

AGENCY FOR INTERNATIONAL DEVELOPMENT WASHINGTON, D. C. 20023 BIBLIOGRAPHIC INPUT SHEET	FOR AID USE ONLY
---	-------------------------

1. SUBJECT CLASSIFICATION	A. PRIMARY Economics
	B. SECONDARY Housing Surveys

2. TITLE AND SUBTITLE Pre-investment survey report, housing guaranty program: Fort Lamy, Chad

3. AUTHOR(S) Dean, C.F.

4. DOCUMENT DATE 1971	5. NUMBER OF PAGES 44p.	6. ARC NUMBER ARC
---------------------------------	-----------------------------------	-----------------------------

7. REFERENCE ORGANIZATION NAME AND ADDRESS A.I.D. Office of Housing, Bureau for Program and Management Services, Agency for International Development, Washington, DC 20523
--

8. SUPPLEMENTARY NOTES (<i>Sponsoring Organization, Publishers, Availability</i>)
--

9. ABSTRACT

Since 1971, the Office of Housing of AID has been conducting preinvestment surveys in countries where housing investment guaranty programs are anticipated in order to provide the background and framework for its intervention. These surveys are, in fact, increasingly sophisticated analyses of the shelter sector of each country. Each report is intended to provide the Office of Housing with the information necessary to enable it to answer three primary questions about a specific country:

- . What is the country's capacity to undertake a large-scale housing program?
- . What is the effective demand for housing at a given price level?
- . What is the country's capacity to repay a foreign loan?

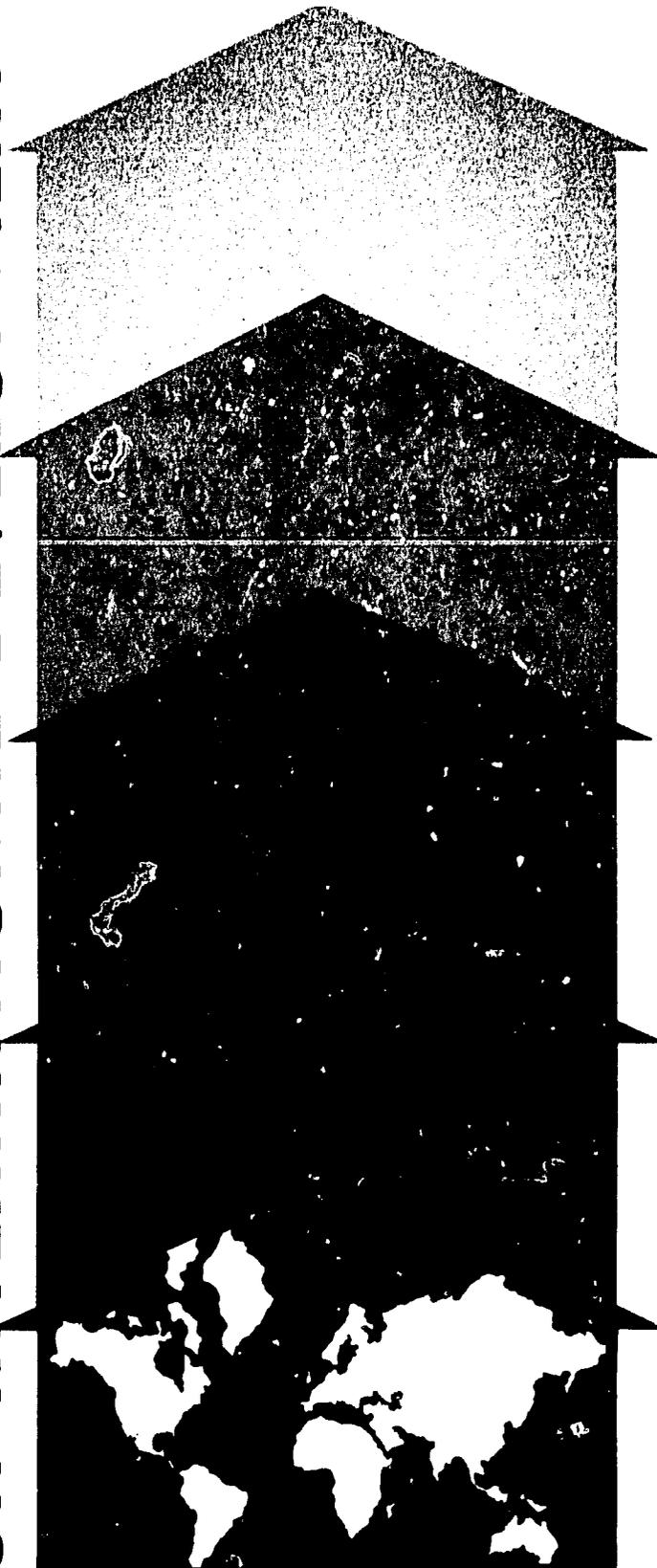
To paraphrase the introduction to the scope of work for a recent survey, its objectives are to determine the need for housing at all socio-economic levels of society, to determine the ability of each socio-economic group to pay for housing; to assess the capabilities of the Government to plan and manage large scale housing programs and projects; to analyze the impact of large scale foreign borrowing on the country's economy and its ability to repay; and to assess the ability of the country to absorb large sums of money into the shelter sector industries.

These objectives have been realized with varying degrees of success. Some of the more recent surveys, in particular, provide broad panoramas of the country housing sectors. Some of the earlier ones are more limited in scope and cover only a part of the sector.

These reports provide valuable orientation for anyone becoming involved in housing sector in one of these countries. They should also be useful for comparative studies of housing programs and policies on a regional or world-wide basis.

10. CONTROL NUMBER PI-AAB- 525	11. PRICE OF DOCUMENT
12. DESCRIPTORS	13. PROJECT NUMBER
	14. CONTRACT NUMBER AID/SER/H
	15. TYPE OF DOCUMENT

AGENCY FOR INTERNATIONAL DEVELOPMENT



OFFICE OF HOUSING

**Stanley Baruch, Director
Peter Kimm, Deputy Director**

**PRE INVESTMENT
SURVEY REPORT
HOUSING GUARANTY
PROGRAM
FORT LAMY, CHAD
1971**



FCH INTERNATIONAL, INC.

A Subsidiary of The Foundation for Cooperative Housing

1012 FOURTEENTH STREET, N.W. WASHINGTON, D.C. 20005 TELEPHONE 202 737-3411

April 29, 1971

Mr. George Hazel
Housing Officer
AID Office of Housing
Washington, D.C.

Dear Mr. Hazel:

This is to transmit our final report on the FCH survey work in Chad for your consideration.

We appreciate the support we received from your office and from the U.S. Embassy in carrying out this work, and we look forward to assisting AID on project implementation. Thank you for your personal cooperation.

Sincerely,

Charles Dean
Vice President

CC: S. Baruch
P. Kimm
W. Campbell
J. Edmondson
E. Bueneman
D. Coleman

TABLE OF CONTENTS

	PAGE
I - Background and Purpose	1
II - Summary of Findings and Recommendations	2
III - Housing Market	7
IV - Potential Project Sponsor	15
V - Construction Industry	19
VI - Initial HIG Pilot Project	25

ATTACHMENTS

1. Map of Chad
2. Map of Fort Lamy and Tentative Project Location
3. Tentative Project Organizational Chart
4. Plans and Cost Estimates/Three BDT Houses
5. SATOM Cost Estimate - BDT 100 m² house
6. Photos - typical BDT house
7. List of Contacts

FINAL REPORT

FCH Pre-Investment Survey
Housing Investment Guaranty Program
Fort Lamy, Chad
February, 1971

I. BACKGROUND AND PURPOSE

During a recent visit to Washington by the U.S. Ambassador to Chad, Terence A. Todman, a meeting was held with Mr. Stanley Baruch, Director of the AID Office of Housing, on the possibility of developing a housing investment guaranty project in Fort Lamy. Upon his return to Chad, Ambassador Todman had further discussions on this subject with President Tombalbaye, and as a result requested a pre-investment survey through the AID Office of Housing. The Office of Housing responded to this request by providing for the TDY services of two housing consultants: Charles Dean and Daniel Coleman, from the Foundation for Cooperative Housing (FCH). The FCH team arrived in Fort Lamy on February 8, 1971 upon completion of a similar survey in Kinshasa, Congo.

Ambassador Todman briefed the FCH team upon their arrival and provided a great deal of assistance in conducting the survey through his staff: Mr. John Blane, Counselor of Embassy; Keith Wauchope, Counselor Officer; and Basile Yannoulis, Counselor/Commerical Clerk. Ambassador Todman also arranged for the FCH team to meet with President Tombalbaye during the first week of the survey. The President indicated his strong personal interest in the development

of the proposed housing investment guaranty project, as a complement to other Chadian development activities.

A brief interim report was prepared at the end of the first week, suggesting an initial pilot project involving a total of 250 housing units for a total of \$1 million. Mr. Dean returned to Washington on February 13 and Mr. Coleman remained in Chad until March 3, 1971 to complete the survey work.

