

The Implementation of a Low-income Housing Plan in Jordan

An Urban Development Housing Project:
Manara-3

Ribhi Ibrahim Al-Sabban

Civil Engineer
Ministry of Public Works and Housing, Jordan

Summary

The annual contribution of construction sector to the gross national product (GNP) of Jordan is 8%, which shows the great role that sector occupies in Jordan economy.

In Jordan, one of the top priorities of the government is the housing issue, especially for low-income people. That issue is the responsibility of Ministry of Public Works and Housing (MPWH)¹ through Housing and Urban Development Corporation (HUDC), a governmental corporation that is related to the ministry.

This paper presents the successive development stages of Manara-3, a low-income housing project, which was one of the Urban Development Projects (UDP) series, namely UDP-3. Manara-3 is demonstrated as an example to show the governmental efforts to provide housing projects for low to moderate-income beneficiaries.

The project development stages, which will be detailed throughout this paper, include the design stage, the production stage and the property management stage.

Introduction

The population of Jordan had increased from 586,200 at 1952 to reach 4.2 millions at 1994. Also Jordan had experienced three migration periods, at 1948 and 1967 from the West Bank, and the last one at 1990 from Kuwait before the Gulf War.

Due to the mentioned normal yearly increase of population and to the mentioned migrations, the number of dwellings increased from 37,900 in 1979 to 836,000 in 1996 (a 40% increase).

Consequently, major housing policies, programs and projects have been conducted by the public and the private sectors over years and yet, due to the scale of demand for new shelter and services, especially for low to moderate-income inhabitants, substantial housing problems are still existing and waiting to be solved by mutual efforts from the public and the private sectors.

¹ For all the abbreviations used in this paper, see the list at the end of this paper.

Aim of the paper

By following the stages of Manara-3 project, the aim of this paper is to view the general housing efforts and tasks the public sector, in particular, carries the responsibility to afford and tries his best to achieve and implement.

On the other hand, as this paper will demonstrate, the technical, administrative and financial staff of MPWH and HUDC, involved with UDP, gained much experience from UDP-1 and UDP-2. This added innovations were fully utilized in UDP-3 and will be the basis to pre-handle future projects to come like UDP-4, a project in its preliminary stage for the time being.

The Project

Manara-3 is both a site & service (S&S) and a schools & community (S&C) project of UDP-3 set of projects. It was designed to accommodate 3,750 inhabitants. Its area is 0.25 km². It is located at southeast of Amman (Jordan's capital), and it includes, besides housing units, other complementary elements like: schools, clinics, community buildings, commercial and industrial properties.

The project was funded as follows:

- 20% by the government of Jordan.
- 80% by the World Bank

An important issue to mention, usually when any government project is funded completely or partially by a loan from foreign institutions, then the government is restricted to assign a private consultant to supervise such project and that was the case for Manara-3.

The role of HUDC was to design the project and to assign a site-staff which worked as a link between the consultant and HUDC.

The Actors of the Project

- The Board of General Directors: MPWH.
- The Client: HUDC.
- The Jordan Government and the World Bank as the financiers of the project.
- The Consultant: Associated Consulted Engineers (ACE).
- The Contractor: Engineering Technical Contracting Company (ETCC).

Country Background

Jordan's location is at the southwestern part of Asia. Its population is 4.2 millions with an average annual live growth of 2.8%. About 76% of the population live in urban areas, 23% in rural areas and 1% in desert areas (as nomadic Bedouins).

Jordan is bounded on the north by Syria, on the south by Saudi Arabia, on the east by Iraq and on the west by the West Bank.

Jordan's capital is Amman which has a population of 1.5 millions. The currency of Jordan is the Jordan Dinar (JD) with 1JD=1.43 US\$.

Jordan's main topographic feature is a dry plateau running from north to south and rises steeply from the lowest point in the region, about 400 m below sea level, (the Dead Sea) to reach a height of between 610-915 m above sea level. This plateau area includes most of Jordan's main cities and towns.

Jordan's weather marks seasonal contrasts ranging from summer: dry and hot to winter: cold, rainy and occasional snowstorms.

