedule for the first stage of Phase I would be considerably upset if any change to the basic unit design should be insisted upon at this time.

It is evident that alternate solutions were not sufficiently studied during the design effort for this phase where 2,652 "A" and "B" units will be built. While it may not be as critical as it appears at this stage, with a total of 15,579 dwelling units yet to be built in the Phases II and III, more extensive study and effort should be considered for the second and third stages of Phase I and for during the design of Phases II and III. Undoubtedly, considerable improvements could be achieved on all dwelling units.

● ROADS

The six-lane, dual arterial road crossing the new town site in the south-north direction was proposed as the main traffic collector for the project extending between the Sukhumvit Road south and the Bang Na-Trad Highway north. The NHA expected that all parts of this road outside of the project site will be undertaken and financed by the National Department of Highways. The department officials, however, indicated that they have neither the funds nor the intention of assuming this obligation. Furthermore, they questioned the need for this link between the Sukhumvit Road and Bang Na-Trad Highway which would either serve only the project, or otherwise attract additional and undesirable traffic through the new town since there is such an existing connection only 3 km east from the project accessible by the Teprarak Road. In addition to that, the department has plans to build a similar connecting road crossing the Teprarak Road about 7 km west from the project site. The highway officials, however, concurred with the need for and the practicality of the approximately 700 m extension of the project's main road to connect with the Bang Na-Trad Highway.

The funding for the off-site construction, including the intersection, will have, however, to be secured by the NHA. The Highway Department suggested an early discussion with NHA as to the type, design and schedule of the intersection, or possibly interchange, at the Bang Na-Trad Highway.

The proposed roads and walkway within the project site appear to be adequate although additional study of the exits and accesses at the main road have been recommended and will be undertaken by the NHA.

- WATER SUPPLY AND DISTRIBUTION

The proposed potable water supply for the entire New Town Project depends on deep wells to be drilled in various locations of the site, pumps and elevated water tanks. The Department of Water Works, however, expressed a concern that once the entire project is completed and occupied, the consumption will exceed the rechargeable capacity of the ground water supply and could result in a serious depletion. The Department has plans, however, for extension of its piped water supply network from the central source along the Teparak Road which would ultimately provide a comfortable supply capacity for the new town consumption.

- ELECTRIC POWER SUPPLY

Full electrification, including street lighting, is proposed for the project. The official of the Metropolitan Electricity Authority (MEA) confirmed that sufficient capacity is available in the project area.

- SEWAGE COLLECTION AND DISPOSAL

The sewage collection system with the necessary lift stations appears to be adequate as proposed. Since the type and capacity of the treatment plant is still under NHA study and has not been yet determined, it is not possible, at this time, to evaluate the effects of the discharge into the adjacent canal. It is obvious that the type and capacity of the plant will very much depend on the type of industry and commerce the New Town Project will attract. The operation and maintenance costs of the plant and their distribution, particularly in relationship to the residential population will be equally critical. In absence of local municipal administration, it will be the responsibility of the NHA to maintain and service the entire system.

● TIME SCHEDULE

Assuming that the NHA meets the schedule and will start the site preparation in January, 1980, it is rather questionable whether any major construction work can start three months later in April. It would seem that the three months may not be sufficient time to complete the dike and pump the water out of the site. Nevertheless, even with some delays at the beginning, 45 months seems to be sufficient to complete the Phase I project. The work schedule presented by the NHA for this purpose should be carefully reviewed and adjusted to assure timely delivery of related segments of work so that the completed parts of Phase I may be utilized as soon as possible. The proposed schedule for installation of the electric power sub-station should be verified by MEA to assure appropriate power supply to the completed structures in the interim.

● PROJECT COSTS

The Phase I project costs estimate has been prepared on a basis of August/September, 1979 prices, and can therefore be considered accurate.

Although it is customary to include the contingencies in the estimated project costs, the NHA proposed to establish a contingency reserve in its budget and use it as needed. It may be, therefore, expected that the project costs now estimated will keep growing with the progress of the work. The NHA, however, claims that the possible cost variations will not affect the affordability of the dwelling units. It will be important, however, to make a more detailed costs review and to determine their relationship to the unit selling prices when the contractors' bids are available and the construction contracts awarded.

The costs distribution shows that only 50.465% of total Phase I project costs shall be charged to the home purchasers. The balance is expected to be recovered through government contributions, commercial and business enterprises, industry and the telephone company. Some of the recovery may be of a long-term nature, but the NHA projects an ultimate profit on the industrial estate investment in the amount of Baht 84,152,000 at a return rate of 18.8% per annum over a 15-year period; and a profit of Baht 338,171,000 at a return rate of 3.58% per annum over 20 years on its investment in the residential structures.