II. SUMMARY OF FINDINGS AND RECOMMENDATIONS

A. General

The FCH survey team found that there is an existing effective demand in Fort Lamy for the proposed initial project of 250 units, and it is technically feasible to develop the project through the negotiated housing investment guaranty program. However, project implementation in Fort Lamy will be considerably more difficult than developing a similar HIG project in a more developed, less remote location.

Several potential problems are noted so that special provisions can be made to resolve them during project development: a) construction costs are very high in Fort Lamy and salaries are relatively low; b) almost all construction materials must be imported and transported by rail and truck for long distances, resulting in a considerable time lag from time of ordering to time of delivery; c) there is lack of trained and experienced Chadian

technical personnel; d) there is no USAID Mission in Fort Lamy to support the activity, and the U.S. Embassy staff is quite small.

On the positive side, there are people who need and can afford better homes, there is a good potential sponsor, land is available, and the government of Chad strongly supports this activity. The HIG program offers perhaps the only possibility of a tangible demonstration of U.S. concern for the development problems facing the Chadian government. Both President Tombalbaye and Ambassador Todman expressed their opinions that this should be a high priority project and would be worthwhile even if extra effort were required.

FCH believes that the project is technically feasible if it receives high priority and could be developed with a great deal of technical assistance, perhaps out of proportion to the size of the initial project. There would be a definite need for at least one full-time resident U.S. project coordinator for a period of at least 18 months.

B. Housing Market - Fort Lamy

The population of Fort Lamy is about 140,000. The annual growth rate of the city is 8% to 11%. The preliminary housing market information gathered by the FCH team indicates that there are approximately 3,000 wage earners in the US\$55-\$91 per month range and approximately 1,300 wage earners in the US\$91-182 per month range, with a third group of approximately 300 persons in the over US\$182 per month income range. It was not possible to determine

how many people in each group already have adequate housing and therefore would not be in the market for a house under the HIG program. However, a very conservative estimate would be that at least 10 per cent of each group would be qualified, potential home buyers. Based on the information, we have suggested a relatively small initial pilot project of 250 units. This could be greatly expanded if the effective demand for considerably more houses could be verified, or if after the sales program is under way, it becomes clear that there are many more qualified home buyers.

C. Project Sponsor

The logical sponsor for a HIG project in Fort Lamy would be the Chadian Development Bank, the BDT. The BDT was founded in 1952 and its operation includes the granting of industrial, agricultural, and housing loans. In 1970, twenty-two per cent of its total loan program, 635 loans, was made for housing. The BDT receives its funds from the Chadian Central Bank and the European Development Fund, as well as from savings deposits.

The BDT does not build housing "projects" but rather, loans to applicants who own their own lots and utilize small Chadian contractors for construction of individual single family detached homes. Some of the loans are for home improvement. The average loan during 1970 was about US\$1,300. New houses constructed under BDT loans average about US\$2,000. Construction is normally from

locally available mud brick and stucco with metal roofs. The repayment rate on all BDT housing loans is apparently very good.

D. Land

The capital city, Fort Lamy, borders the Chari River and is located on low, flat land subject to occasional flooding from rains or overflow from the river. For this reason, any site selected in the capital area will be subject to potential water problems and special attention would be required to provide adequate drainage.

The most desirable site for a HIG project in Fort Lamy seems to be the Cuvette St. Martin site, located close to the city's center and owned by the Chadian government. The site contains more than 100 acres and the proposed 250 unit initial project would utilize only a small percentage of the available land.

An additional advantage of utilizing the Cuvette St. Martin site would be that it is on the "boundary" between the Arab, Moslem, northern half of Fort Lamy and the southern non-Moslem half of the city. If only one project is to be built and occupied on an integrated basis, it is perhaps the only feasible location. If the Chadians recommend two projects, one for each group, two sections of the same project could be built on separate parts of the Cuvette St. Martin site. The FCH team has no recommendation on this aspect of the project which should be resolved by the

Chadian government.

E. Construction Industry

There are several relatively large, well built, modern structures in Fort Lamy built by foreign construction firms permanently located in Fort Lamy. The quality of this work is good but very expensive. All cement, steel, wiring, mechanical equipment and hardware are imported, mainly from Europe, and material costs are therefore very high. Concrete blocks, structural clay tile, and fired clay bricks are made locally. Wood construction is extremely expensive because wood is not available near the capital city.

There are several competent but small Chadian contractors building houses for the BTD and acting as subcontractors to foreign firms on larger projects

We did not meet any Chadian engineers or architects, and we understand that most technical work in both public and private sectors is done by French technicians.

F. Pilot Project Approach

We recommend that the first HIG project should be developed in two sections on the Cuvette St. Martin site with approximately 100 units in the first section at about US\$2,500 per unit and a second section of approximately 150 units at about US\$5,000 per house.

The US\$2,500 houses would be developed as "core" houses, defined here as complete but small houses designed for self-help expansion as the homeowner's income increases. The US\$5,000 unit in the second section would be larger and of higher quality, but also designed

for future expansion.

We recommend that the project be developed to include a cooperative type homeowners' association, in which community facilities are owned by the association and overall project maintenance is controlled by the association. Individual homeowners, however, would have title to their individual lots and houses.

III. HOUSING MARKET

A. General

The population of Chad in 1971 has been estimated at 3.7 million. The country growth rate of 1.5 per cent per annum is one of the lowest of the underdeveloped countries. Fort Lamy, the capital and largest city in Chad, has an estimated population from 136,000 (U.S. Embassy) to 150,000 (Chadian government). The annual growth rate of 8 per cent to 11 per cent is based on estimated 1964 population of 81,000 inhabitants.

According to the latest Department of Commerce Overseas Report on Chad (July 1969), 1.1 million persons comprised the work force that year. Of this amount, only 68,700 are wage earners, the great majority of whom work for the government or in the service sector. Only 8,000, or 15 per cent, of the wage earners are employed by private firms and industries.

Most financial assistance to Chad comes from the European Development Fund. The French Government provides the most technical assistance to the Chadian government which includes the payment of

salaries of almost 450 French technicians and managers.

B. Market for Proposed HIG Program

In order to estimate the potential market for the proposed HIG project, the FCH team gathered information from the following sources:

- 1) Survey dated 1/70 by BTCD (private bank) of 237 firms with 12,914 Chadian employees on average monthly income in different "occupational" categories.
- 2) Study of income distribution of government employees excluding police and military - Bulletin Mensual de Statistique, Ministère du Plan, June 1969.
- 3) Report of UNITCHAD (Union of Employers) on average income in eleven occupational categories.
- 4) Data from Chadian Development Bank on age and income distribution of borrowers in 1968, 1969 and 1970.
- 5) Overseas Business Reports, U.S. Department of Commerce, Basic Data on Chad, July, 1969.
- 6) Personal interviews with bankers, businessmen and government officials.

The terms to the house buyer for a potential HIG program in Fort Lamy will probably be as follows:

Interest	9% to 9½%
Term	25 years
Down Payment	10%

Several sources of information on income distribution in Fort Lamy use the following categories: less than CFA 15,000; 15-25,000; 25-50,000; and over 50,000. All income data gathered includes only Chadians, thus excluding most of the expatriate population earning

more than 50,000 CFA* per month.

The Chadian Development Bank (BDT), the principal mortgagee in Fort Lamy, requires as a rule of thumb that the final cost of a house be roughly thirty times the monthly income of the purchaser. This rule of thumb is consistent with guidelines generally acceptable in other countries. Thus, based on the probable HIG terms and BDT income requirements, unit costs and the monthly required payments could be calculated as follows:

Table 1

CFA

<u>Monthly Income by Category</u>	<u>House Unit Cost (X30)</u>	<u>Less 10% Down Payment</u>	<u>Mortgage</u>	<u>Monthly Payment (CFA)</u>
15,000	450,000	45,000	405,000	3,600
25,000	750,000	75,000	675,000	6,000
50,000	1,500,000	150,000	1,350,000	11,800

Table 2

US \$

<u>Monthly Income by Category</u>	<u>House Unit Cost (X30)</u>	<u>Less 10% Down Payment</u>	<u>Mortgage</u>	<u>Monthly Payment (\$ US)</u>
55.00	1,650.00	165.00	1,485.00	\$13.00
91.00	2,730.00	273.00	2,457.00	\$22.00
182.00	5,460.00	546.00	4,914.00	\$43.00

*Exchange rate CFA 275 = US\$1.00

Although the BDT requires a potential borrower to allocate one-third of his monthly income for housing, this is generally considered to be too high. A monthly payment ranging from 20% to 25% of his income^{1/} is considered normal in most developing countries and this assumption will be used here.

In order to cross-check the validity of this assumption, the monthly payment is calculated as a fixed percentage of income and then compared to the actual required payment in Table 3.

Table 3

US \$

<u>Monthly Income of Wage Earner</u>	<u>% of Income for Housing</u>	<u>Ability to Pay</u>	<u>Actual Payment</u>
55.00	20%	11.00	13.00
55.00	25%	14.00	13.00*
91.00	20%	18.00	22.00
91.00	25%	23.00	22.00*
182.00	20%	36.00	43.00
182.00	25%	45.00	43.00*

The above table shows that a potential homeowner in all three income ranges would allocate about 25% of his monthly income for housing in order to participate in the HIG program (marked with asterisk). Twenty per cent might be acceptable, particularly if

1/ NOTE This refers to income of wage earner. Most family incomes in Fort Lamy are higher but statistics were not available on family income.

it could be proved that there are other sources of income within the family group.