Jordan has few natural resources that contribute to the revenue item of the yearly budget. These resources include mainly cement and phosphate mining industry.

Due to the mentioned lack of natural resources, the government mostly depend on taxes, fees and external loans from Arabic and foreign institutions. These loans' interest item in the budget (called the General Debt Service) is very high and increases from year to year. That is a big problem issue for the government, firstly it affects very badly the citizen's economic situation, and secondly it restrains the government efforts to carry its economic programs and plans.

At the same time, in Jordan it is frequently referred to that the middle class has almost disappeared due to the very bad economic situation. What really exists is a very rich class and a poor class. That is why it gradually becomes necessary for the

government to provide low-income housing projects knowing that most of the people cannot afford their basic life requirements.

Design Stage

Project Organization

The organization plan of Manara-3, shown in figure (1), consisted of the Board of General Directors (MPWH), the Client (HUDC), HUDC Design Department, HUDC Beneficiary Affairs Department, HUDC Supervision Department, ACE as the consultant and ETCC as the contractor.

The design of the project was done by HUDC Design Department and ACE was responsible for technical control, supervision and site inspection of the project. ETCC was the contractor to implement the project.

HUDC Beneficiary Affairs Department carried out marketing, rehabilitation and handling the beneficiary affairs at site during and after construction of the dwellings.

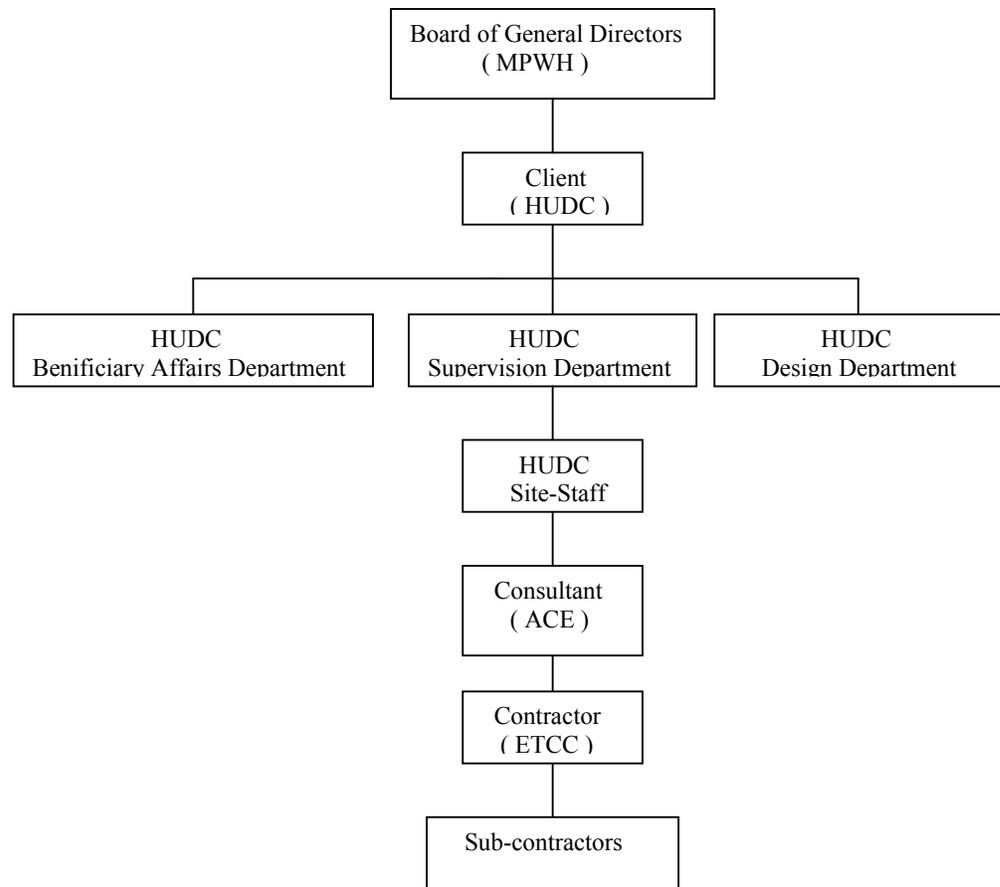


Figure (1): Project Organisation Chart.