The proposed selling prices of the "A" and "B" units comfortably meet the AID criteria; even the "C" units appear to be acceptable if we consider the current medium income at Baht 3,300 as determined by the World Bank analysts.

The projected monthly mortgage payments in the amounts of Baht 450 for Type "A" and Baht 590 for Type "B" include also

charges for street lighting, roads and walk maintenance and use of the sewers and require monthly income of 1,500 and 2,000 Baht respectively. Both units are, therefore, easily accessible for purchasers with an income below the 50th percentile. The monthly payments are calculated not to exceed 30% of total monthly income.

3. Conclusion and Recommendations

From the technical and cost viewpoint, the proposed Phase I project is considered acceptable and in compliance with the current AID/HG requirements.

Some planning and design improvements could have been introduced at an earlier stage of the process, but an undesirable delay in implementation of this project would have to be accepted should they be insisted upon at this time. The NHA staff has done commendable work on preparation of the New Town Project. If there is any criticism of the results of their performance, it certainly does not relate to their technical capability; perhaps only years of experience are still missing.

It would, therefore, seem logical to suggest external assistance in planning and design reviews for the second and third stages of Phase I and in planning and design of Phases II and III of the New Town Project. Considerable benefits could be realized from the assistance of a senior town planner and an architect, both with specific experience in new town planning, low-cost housing, appropriate construction technology and extensive work in less developed countries, particularly in Southeast Asia. It is estimated that six to eight months participation of two professionals for each phase of the project should be sufficient.

ANNEX BPROPOSED INDUSTRIAL SURVEY AND PROMOTION PROGRAM

One of the most important and most immediate needs in advancing the overall Bang Plee-Bang Bor New Town Project is to expedite the sale and development of industrial land in order to have on-site employment opportunities created as soon as possible, along with the provision of housing. This AID review has concluded that now is the time to begin to promote the industrial estate.

The Industrial Estate Authority of Thailand (IEAT) will be responsible for this promotion effort, essentially as the agent of NHA. IEAT says a survey is necessary before promotion can begin. At this time it has not been determined if NHA or IEAT (or both) will make this survey. Because of NHA's and AID's mutual desire to get this activity underway, at the request of NHA's Chief of Policy and Planning, Mr. Sidhijai Tanhiphat, the review team's housing economist/market specialist, Robert DeVoy, prepared the following preliminary list of major activities.

This proposal has been reviewed by the staff of Policy and Planning and, with minor reservations and changes, agreed upon. Therefore, it is expected that the survey and promotion program along these general lines will soon commence.

PRELIMINARY LIST OF MAJOR ACTIVITIES COMPRISING SURVEY
AND PROMOTION PROGRAM FOR INDUSTRIAL ESTATE IN BANG
PLEE-BANG BOR NEW TOWN

I. INDUSTRIAL SURVEY (November-December 1979, January 1980)

1. Draft Preliminary Survey Questionnaire (base on previous surveys; will be revised later, see 9, below).

2. Obtain from Ministry of Industry, Ministry of Commerce, Chamber of Commerce, etc., names of specific companies planning to expand existing factories and warehouses and/or to construct new ones.

3. Prepare descriptions of new industries (since 1975) locating within 10-15 kilometers of New Town site. (Based on travel routes and times). Description to include: type of activity; site size; building size; number of workers by general skills and wage levels; housing characteristics of workers (locations, types of housing, monthly costs of housing).

4. Determine from records of Ministry of Industry and/or other sources, industries now in Bangkok which have similar industrial characteristics to those now in the area--will yield a general list of potential prospects.

5. Re-evaluate layout of industrial estate based on findings of site and building characteristics of companies in new industrial areas; make appropriate revisions.

115

6. Check with architects and site acquisition agents for industries to ascertain what specific companies are planning new factories -- determine if New Town would be satisfactory location (if not, why not; if so, follow-up with promotion effort).
7. Work with staff of Town and Country Planning responsible for Bangkok metropolitan area Plan to identify industries which are most likely to relocate because they will be unable to stay and expand at their present locations.
8. Prepare consolidated prospect list for New Town Industrial Estate from above findings.
9. Revise draft of questionnaire based on information obtained in carrying out above steps.
10. Send questionnaire with letter of request/explanation to chief executives of companies on this prospect list.
11. Follow-up with telephone calls in two weeks to request return of questionnaires not already returned.
12. Analyze returns to (a) ascertain overall interest in New Town Industrial Estate and (b) identify companies deserving promotional visits by IEAT/NHA.