Conversations with individuals and public officials, including the Minister of Planning, plus data obtained from various sources (see list of contacts and sources), have indicated the following market information: Wage earners with monthly incomes below CFA 15,000 (US\$55,000) simply do not have sufficient income to make a substantial (for them) monthly payment. To back up that statement, the BDT has made only 2% of its housing loans in 1968 and 1969 to wage earners in that income group.

The next highest income group, CFA 15-25,000 (US\$55.00 to US\$91.00) has sufficient incomes to support a mortgage debt and therefore could participate in a very low-cost housing program, particularly if the program includes some sort of government subsidy or self-help element. The third income group, CFA 25-50,000 (US\$91.00 to US\$182.00) is in a more normal income range for the HIG program.

In order to determine the potential number of units to be built under the proposed program, it is necessary to know the number of wage earners in each income group. Table 4 shows the number of wage earners and "others" in several income ranges in Fort Lamy. As mentioned earlier, only Chadians are included.

Table 4

<u>US\$</u>	<u>CFA</u>	<u>Private Firms (C of C)</u>	<u>Government</u>	<u>Total</u>	<u>Other</u>	<u>Total</u>
55.00-91.00	15-25,000	1,338	1,581	2,919	200	3,119
91.00-182.00	25-50,000	567	679	1,246	100	1,346
over 182.00	over 50,000	64	211	275	50	325

The above column marked "other" includes the self-employed, merchants, professionals and all other income earners whose exact income is difficult to determine. This is an estimate only, backed up mainly by observation. According to the BDT loan policy, this group usually does not qualify for a BDT loan since the "check-off" salary deduction system is not applicable.

To cross-check the figures on employees of private firms, another source of information was secured -- a report by UNITCHAD. This smaller survey conflicted somewhat with the Chamber of Commerce study. Whereas the percentage number of wage earners in the CFA 15-25,000 income group in both reports was consistent, there was an obvious discrepancy in the CFA 25-50,000 income group. The UNITCHAD report had 148 in this income group out of a total of 6,690, while the Chamber of Commerce (C of C) report showed 567 out of 13,689. Our simplistic conclusion is that the correct figure is somewhat between the two. However, we are using the higher figure, taking into consideration that this income group has and will increase, that probably

all firms were not surveyed, and that new firms will be initiated in Fort Lamy prior to completion of the proposed project.

There was no way to cross-check the government figures, and it is assumed that they are correct.

The number of wage earners in each income group has already been estimated in Table 4. However, for a variety of reasons, not all would participate in the program. First, there are those people who have an adequate home and do not need or want a new home. Secondly, there are those people who do not place a priority on housing and prefer to save or spend on other items, such as a car, education, entertainment, etc. Thirdly, some people will not like the design, location, or some other such factor.

To determine the number of people who now have adequate housing, it should be noted that the BDT made 1379 loans in 1968, 1969, and 1970 to individuals whose incomes varied between CFA 11,000 and 60,000, which is more or less the same income group being considered for the HIG program. It is safe to assume that most of these people would not participate in the HIG program, yet they have been included in the income grouping as shown in Table 4. There is no accurate way of determining the actual number of Chadians who need and can afford housing under the HIG program.

A conservative estimate might be that 10 per cent of the total in each income group would participate in the HIG program, i.e., are potential purchasers.

C. Market for Potential First Project

Two sections of the first project could be built as proposed in the interim report: 100 units with an average cost of US\$2,500 and 150 units at about US\$5,000.^{1/}

Table 5

<u>No. of Units</u>	<u>Average Cost US\$</u>	<u>Totals US\$</u>
100	US\$2,500	US\$250,000
150	US\$5,000	US\$750,000
250	US\$4,000	US\$1,000,000

If 10 per cent of each income group as computed in Table 4 want and can afford to participate in the potential HIG project, a comparison can be made between the potential buyers in each income group and the proposed number of units for that group.

^{1/} This assumes that unit cost and mortgage are the same. To total out a US\$1.0 million mortgage, US\$2,500 and US\$5,000 plus a 10 per cent down payment should be computed, giving a unit cost of US\$2,777 plus US\$5,555 respectively.

Table 6

<u>US\$ Income Range</u>	<u>US\$ Average Unit Cost</u>	<u>Qualified Persons in Each Range</u>	<u>10% Potential Participants</u>	<u>No. of Units Proposed</u>
55 - 91	2,500	3,119	312	100
91-182	5,000	1,346	135)) 150
over 182	5,000	325	33	

According to the above tables, there would be no problem in marketing the US\$2,500 units. For each unit, there are over 30 qualified persons and three potential participants. However, the margin is much thinner for the US\$5,000 units, particularly considering that the number of qualified persons computed for this income level was optimistically taken.

IV. POTENTIAL PROJECT SPONSOR

The BDT was founded in 1952. Its scope of operation includes the granting of industrial, agricultural, and housing development loans. In 1970, 22 per cent of its loans were made for housing (See Figure 3).

The main sources of funds for the BDT are the Chadian Central Bank and the European Development Fund, who both make loans at low interest rates (5 to 10 per cent).^{1/} The relatively short terms of these loans of 5 to 10 years do not permit the bank to make the long-term loans for housing.

^{1/} The Caisse Central de Cooperation Économique also provides some financing.

The BDT permits only local Chadian contractors to build houses financed by the bank. The effect has been that 80 per cent of all loans are for construction of low-cost, improved mud-brick (pote pote) houses. Construction has been of single detached units, built one at a time. The bank provides the construction financing on a piecemeal basis to the mortgagor, which in turn permits the contractor to buy materials and pay his labor costs as construction develops. The Chadian contractors are not set up for large scale projects, nor are they able to secure the necessary line of credit for large-scale construction as are the French contractors.

Originally BDT loans were made for purchase of land as well as construction. However, this policy was changed several years ago, and now all applicants for housing loans must have clear title to the land as a prerequisite for the loan.

The BDT terms to the home buyer vary from 5 to 10 years. The interest rate is 5 to 6 per cent per annum, depending on the size of the loan, plus an administration fee of $2\frac{1}{2}$ per cent. This makes an effective interest rate of $7\frac{1}{2}$ to $8\frac{1}{2}$ per cent. The bank has a strict lending policy as follows:

- 1) A loan cannot amount to more than 30 times the monthly income of the applicant.
- 2) The applicant must agree to allocate at least one-third of his monthly income for the monthly payments, which determines the term of the loan.

3) In order to insure repayment of the loan, there is the following policy:

- a) For government employees, the salary deduction "check-off" system is required.
- b) For employees of private firms, the employer must co-sign the note.
- c) Self-employed persons do not qualify.

The result of this policy has been that most recipients of the loans are government employees, which limits the scope of operation of the bank. However, a real plus factor is that there are, for all practical purposes, no delinquent loans.

The bank's operations are not unsubstantial. The total number of housing loans in 1970 was 635, amounting to an investment of US\$810,000. However, the most important aspect of its housing policy is the income group benefiting from the bank's loans. Figures 1 and 2 point out very clearly that well over 50 per cent of the loans in 1968, 1969, and 1970 were to wage earners making US\$37 to US\$144 monthly. The bulk of the loans in 1970 were about US\$1,000, which demonstrates again the income level the bank is reaching.

The BDT is the only institution in Chad with considerable experience in social interest housing. Their programs are designed to meet the needs of low middle income families, and their collection record is excellent. There does not seem to be any other institution in Chad which could qualify as a non-profit sponsor for the proposed

HIG program. The BDT would need considerable U.S. technical assistance and would need to add several staff members before undertaking a HIG project.

Figure 1

BDT 1970 Housing Loan Portfolio

<u>Type of Loan</u>	<u>No. of Loans</u>	<u>Amount CFA</u>	<u>Average Loan CFA</u>	<u>US\$ Equivalent</u>
Short Term (1 yr)	60	10,000,000	166,000	600.00
Medium (1-5 yrs)	516	141,000,000	273,000	1,000.00
Long (5-10 yrs)	<u>59</u>	<u>72,000,000</u>	1,200,000	4,300.00
TOTALS	635	223,000,000		

Figure 2

Income Distribution of Borrowers for Housing Loans - BDT -

<u>CFA Monthly Income</u>	<u>1968</u>		<u>1969</u>		<u>1970</u>		<u>US\$ Monthly Income</u>
	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>	
Less than 10,000	17	3	9	2	6	0.9	36.00
11-20,000	178	34	133	26	195	28.8	37-72.00
21-40,000	180	34	186	37	240	35.5	73-144.00
41-60,000	69	13	89	18	109	16.3	145-216.00
61-90,000	22	4	34	7	45	6.6	217-324.00
91-150,000	32	6	23	4.5	46	6.7	325-540.00
More than 150,000	16	3	18	3.5	23	3.3	Over 540.00
Income not determined	<u>15</u>	<u>3</u>	<u>12</u>	<u>2</u>	<u>13</u>	<u>1.9</u>	Income not determined
TOTALS	529	100	504	100	677	100	

Figure 3

BDT Total Loan Distribution

<u>Type</u>	<u>%</u>	<u>CFA (thou.)</u>	<u>US\$000</u>
Agriculture	45.82	460,816	1,672
Artisan/industrial	10.07	100,586	365
Commerce/transp.	13.37	134,512	490
Building/construction	22.19	223,342	812
Small equipment	6.78	68,408	248
Automobile	<u>1.77</u>	<u>18,108</u>	<u>66</u>
TOTALS	100.00	1,005.762	3,653

V. CONSTRUCTION INDUSTRY

A. Contractors and Methods

There are several large foreign construction companies working in Chad which have been responsible for the construction of almost all large-scale construction, including the airport, the Presidential Palace, a new hotel, etc.