Project Planning

The timetable, shown in table (1), was anticipated for UDP-3.

Table (1): Project Planning Chart

Stage	1993	1994	1995	1996	1997	1998	1999	2000
Identification Report	■							
Feasibility Study	■							
Loan Preparation		■						
Loan Approval		■						
Land acquisition		■						
Survey			■					
Design			■					
Tendering and contract			■	■				
Supervision				■	■	■	■	■
Construction				■	■	■	■	■
Beneficiary selection							■	■
UDP-4 Study								■

Below is a short view of the planning-phase items of the timetable; other items to be viewed in later related phases.

Identification Report

From January to April 1993, an identification report proposing the projects of UDP-3 was prepared, reviewed and submitted by the government to the World Bank for approval. The World Bank approved the report by June 1993.

Feasibility Study

The feasibility study took place during the following six months and was approved by the World Bank on November 1993. The study provided a concise digest of the main proposals for evaluation and consideration by the potential funding parties. It included an examination of several alternatives in order for the project plots to be affordable to each group target income range with a cost recovery mechanism evaluation of the proposed schemes.

Site Selection and Purchase

The site selection followed the feasibility study. The pre-selection investigations were the task of HUDC. These investigations took into consideration that the project site to be suitable for low to moderate-income beneficiaries housing requirements; for example, site accessibility. The selection was done by June 1993.

Project Survey

A physical and social survey was achieved which considered topographic suitability, availability of public infrastructure services, affordability and future marketing aspects.

Project Design

It was the task of HUDC Design Department to prepare the design of UDP-3. The design was completed by mid 1994 as scheduled to take an advantage of the loan negotiation period. The preparation of tender documents followed, so the tendering process was ready by the time the loan agreement was signed.

Plot Design

The plots were designed to meet the marketable considerations in Jordan; for example, the room size was 3.2 to 3.5 m² which is the average accepted size in Jordan. The configuration of the plots has been chosen with a frontage to depth ratio not less than 1:2 to permit an efficient size planning and some degree of flexibility. 60% of the plots were designed to accommodate for 3 rooms, a kitchen and a bathroom with a gross floor area (GFA) of 80 m². The rest 40% had a GFA up to 110 m².

Community Configuration Standards

Specific site layout alternatives were tested. The alternative chosen achieved a high proportion of productive land with appropriate cost.

Market plots were located on the wider roads while the beneficiary plots were designed on the local internal elements. Plot sizes and forms were located on the suitable slope and ground conditions to minimize the earthwork item cost. The design considered a balance of plot types and sizes to each level of the target population.

Design Details

(1) For the site & service (S&S) part of the project: the following elements were designed:

- A. Residential and commercial plots with a total area of about 195,000 m²:
 332 vacant residential plots.
 174 core-unit residential plots.
 25 vacant commercial plots.
 174 core-shop commercial plots.
- B. Footpaths and roads with a total area of about 58,800 m².
- C. Water network of a diameter 12.5 to 200 mm with a total length of 11,800m.
- D. Sewage network of a diameter 150 to 300 mm with a total length of 11,400m.
- E. Electricity and telephone network.
- F. Screen and retaining walls.

(2) For the schools & community (S&C) part of the project: the following elements were designed: a primary school for boys, a secondary school for boys, a primary school for girls, a secondary school for girls, a health centre, a community centre, a woman’s training centre and an emergency centre.

Project Financing

As shown in figure (2), the main direct financiers of UDP-3 were the Jordan Government and the World Bank. Also the Jordan Central Bank supported the local banks to provide low-interest housing loans for the project beneficiaries. The beneficiaries, in turn, contributed monthly re-payments to HUDC.

Finally, HUDC held the task to pay for the recoverable and the non-recoverable expenditures of the project shown in table (2).

Funds for the project were set aside according to the agreement with the World Bank. The overall summation of the loan was 7,500,000 US\$.