116

II. INDUSTRIAL PROMOTION PROGRAM (December 1979 - March 1980)

1. Prepare promotional brochure on New Town Industrial Estate--including as much detail as possible on assistance to industries which would move into industrial estate, including but not limited to financing, tax incentives, design assistance, regulatory assistance, plans for subsequent management or industrial estate, attributes of general location and new town, progress schedule of development.
2. Determine specific roles and activities of IEAT and NHA (should be determined as soon as possible).
3. Announce New Town plan and availability of industrial land on NHA radio time and in newspapers.
4. Prepare promotional articles to be placed in English and Thai language newspapers (probably in business sections) and arrange to have these appear when promotion staff is ready to make follow-up visits.
5. Meet with Ministry of Industry and Board of Investment officials who directly encounter industrialists in need of new factories; brief them on New Town Industrial Estate and give them copies of promotion brochure to handout to prospects.
6. Obtain specific commitments from Government on incentives available to industries locating in this New Town (ascertain soon enough to include information in brochure -- or as separate information sheet, if necessary).

7. Investigate public and private sources of financing for industrial construction to (a) be sure that financing will be available and (b) provide guidance and assistance to industries in obtaining the financing they require.
8. Prepare lists of qualified industrial architects and construction contractors and make lists available to industrialists interested in Bang Plee - Bang Bor to facilitate their construction programs.
9. Review all NHA, BOI and other Government approvals required to see how procedures can be simplified and shortened in order to expedite plant construction programs; foster appropriate changes; assist industrialists obtain necessary approvals.
10. Visit high-priority industrialists (as determined by results of survey) to encourage them to bid on industrial land in Bang Plee - Bang Bor. These visits should occur 2-3 months prior to beginning of bidding procedures, since companies need this much time to make major expansion and site acquisition decisions.
11. Determine criteria to use in evaluating bids for this industrial land, including but not limited to total price, method of payment, firmness and timing of construction schedule, type of industrial activity (pollution levels, use of water, etc.), size of initial employment, growth plans/prospects,

and financial soundness of company.

12. Prepare bidding procedures and documents; announce on radio and in news papers about 2 months prior to beginning of bidding; prepare mailing list of companies wishing to receive bid documents.

13. Expeditiously determine successful bidders and notify them promptly; meet with them immediately to sign contracts and to arrange financing and legal matters (keep list of other acceptable bids to substitute for any dropouts).

ANNEX CESTIMATION OF LOW-COST HOESING COMPONENTS FOR LAD KRABANG
AND SONGKHLA PROJECTS

The HOusing Guaranty Loan to NHA will fund low-cost housing projects of various types throughout Thailand. In order to put the Bang Plee-Bang Bor costs for low-cost housing in perspective, a brief analysis was made of the projected costs for two other projects also being planned: the Lad Krabang Sites and Services Project in the Bangkok area and a sites and Services Project in Songkhla, a regional city in southern Thailand.

The tables summarizing these analyses are included here.

Estimation of Low Cost Housing Components of Total Capital

Cost for Lad Krabang Sites and Services Project, Phase I (1980-1983)

Affordable Housing Options: 1/

| | | |
|-------------------------------------|-----------------|--------------|
| A ₁ (wet core) | 14th percentile | 322 plots |
| A ₂ (24 m ²) | 16th " | 869 " |
| B (17 m ²) | 16th " | 308 " |
| C ₁ (37 m ²) | 32nd " | <u>800</u> " |
| Sub-total | | 2,299 |
| Total | | 4,200 |
| % of total | | 55% |

| | | | |
|--------------------------|---------|--------------------------|--------|
| <u>Phase I Land Area</u> | 834 rai | 1,334,625 m ² | |
| Residential | 303 rai | 484,832 m ² | 36.33% |

Total Final Cost (including physical contingency, design and supervision, management, interest during construction)

| | <u>฿</u> | <u>\$</u> |
|--|-----------------------|--------------|
| Land Acquisition | ฿ 43,028,000 | 2,151.0 |
| Flood protection | 9,569,000 | 479.0 |
| On-site infrastructure | 115,889,000 | 5,795.0 |
| Off-site infrastructure (roads and bridges) | 204,317,000 <u>2/</u> | 10,216.0 |
| Utilities | 31,514,000 | 1,576.0 |
| Landscaping | <u>400,000</u> | <u>200.0</u> |
| Sub-total | ฿404,718,000 | \$20,236.0 |

| | <u>₧</u> | <u>\$</u> |
|----------------------------|------------------------------|----------------------------|
| Education facilities | 14,279,000 | 714.0 |
| Other community facilities | <u>10,349,000</u> | <u>517.4</u> |
| Sub-total | ₧24,628,000 | \$1,231.4 |
| Commercial (small scale) | <u>163,000</u> | <u>\$ 8.2</u> |
| | ₧429,509,000 | \$21,475.6 |
| Core houses | 304,952,000 | 15,247.6 |
| Building materials loans | <u>34,456,000</u> | <u>1,722.8</u> |
| Total cost Phase I | <u>₧768,917,000</u> ===== | <u>\$38,446.0</u> ===== |

1/ Assumes median family income of ₧3,300 per month based on IBRD July, 1979 estimate.