We met with representatives from one French firm, SATOM, to evaluate their capability as a potential contractor on a HIG project. The main SATOM office is in Paris but they have field offices throughout Africa. They provided detailed information on their past experience, which includes housing projects in Africa, other than Chad. SATOM would definitely be interested in both the architectural design, and engineering and construction phases of a housing investment guaranty project in Chad. They have the

capability to do competent work; however, a HIG project constructed by SATOM or any of the large French contractors in Chad would be expensive.

As mentioned earlier, there are several small Chadian contractors building houses for the Chadian Development Bank and also working as subcontractors to the French firms on larger projects. It might be possible to develop a lower-range HIG project in Chad, using essentially the same system as the BDT. Under this system, the BDT advances funds to the contractors as the work progresses and makes periodic technical inspections of the work, using a private engineer under contract to the Bank. The houses constructed under this system are often built from the traditional mud bricks (sun-dried), but with important improvements over the traditional method of building mud brick housing in Fort Lamy. Under the traditional system, the exterior walls are not protected from the heavy rains, and the roof-design does not include overhangs to provide necessary water protection. The traditional roofing material is wood poles covered by woven fiber mats and then covered with mud. The traditional house in Fort Lamy does not stand up well in the heavy rains, and complete collapse is a frequent occurrence. Even when the house does not completely fail, major repairs and rebuilding are required almost every year after the heavy rains. For this reason, there is a strong feeling within the

office of the President and within the U.S. Embassy that the traditional type of construction would definitely not be acceptable for a HIG project.

We are in agreement with this position. However, we believe that further technical study is needed to determine just what construction system can best be used to produce an acceptable house in the US\$2,500 range. Several alternatives were discussed during the survey visit:

Alternative No. 1 - Improved Mud Brick Houses (similar to those built by the Chadian contractors for the BDT)

The improvements over the traditional mud-brick houses include metal roofs with overhangs to protect the walls, cement grout (stucco) over the mud bricks to keep out moisture, concrete floors, plumbing, toilets, and electricity. Preliminary information indicates that a 70 M² house of this type costs about US\$2,500.

Alternative No. 2 - "Core" Houses

"Core" houses could be built, using modern materials (fired brick or concrete block walls, concrete floor, metal roof) and including water, electricity, and sanitary facilities. The core houses would initially be quite small, but it would be designed for future expansion by self-help as the homeowners' incomes increase.

Alternative No. 3 - Stabilized Earth Blocks

A variation on Alternative No. 1 could be to use stabilized earth blocks (CINVA RAM) to reduce costs. Success on this type of project has been sporadic. There are several successful projects in Africa and Asia, but there have also been several failures in Latin America.

The final "solution" to the problem of constructing a US\$2,500 house may well involve a combination of the alternatives suggested above.

The construction of houses in the US\$5,000 range would be by more conventional methods, i.e., pre-selected bidding by local construction contractors and a lump sum contract. Construction materials would probably include metal roofs, concrete block, or fired brick walls (with stucco) concrete and tile floors and water, electricity, toilets and showers.

All construction materials except sand and gravel are imported, usually from Europe, and their normal shipping time is from 2-4 months. Some items might be purchased from nearby countries since import duties may total 60% of European material costs. Efforts should be made to have import duties eliminated on an AID project to reduce costs to the home buyers.

Maximum effort should be made for on-site fabrication of certain items, such as pre-cast concrete sinks, toilets, etc.,

for the lower range houses. A low volume automatic block machine might also be set up. Also, consideration should be given to on-site final cutting and forming of corrugated metal roofing. This would allow importation of rolled sheet metal, thereby reducing initial costs and shipping costs. On-site fabrication of some items would also produce jobs, and perhaps create some permanent small industries.

B. Water System

The water system for the city of Fort Lamy consists of five main deep wells and a distribution system in the central area, which is supplemented by many small, privately dug shallow wells on private lots. The private wells are usually contaminated.

C. Waste Disposal System

The waste disposal system for the city consists mainly of septic tanks and cesspools. Some sewage is also dumped directly into the Chari River. In some areas, chamber pots are dumped in open fields, and in others, pit latrines are also used.

D. Basic Construction Materials

Most construction materials are imported over long distances by road, rail and riverboats. The three most common routes are (1) Pointe Noire-Bangui-Fort Lamy, 1800 miles; (2) Lagos-Fort Lamy, 1200 miles; and (3) Benoui-Buruta-Garoua-Fort Lamy, 1300 miles.

- 1) Cement is all imported, usually from Europe, and is very expensive. (See attachment for typical material cost.) Several companies keep a stock of cement and the cost varies according to supply and demand.
- 2) Sand and gravel is locally available.
- 3) Clay is available locally and a local company, CONABA, produces over 5000 fired bricks per day.
- 4) Steel is imported from Europe.
- 5) Wood is not available near Fort Lamy and is imported and expensive (about the same as steel for structural uses).

E. Construction Material Cost

Attachment #4 shows three typical BDT house plans with detailed cost estimates prepared by Chadian contractors and checked by the BDT engineer. The BDT does not have a "standard" approved plan although many of the houses are similar in design and construction. We have labeled the three typical plans in Attachment #4 as BDT plans A, B and C for this report.

Plan A (100 M²+) is in the upper BDT range, constructed of "modern" materials; fired brick walls, cement stucco exterior, metal roof, bath and kitchen, at costs of about US\$6800 without land.

Plans B (85 M²+) and C (95 M²+) are constructed of more "traditional" materials (mud-brick walls) but with important improvements over the traditional way of building. Plan B has interior

bath with fixtures but no kitchen. The Plan B house costs about US\$3500 without land.

Plan C house provides space for future interior bathroom, but neither kitchen nor bath is included in cost estimate. Plan C house costs about US\$3000 without land.

In both Plans B and C cooking is done outside in the courtyard and latrines are used in the Plan C house.

Attachment #5 gives the SATOM (French construction company) corrected cost estimate on the BDT 100 M² house (Plan A). The Satom estimate is higher and reflects the increase in material costs from December 1969 (date of BDT estimate) to February 1971 (SATOM estimate). According to SATOM, the Plan C house would now cost about US\$9500 without land.

F. Construction Financing

Construction financing is available from local banks if the contractor selected for a project is one of the large established foreign firms. Special arrangements would have to be made if one of the smaller Chadian firms were to construct a HIG project.

VI. INITIAL HIG PILOT PROJECT

Housing is not the highest priority development activity for Chad. However, a small successful housing program could complement other development activities as suggested during the meeting with President Tombalbaye.

The market information gathered during the survey indicates that there is a fairly large group of middle income Chadians, including government employees, professionals and private and public sector management personnel who badly need decent housing and could afford to pay for it, if long-term credit were available. A second larger group which also needs better housing and could pay for it consists of lower middle income people employed as civil servants, clerks, teachers, and skilled workmen. A large portion of the income of both groups now goes for rental housing and for constant repair and rebuilding of their mud-brick (pote pote) houses.

The approach to a HIG program in Chad could be to develop a modest "pilot" project through the BDT, with two sections serving the needs of these two groups. A larger, more ambitious program could be developed later, based on the experience gained during development of the pilot project.

A. Location of Pilot Project

As a result of our discussions with Chadian officials and private professionals, a site has been tentatively identified for a potential HIG project in Fort Lamy, designated as Cuvette St. Martin. (See Attachment #2) The site is centrally located close to the city center on land which has been reserved for some time by the GOC. The potential problems with this site are typical for any site in Fort Lamy -- the site is low and flat with potential

drainage problems and the soil is not stable (both city-wide problems). Corrective measures for both problems would add to the total unit cost of each house. On the positive side, the Cuvette St. Martin site is in an excellent location in relationship to the city center and employment areas. There is probably no better site in Fort Lamy for the proposed pilot HIG housing project.

There are apparently some very important socio-cultural considerations in selecting a site for any housing project in Fort Lamy, as a result of the existing pattern of development whereby the population of the northern half of the city is Moslem and the southern half is non-Moslem. The FCH team has no recommendation on this aspect of site selection.

B. Number of Units and Price Range

The first project should include two sections corresponding to the groups mentioned in Section III (C), Table 6. We would suggest a total of about 100 units in the US\$2,500 range for Section #1 (low income) and 150 units in the US\$5,000 range in Section #2 (middle income). The total HIG pilot project would be 250 units at about US\$1.0 million. This program could be expanded considerably over a five-year period upon successful completion of the first phase pilot project.