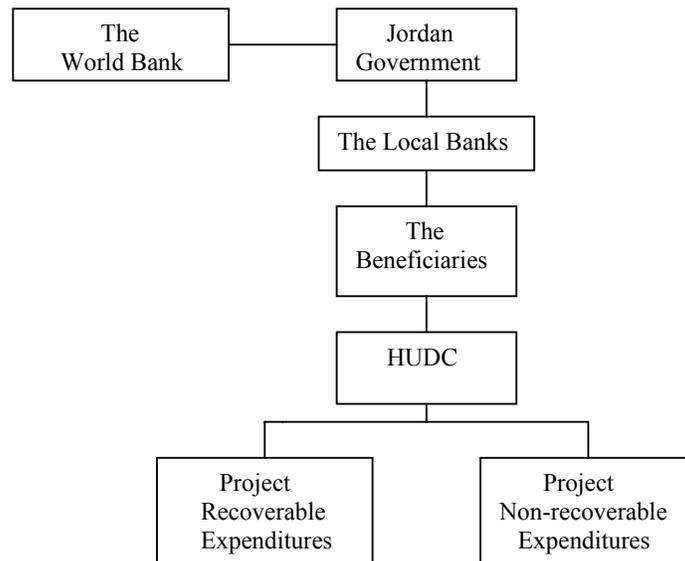


Figure (2): Project Financing Chart.

Budget and Budget Control

Pricing and Cost Estimation

The items considered, when preparing the pricing and the cost estimates, were direct cost recovery, complementary cost elements, market conditions for each scheme and above all the affordability throughout the target income group range.

Pricing Policy

The factors considered for deciding the appropriate pricing of the disposable elements were:

- Achieved land, contract pricing, market values at time of disposal, feedback from UDP-1&UDP-2 over appropriate levels and form of on plot development.
- Production of 5% as an overall margin of price over cost.
- Market price plot for housing, commerce and industry to provide surplus.
- Different pricing and cross-subsidation of beneficiary plots that will enable access to the project by the target group.
- Full cost recovery of on-plot development and building loans.
- Use of higher down payment in relation to specific higher income levels.

Cost Estimation

The cost estimation included land, infrastructure, management, design, supervision and survey fees. Also, physical contingencies were added. A series of iterations were evaluated to produce a match among the range of income, the type of plots and the accommodations to be provided.

Finally, values for market housing, industrial and commercial plots were based on market assessments set at a cautionary level.

Affordability Cost Recovery

A fundamental objective of the program was to meet the housing needs of the target population at an affordable cost without resort to a public subsidiary approach. 77% of the overall project cost was expected to be recovered from the beneficiaries by plot sales (excluding technical assistance and equipment).

Component Recovery

The project components cost recovery was planned as shown in the following table:

Table Project Cost Recovery Plan

Component	Recovered through
Land and service	Plot charges
On-site infrastructure	Plot charges
Off-site infrastructure	User charges and property taxation
On-plot development	Plot charges
Education and health facilities	Government transfer
Project implementing agency	Government transfer
Line of credit material building loans	Beneficiary loan repayments
Capital equipment	Not recovered
Technical assistance	Not recovered

Cost Recovery Mechanism

The surplus created in certain sectors was used to offset deficiencies of affordability in a number of crucial areas through cross-subsidisation. Nevertheless a significant proportion of income was to be recovered from the services, relevant ministries, utility agencies and the Greater Amman Municipality.

For each income group the assumption made was that not more than 30% of the family income can be consumed for mortgage repayments with 10% deposit and at an interest rate of 10% on the loan repay-back over a period of 16 years.

Information Technology

Intensive training programs were made to improve management practices for HUDC UDP-3 related staff. These programs included attending of construction management courses inside and outside Jordan, visiting similar projects sites, analyzing full documents of UDP-1&UDP-2 and attending computer courses.

Unfortunately, the design and supervision of UDP-3 were executed manually although a private consultant was involved in the project. The project communications were through the telephone and the fax to arrange for a meeting or send or receive a message, etc. The consultant considered using computerized supervision techniques as an extra cost that will affect his low profits because he was chosen on the lowest-price basis.

Up till now, HUDC uses computerized techniques for Financial, Planning and Beneficiary Affairs Departments only.