2/ ₧14,771,000 to be recovered directly through land sales. Balance to be financed by Government.

122

Low Cost Housing Share of Total CostsLand Acquisition, Flood Protection andOn-Site Infrastructure - total ₪200,401,000

Types A₁, A₂, B, C houses are 55% of
total residential units; residential land
is 36% of total land

| | <u>₪</u> | <u>\$</u> |
|---|---------------|--------------|
| 55% of total (200,401,000) | 110,221,000 | 5,511.1 |
| <u>Off-site Infrastructure</u> (55% of recoverable costs) | 8,122,000 | 406.1 |
| <p>Nearly all major roads not to be recovered from project beneficiaries directly because these roads are part of the Metropolitan Highway plan</p> | | |
| <u>Community Facilities</u> | | |
| 55% of ₪24,628,000 | 13,545,000 | 677.3 |
| <u>Houses</u> (A ₁ , A ₂ , B, C ₁) (Cores and building material loans) | 97,720,000 | 4,886.0 |
| | <hr/> | <hr/> |
| Total | ₪229,608,000 | \$11,480.4 |
| AID financing @30% | \$ 70,000,000 | \$ 3,500,000 |
| Per housing unit (2,299) (approximate) | ₪ 100,000 | \$ 5,000 |

(Source: R. DeVoy from Lad Krabang Phase I report, November 1979)

Estimation of Low Cost Housing Components of Total Capital
Cost for Songkhla

Sites and Services Project

| | |
|--|---------------|
| IBRD estimated median household income (1979) | ฿3,900 |
| Affordable houses A ₁ , A ₁ B ₁ C | 579 units |
| Total 631 units | 95% <u>1/</u> |

Land is on 30 year lease

| | <u>(000)</u> | <u>฿</u> | <u>\$</u> |
|--|--------------|------------|-----------|
| Flood protection | ฿4,076 | 4,076 | 204 |
| On-site infrastructure | | | |
| - Roads | 1,732 | | |
| - Sewerage | 1,536 | | |
| - Connections and special feature (septic) | 3,240 | | |
| - Water | 1,820 | | |
| - Electric | <u>1,526</u> | | |
| On-site sub-total | 9,854 | 9,854 | 493 |
| Off-site (road, bridge, utilities) | 9,256 | 9,256 | 463 |
| Community facilities | 257 | <u>257</u> | <u>13</u> |
| Sub-total | | ฿23,443 | \$1,173 |
| Commercial and business | 4,270 | | 214 |

Core Houses

| | | | |
|------------------------|-----------|---------------------|-------------------|
| A | 72 units | 858 | |
| ¹ | | | |
| A | 231 units | 7,307 | |
| B | 216 units | 7,790 | |
| C | 60 units | <u>3,503</u> | |
| | | 19,458 | 973.0 |
| Sub-total | | 47,171 | 2,359 |
| Optional building loan | | 5,686 ^{2/} | 284.3 |
| Type D | - 360 | - 360 | 18 |
| | | <u> </u> | <u> </u> |
| | | ₱52,497 | \$2,625 |
| | | +15% | |
| | | <u>₱60,372</u> | |

Allocation Total Costs to Low Cost Houses

92% of flood protection, on-site and offsite
infrastructure, community facilities

| | | |
|---|---------------------|--------------------|
| 92% x 23,443,000 | 21,568,000 | |
| Core houses | 19,458,000 | |
| Building material loans (excludes type D loan) | 5,326,000 | |
| Total | <u>₱46,352,000*</u> | |
| | \$ 2,318,000 | |
| AID financing @50 % | <u>₱23,176,000</u> | <u>\$1,159,000</u> |
| Price contingency 15% | ₱53,305,000 | 50% = ₱26,652 |
| | \$ 2,665,000 | 50% = \$ 1,333 |
| Per housing unit (579) | ₱92,000 | |
| | \$ 4,600 | |

1/ 82% excluding type C unit

Allocation of Total Costs to Low Cost Houses (excluding type C unit)

| | | |
|-------------------------|----------------|--------------------|
| 82% of 23,443,000 | ₪ 19,223 | \$ 961,000 |
| Core houses | 15,955 | 798,000 |
| Building material loans | 5,326 | 266,000 |
| | <u>₪40,504</u> | <u>\$2,025,000</u> |
| AID financing @50% | <u>₪20,252</u> | <u>\$1,013,000</u> |
| Price contingency | | |