C. Architectural and Engineering Work

If this potential pilot project is approved, the architectural work could be done by local private professionals under contract to

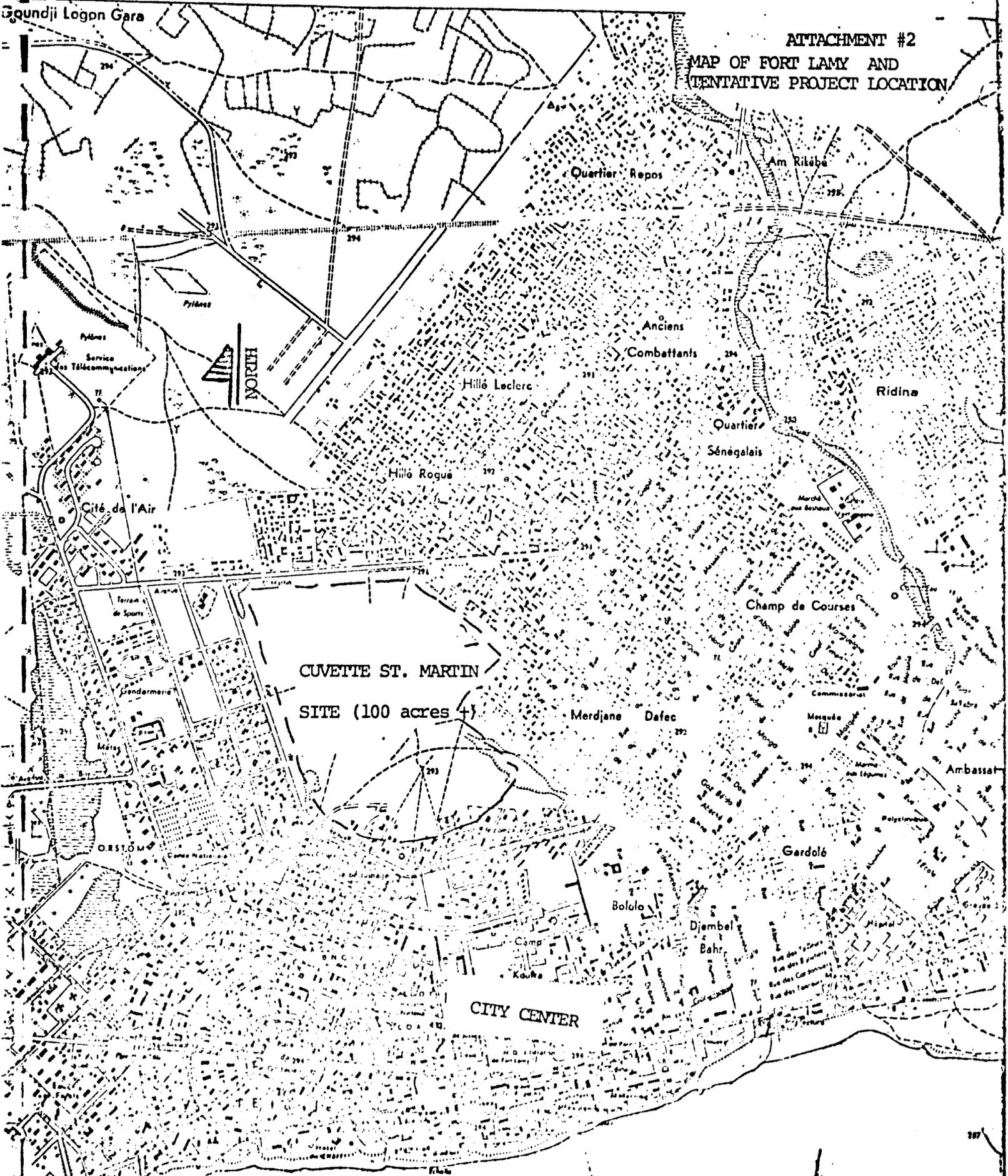
the sponsor. One of the several French-owned construction firms, which also provide architectural and engineering service, could do this work. Apparently, there are no Chadian professionals available, although more discussion is needed on this point. In any case, AID would need to provide a great deal of technical backup in all phases of a HIG project in Chad.

D. Co-op and Homeowners Association

We would recommend a homeowners association or housing cooperative for any HIG project in Chad to help maintain and improve the project after occupancy. This would be especially important to help solve some of the chronic problems caused by heavy rains in Fort Lamy, such as home repair, clogged drainage ditches, drinking water problems, etc. A housing co-op would also provide a way for homeowners to provide special community services and to encourage democratic participation in community problem solving.

Logon Gara

ATTACHMENT #2
MAP OF FORT LAMY AND
TENTATIVE PROJECT LOCATION

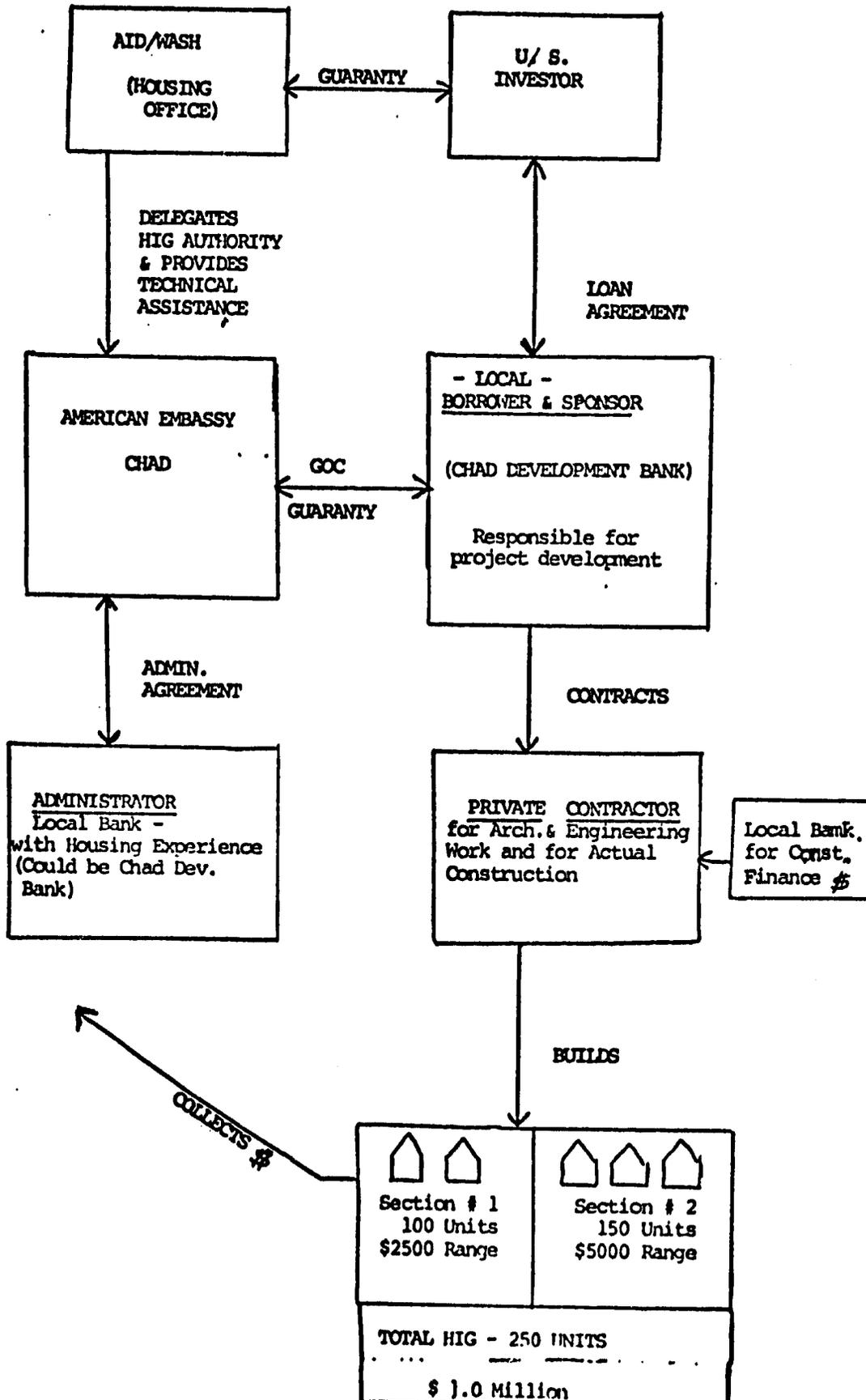


CUVETTE ST. MARTIN
SITE (100 acres +)

CITY CENTER

CHARI
River

PROPOSED HIG PROJECT -- CHAD



COST ESTIMATE/BDT PLAN A
 (100 m² house)

DEVIS ESTIMATIF : "CELE A 100 M²"