Efforts are made by HUDC engineers to incorporate the computer technology for other HUDC departments such as supervision and design departments. Fortunately, these efforts are encouraged and supported by HUDC high administrators but it seems these efforts will take a long time basically due to financial aspects.

Conclusions

The feed-back process is a very important factor in the design stage. The innovations gained by HUDC staff from UDP-1 and UDP-2 was utilized in UDP-3.

One of the learned lessons is that reducing the time and cost of the project can be enhanced by adopting clear definitions of the goals and preparing a precise listing of the requirements needed to achieve these goals.

Activating the computer role is a task for HUDC engineers to carry on. It is not an easy task but the challenge will be achieved especially by the efforts of all HUDC staff.

Production Stage

The process of tendering and contracting can be the greatest source of cost variations in a project. A great consideration is required at the time of tendering in relation to the economic climate and attitudes towards employment of foreign workers and contractors.

Conditions of the loan required competitive bidding and a high level of management skills.

Tendering and Tender Documents

Tender Invitation

As mentioned earlier, HUDC considered splitting the project into two separate parts as follows:

- Site and service (S&S) part contract no.16/95.
- School and community (S&C) part contract no.18/95.

As soon as HUDC Design Department prepared the design documents for both contracts, HUDC submitted the design to MPWH, which in turn reviewed and approved the design.

After that, MPWH informed the Governmental Tenders Department (GTD), which in turn published Arabic and English invitation-to-bid advertisements in two local newspapers for three consecutive days.

Tender Documents

The tender documents for each contract include the following:

- Invitation to bid advertisement.
- General instructions for the tenderers.
- MPWH Contract General Conditions.
- MPWH Contract Special Conditions which include forms of contract agreements and required guarantees.
- MPWH Buildings General Specifications (volumes 1&2/1986).
- MPWH Roads, Bridges and Culverts General Specifications (1991).
- Project Special Specifications.
- Bills of quantities.
- Drawings.

The Contract Special Conditions for each tender stated the following:

1. A security bidding bond of 56,000 US\$.
2. Tender guarantee is 5% of the total offer.
3. Insurance Against others 14,200 US\$ For each accident with unlimited no. of accidents.

4. Delay penalty 1430US\$/day but not to exceed 15% of the total offer.

The purchase of a complete set of the above set of documents was to be accompanied by a written application with a non-refundable price of 280 US\$.

The tenderer was required to fill the tender forms and submit the required bid bond. The bills of quantities were also to be filled for each item (in numbers and words). Every page was signed and stamped by the tenderer and finally the offer was put in a sealed envelop.

The submitted offer was to be in accordance with the instructions and the tender invitation and should not include any restrictions from the tenderer. The following information was to be submitted by the tenderer in his offer:

- The status the tenderer's company.
- The experiences of the tenderer.
- A price analysis for each item of the B.O.Q.

Questions by the tenderers, in case of misunderstanding or need of explanations, were to be submitted written to GTD at least 14 days before opening the envelopes so that the answers' sheets for all tenderers' questions were distributed to all tenderers before putting their prices and the sheets were considered as a part of the contract documents.

The tenderer was committed for his offer for 90 days. GTD, through its tenders' evaluation committee, had the right to neglect any offer not committed to the tender conditions and instructions. It also had the right to assign the contract to any tenderer that it sees fit without considering the lowest-price offer.

Bids Opening

Bids were opened on the assigned day in the presence of all tenderers' representatives. It was found that four contractors had applied for the S&S contract and seven for the S&C contract.

The following table illustrates the tenderers offers' prices and the percentage increase from the lowest price submitted.

Table 3 Tenderers Offers' Prices

Company	S&S	% increase	S&C	% increase
Engineering Technical Contracting Company (ETCC)	2,205,662	Lowest	1,753,673	Lowest
General Contracting Company (GCC)	2,406,299	9.1	1,947,737	12.2
Al-Massar Contracting Company (MCC)	2,607,543	18.2	2,087,699	20.3
Al-Ittihad Contracting Company (ICC)	2,800,504	27.1	2,160,781	24.5
National Contracting Company (NCC)	-----	-----	1,815,710	4.6
Ritt-Ser Contracting Company (RSCC)	-----	-----	2,447,534	41
Slovenia Cest Tehnica Obnova Company (SCT)	-----	-----	2,332,333	34.8
HUDC engineers' estimate	2,442,695	10.7	2,221,867	28