DESIGNATION DES COUVRAGES	UNIT U.	QUANTITY QUANTITE	UNIT PRICE PRIX U- NITAIRES (CFA)	TOTAL PRICE PRIX TO- TAL
Fouilles en rigoles descendues à 0,50 FOUNDATION DITCH	M3	10,400	500	5.200
Béton de propreté CONCRETE (FINISHED)	M3	0,880	10.000	8.800
Béton armé : Longrine, poteaux en élévation, chaînage général	M3	5,517	40.000	220.680
Maçonnerie en fondation : briques artisanales hourdées au ciment	M3	5,780	6.000	34.680
Maçonnerie en élévation : briques artisanales hourdées au mortier de ciment de C,20	M2	137	1.200	164.400
Maçonnerie en briques de C,10	M2	52	600	31.200
Enduits extérieurs au mortier ciment	M2	175	120	21.000
Enduits intérieurs au potopoto	M2	730	100	73.000
Maçonnerie marche escalier y com- pris la chape	M3	0,225	15.000	3.375
Remblai sous dallage	M3	24,800	600	14.880
Béton de forme de C,C8 7'épaisseur	M3	8,180	10.000	81.800
Chape	M2	102,240	550	56.232
Ménisseries persiennes métalliques				
1 porte persiennée 1'0/2'10 2,940				
1 " " " 0,80/2'10 1,500				
16 fenêtres 120/120 8,640				
12 fenêtres 60/120 0,480	M2	17,740	12.000	164.880
17 portes isoplans	U	7	12.000	84.000
Charpente bois 3 fermes	FCITTAIT			50.000
Couverture toile galvanisée 6/10	M2	117	1.450	169.650
Plafonnage contre plaqué	M2	102	1.250	127.500
Planche de rive	mL	13,60	600	8.160
Ventilation plafond, métal déployé et buses	U	12	1.200	14.400
Fosse septique 5 personnes	U	1	60.000	60.000
1.1. Puisard 100 descendu à - 5m	U	1	85.000	85.000
1 Colonne douche receptrur ciment	U	1	12.000	12.000
1 Lavabo, glace porte serviette et tablette lavabo	U	1	31.000	31.000
1 Evier et paillasse en béton	U	1	70.000	70.000
1 W.C. 1'anglais avec abattant	U	1	26.000	26.000
1 Badigeon chaux sur murs	M2	75	150	11.250
1 Peinture huile	M2	75	300	22.500
1 Fom sur plafond	M2	102	300	30.600
TOTAL partiel à reporter.				1789.720

Continuation Cost Estimate BDT Plan A

DESIGNAGNATION DES COVRAGES	U.	QUANTI TE	PRIX UNITAIRE	PRIX TOTAL
ELECTRIC WORK Reports				1.789.720
Electricité				
FLUORESCENT TUBES 2 tubes fluor de 120	U	2	8.500	17.000
LAMPES 6 lampes pendantes	U	6	5.000	30.000
WALL OUTLETS 6 prises de courant	U	6	4.000	24.000
WIRING Ligne de répartition y compris boîtes dérivation	mL	30	500	15.000
TOTAL			CFA →	1.875.722
				U.S \$ 6800

ESTE LE PRESENT DEVIS ESTIMATIF A LA SOMME DE UN MILLION HUIT CENT SOIXANTE QUINZE MILLE SEPT CENT VINGT DEUX FRANCS.

2.000.000

Cette construction comprend :

- Une semelle filante en B.A
- Chainage général en B.A à hauteur des linteaux
- Toutes les menuiseries sont m' alliques y compris les : cadres des portes isoplanes
- Electricité
- Sanitaire complet.

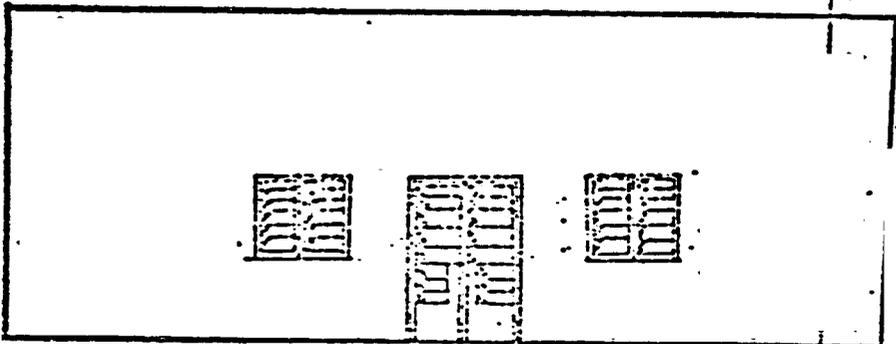
Construction sans sanitaire : 1.619.722

Construction sans sanitaire ni Electricité : 1.575.722

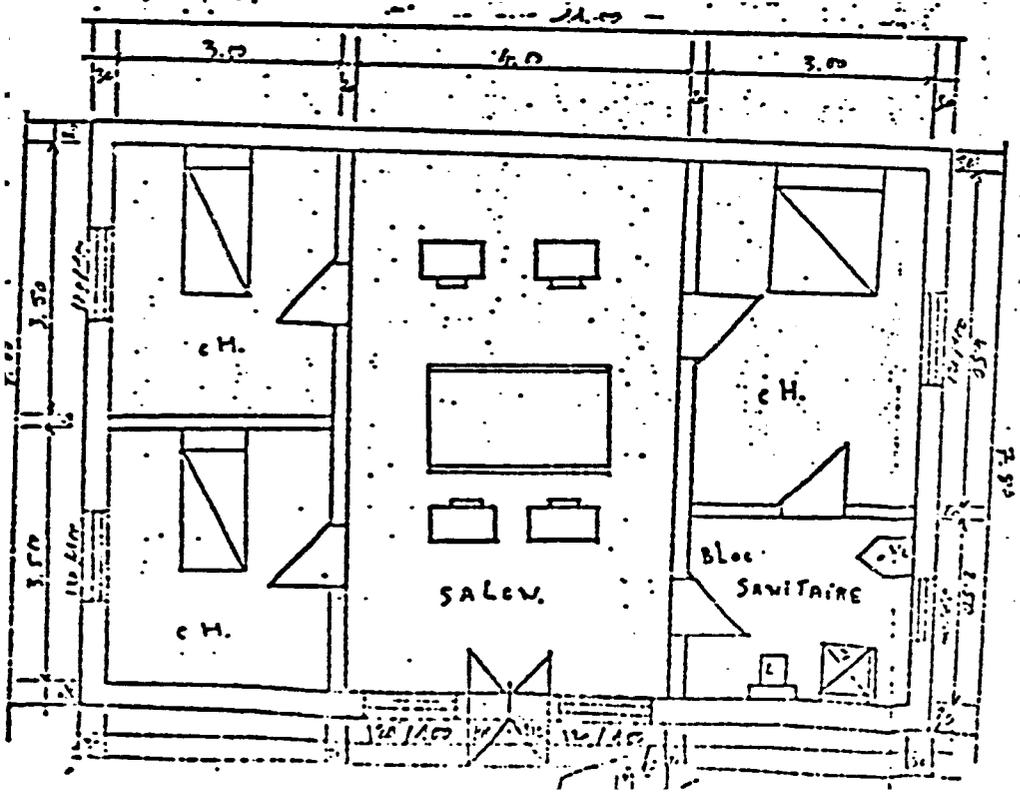
Construction sans Electricité seulement : 1.792.722

Majoration à prévoir : 4 %

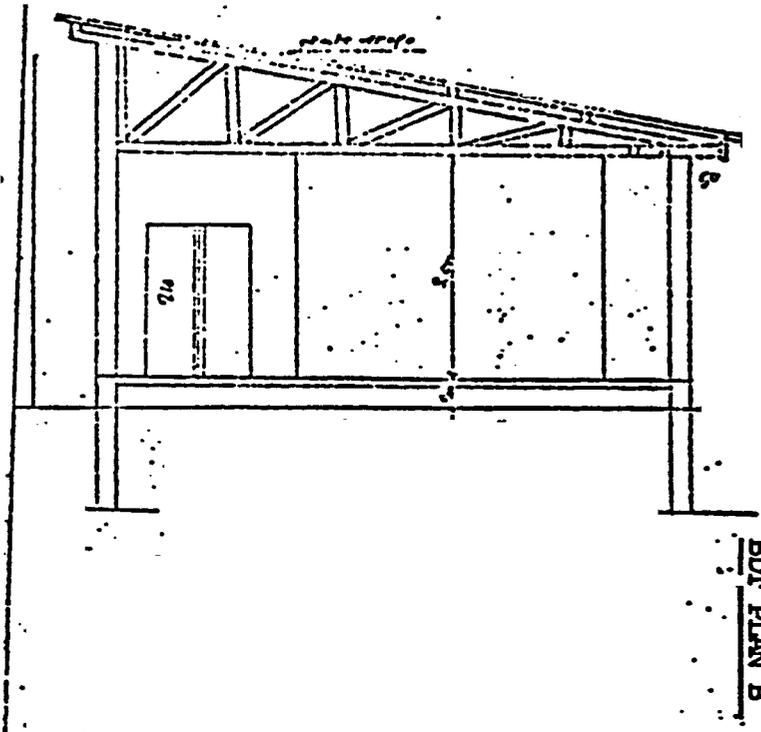
FACADE



PLAN



O - E 3/4



PROJET D'UNE VILLA

A

TROIS CHAMBRES

PROPRIETE DE

ENTREPRENEUR MOUTAR.
BARKA.

PLAN - FACADE - COUPE

ECHELLE 1/500.

972,994 CPA or US\$3,500

85 M² (mod brick)

TYPICAL BDT HOUSE

ATTACHMENT #4/ Page 4

COST ESTIMATE/BDT PLAN B
(85 m² house)

DEVIS ESTIMATIF

POUR LA CONSTRUCTION EN SECTEUR DE MADAME KITCHO
SUZANNE à FORT-LAMY

NOTE

FOUNDATIONS - FIRED BRICK ~~WALLS~~
WALLS - MUD BRICK
METAL ROOF

	QUANTITY	UNIT PRICE (CFA)	TOTAL
1-Fouilles en rigoles descendue de 0,60 dans le sol et de 0,40 de large 35x40x0,60x0,40=	m3 2,735	500=	4.368 Frs
2-Maçonneries de fondation les briques cuites de 0,35 de large, soulevée de 0,20 par rapport à l'axe de la route, se trouvant face cet terrain, maçonnerie s'apposée avoir une hauteur de 0,90.. 25x40x0,35x0,90=	m3 11,166	6.000	66.796
3-Remblais de sable de rivière de 0,20 ép. 10,40x7,20=	m3 14,976	600	8.985
4-Béton de forte de 008 épaisseur dosé à 200 kg de ciment pour 200 litres bri-cailion, 400 litres de sable 74,900 x-008=	m3 5,990	10.000	59.900
5-Maçonnerie en briques crues de 0,30 ép. 35,40x4,25x5,25 = 120,500 reduire 2.....	m2 127,500	600	76.500
6-Maçonneries crues de 0,30.....	m2 51	350	17.850
7-Enduits ciment sur grillage métallique..	m2 127,500	600	76.500
8-Enduits potopoto sur murs intérieurs....	m2 250	150	36.000
9-Chape dosées à 450 kg de ciment pour 1m3 de sable.....	m2 74,800	550	41.144
10-Charpente bois couverture en tôles gal. 6/10 10,20 x 4,30=	m2 29,640	1.500	134.460
11-Plafonnage contreplaqué 4,4/m ép.....	m2 74,800	1.200	89.760
12-MÉNAGERIES PERSIENNES BOIS ROUGE de 0,30 d'épaisseur au.			
1 porte de 140/210.....	2,960		
5 fenêtres 120/100.....	6,000		
1 fenêtre 000/040.....	0,240		
Portes isoplanes sur cadre métallique.....	U 5	12.000	60.000
3- 1 fosse-septique 6 personnes.....	I 1	60.000	60.000
Puissard descendu à 8 m. de 1 m. Ø met. U	I 1	85.000	85.000
Lavabo.....	U 1	25.000	25.000
1 glace 1 porte serviette 1 tablette L.U	U 3	6.000	6.000
repeteur douche en ciment bonde sp. U	I 1	16.000	16.000
avec colonne de douche			
U,C abattant matrées plastique.....	U 1	25.000	26.000
4- Enduits ciment sur murs de la douche sur 2 mètres de hauteur 17m2 x 600= 10,200) reduire enduits potopoto 1'x 150.....)		7.650	7.650
Construction d'un regard maçonné.....	forfait		6.000
Radigeon à la chaux int. et extérieurs.....	m2 367,500	150	55.125
Peinture à l'huile sur menuiseries	m2 52	300	15.600

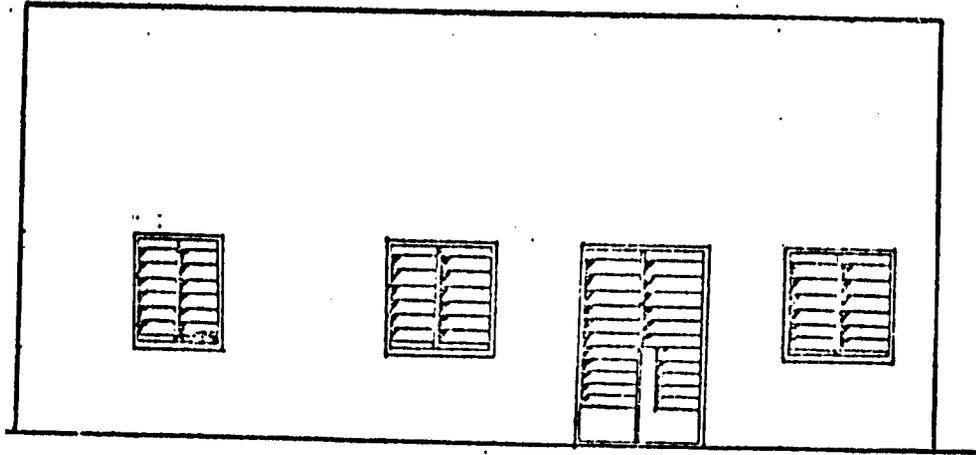
Vu pour accord
le Client

L'entrepreneur

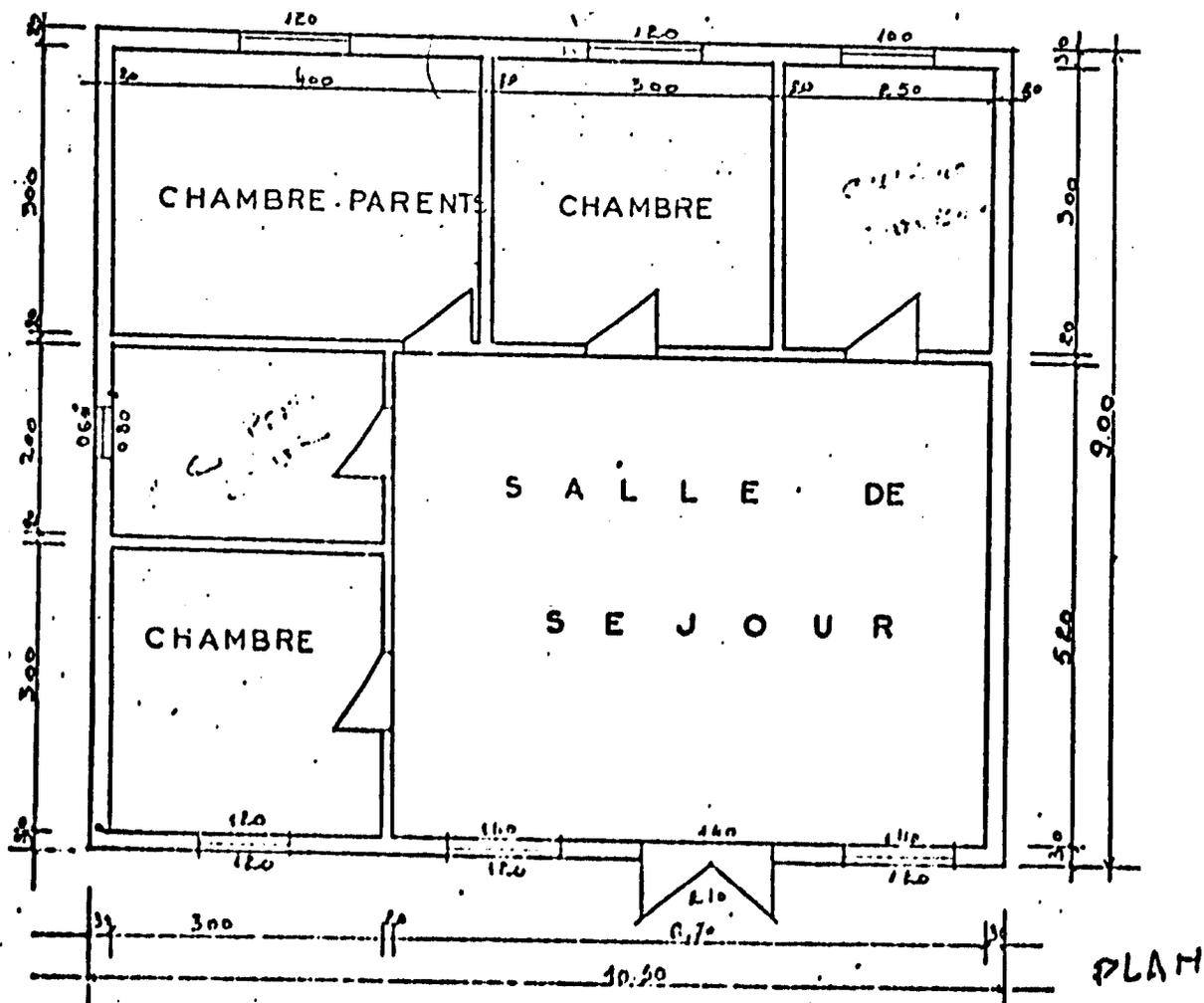
25.12.1969
972.894
\$ 3500 U.S.

BDT PLAN C

Typical BDT House
95 m² (mud brick)
823,550 or US\$3,000
December, 1969



F A Ç A D E



LEVIS ESTIMATIF-

COST ESTIMATE/BDT PLAN C
(95 m² house)

CONSTRUCTION EN SEMI-DUR POUR LE COMPTE DE MME
BARNIERE ANOUA BERTEE A FORT-LAMY.

Désignation des ouvrages	MATERIALS	UNIT	QUANTITY	UNIT PRICE	Total PRICE
		U	Quantité	P.U. CFA	
3' Fouilles en rigoles descendues à 0,60	FOUNDATION DITCH	m3	10	500	5.000
Maçonneries cuites de 0,35 de large	FIRE BRICK FOUNDATION	m3	11,250	6.000	67.500
Remblai de sableux de 0,20 d'épaisseur	FILL	m3	17,200	600	10.320
4' Maçonneries de briques crues en élévation de 0,30 épais.	CRUDE BRICK WALLS EXTERIOR	m2	131	600	78.600
Maçonneries de briques crues pour cloisons intérieures	CRUDE BRICK WALLS INTERIOR	m2	67	350	23.450
Enduits potopoto pour extérieurs	MUD PLASTER EXTERIOR	m2	131	100	13.100
Enduits potopoto pour intérieurs lissés	MUD PLASTER INTERIOR	m2	277	150	41.550
Charpente en bois et couverture en toles galvanisées	WOOD ROOF SUPPORT AND METAL ROOFING	m2	100,500	1.500	150.750
Plafondage en contreplaqué de 4 m/m épaisseur	FINISH CEILING	m2	86,200	1.200	103.440
3' MENUISERIES METALLIQUES		m2	11,820	12.000	141.840
Portes isoplans	DOOR	U	5	12.000	60.000
Badigeon à la chaux	WHITEWASH	m2	265	150	39.750
2' Peinture à l'huile sur menuiseries 2 couches	PAINT	m2	55	350	19.250
Béton de forme au sol simple bricaillon bien damé de 008 d'épaisseur avec chape de 003 d'épaisseur au dessus bien lissé	FLOOR (ROUGH FILL WITH CEMENT)	m3	6,900	10.000	69.000

CFA 823.550

823,550 U.S.

résumé le présent détail estimatif à la somme de **HUIT CENT VINGT TROIS MILLE CINQ CENT CINQUANTE FCS.**

VU POUR ACCORD :

LE CLIENT.

Bertie

Accord de 30 12 1969

Fort-Lamy, le 27/12/69

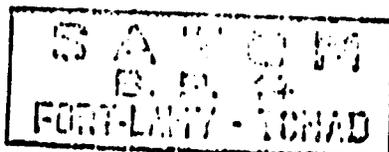
L'ENTREPRENEUR.

ABDIA...
E. B. A. K.

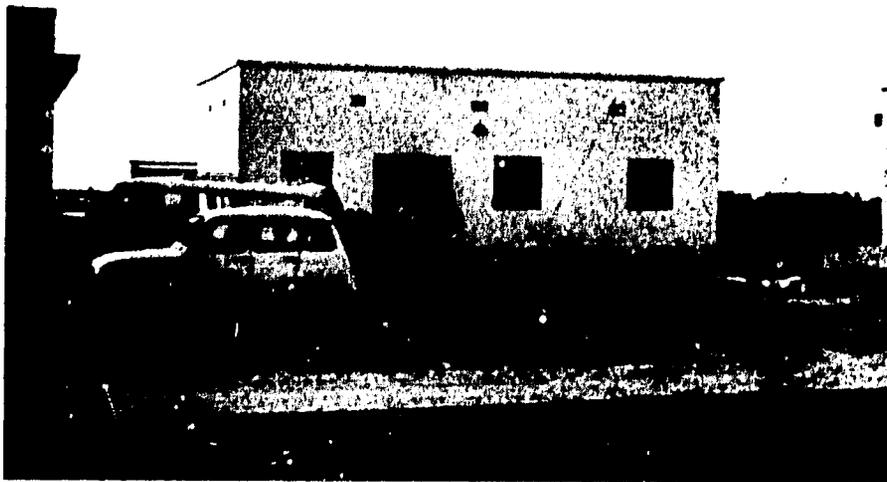
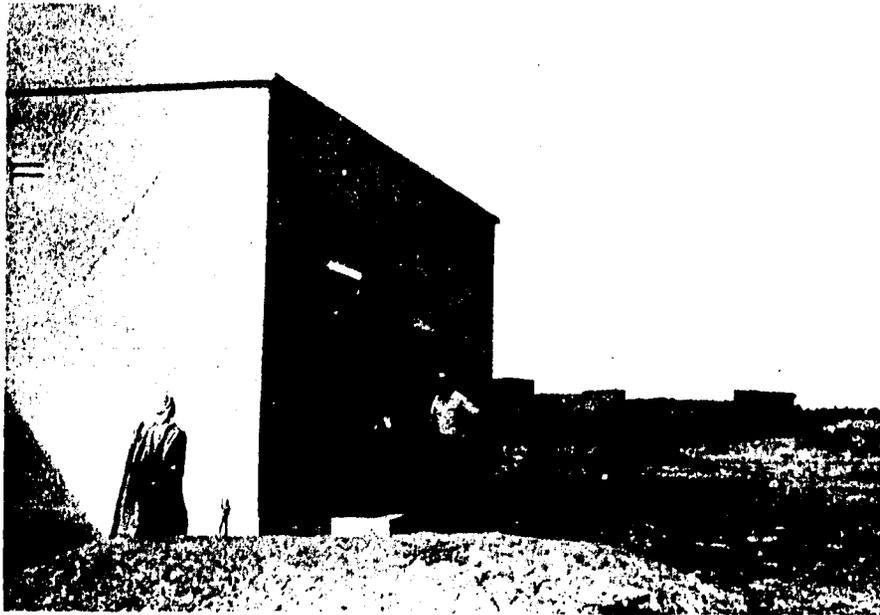
SATOM COST ESTIMATE/BDT 100 m² housemaison individuelle type 100 m²

Designation des ouvrages	U	Quantité	Prix Unitaire	Prix Total.
Fouilles en rigoles	m ³	10,400	550	5720
Béton de propreté	m ³	0,880	20000	17600
Béton armé	m ³	5,917	45000	266265
Plafonnage en fondation	m ³	9,780	11000	107580
Plafonnage en élévation briques de 0,20	m ²	137	2420	331540
Plafonnage - briques de 0,10	m ²	92	1380	126960
Enduit extérieur au mortier de ciment	m ²	145	450	65250
Enduit intérieur au potspoto	m ²	330	200	66000
Plafonnage marche escalier	m ³	4,0325	20000	65000
Rembalai sous dalle	m ³	24,800	350	8680
Béton de forme de 0,08	m ³	8,180	20000	163600
Chape	m ²	102,240	730	74635
Meneuses persiennes métalliques				
2 portes persiennes (4,620 m ²), 8 fenêtres (9,120 m ²)	m ²	13,740	22000	302280
7 portes isoplans	u	7	16000	112000
Charpente 3 fermes			60000	60000
Couverture Toile galvanisée 6/10	m ²	117	1500	175500
Plafonnage contreplaqué	m ²	102	1250	127500
Planche de rive	ml	14,60	600	8760
Ventilation plafond, métal déployé et buses	u	12	1200	14400
Fosse septique 6 personnes	u	1	130000	130000
1 puits Ø 100 descendu à - 8 m.	u	1	105000	105000
Colonne douche récepteur ciment	u	1	15000	15000
Lavabo - glazé - porte serviette et tablette lavabo	u	1	31000	31000
Evier et pailleuse en béton	u	1	30000	30000
WC à l'anglaise avec abattant	u	1	28000	28000
Badigeon chaux sur mur	m ²	475	150	71250
Peinture huile	m ²	75	350	26250
Form sur plafond	m ²	102	300	30600
2 tubes fluor de 120	u	2	10000	20000
6 lampes pendantes	u	6	6000	36000
6 prises de courant	u	6	6000	36000
ligne de répartition y compris boîte de dérivation	ml	30	600	18000

le 10 Février 1971.



2617.270
US \$ 9500



Recent housing by Chadian Development Bank, Fort Lamy - US\$3,000 range
(See BDT Plan C, Attachment #4).

PARTIAL LIST OF CONTACTS

President Francois Tombalbaye
Ambassador Terence A. Todman
Georges Diquimbaye - Minister of Plans
John Blane - Counselor of Embassy
Keith Wauchope - Counselor Officer
Gaston Pallai - Director of BTCD (bank)
Claude Regaud - Director of BIAO (bank)
Lerno - Loan Officer BDT (bank)
Basile Yannoulis - Counselor/Commercial Clerk
Michel Nyangbet - Secretary General of Chamber of Commerce
de Joue - Advisor Chamber of Commerce
Jean List - SATON (construction company)
Luis Adolphe Mear - Ministry of Plans
Felix - Land Registry Office
Ferret - Architect
Herhel - Ministry of Public Works
Lamotte - Director, Catastry Service
Charles Steedman - Director, Peace Corps
Antoine Abtour - Builder (Lebanese Consul)
Konate - CONABA (brick factory)
L. Aboulafia - COFICOMEX (French financing company)
Robert Browstein - COFICOMEX (French financing company)
Chevalier - Lawyer
Chuck Graden - AID Regional Director - Yaounde
Jim Wilson - AID Regional Desk Officer - Washington
Mahamet Yakouma - Mayor, Fort Lamy