Technical Evaluation

GTD formed a technical committee to check and evaluate the submitted prices. The committee, after studying the offers, recommended ETCC for the award of both contracts. The committee's recommendation was based on the following reasons:

- ETCC is an MPWH pre-qualified contractor whose classification is 1st degree in both building and road construction.
- ETCC submitted the lowest price with 10%, 20% less than HUDC engineers' estimate for S&S and S&C contracts respectively which was considered to be acceptable by the committee.
- ETCC offer complied with the conditions and the requirements of the contract.

Contract Agreement

GTD submitted the committee's report to MPWH that approved it and officially informed HUDC to sign an agreement with ETCC following the official procedures.

After that, HUDC forwarded a letter of award to ETCC upon which ETCC submitted the bid good-performance bond and received back the bid security bond which was submitted by him previously. All bonds were submitted by ETCC in the form of bank guarantees.

Finally, after ETCC paid the required bid fees, the contract was signed between HUDC and ETCC.

Production Planning

According to the signed contract, the S&S and S&C projects were to be completed within 730 and 660 calendar days respectively starting from the client's order for ETCC to commence the works.

A site meeting was held during which HUDC, ACE and ETCC agreed on the starting and finishing dates as follows:

- S&S contract:
Starting date : 12-03-1997
Finishing date: 14-03-1999
Duration : 730 days
- S&C contract:
Starting date : 12-03-1997
Finishing : 23-12-1998
Duration : 660 days

Also, ETCC, upon ACE request, submitted the following:

- The two projects' plans for ETCC used the critical path method. The plans were reviewed and approved by ACE and HUDC.
- Detailed daily requests and schedules of site works.
- Weekly reports indicating his total available manpower and their distribution in accordance with site activities.

ETCC nominated the following technical staff for each project:

- A representative civil engineer with a minimum experience of 15 years.
- A structural engineer with a minimum experience of 10 years.
- A material engineer with a minimum experience of 7 years.
- A quantity surveyor with a minimum experience of 5 years.
- A land surveyor with a minimum experience of 5 years.
- A material technician with a minimum experience of 5 years.

The above staff was in accordance with the two contracts conditions and was approved by ACE and HUDC. ETCC also got the approval for his nominated electromechanical sub-contractors. Finally, ETCC started with mobilization and surveying then executing the other required works.

Quality Management

According to the contract, ETCC was submitting the following requirements during the execution of works:

- Preparation and providing the works items samples to ACE for approval before starting executing the relevant related items on site.
- Providing the catalogues and other relevant documents (if any) for the samples and for the structure services components within enough time to get the approval of ACE.
- All samples and catalogues were to be kept in HUDC site staff's office until the initial delivery of the works

Also, ETCC was submitting daily check requests of the finished works to ACE. All required material tests, surveying and layers compaction tests were done by ACE to insure that the items executed by ETCC were in accordance with the specifications of the contracts.

The performed tests included, to mention but a few, the Los Angeles Abrasion test, the plasticity index and the sieve analysis test for the base material (under the asphalt course for the roads). The yield tensile strength, the ultimate tensile strength and the ductility tests were done for the reinforcing steel bars. Concrete compression strength tests were made for the two projects concrete works.

ACE was submitting weekly and monthly work-progress and quality control reports to HUDC. Periodic meetings, at least once a month, included HUDC, ACE, and ETCC were held at site to discuss the progress of the works and any relevant related issues to that.

According to the contract, ETCC constructed a site laboratory to perform the required tests. For the tests which could not be done at site; for example, the asphalt tests then these tests were to be performed at Directorate of Laboratories and Reseaches (DLR) which is a governmental directorate related to MPWH because it was noted that if the tests were allowed to be performed in a private laboratory then the result of the test will be usually O.K because otherwise the private lab will lose his contract with the contractor.

Also, according to the contract, HUDC had the right to perform periodic quality control tests at DLR for random pre-tested succeeding items to check the quality of the site lab staff and the lab testing machines and instruments calibrations.

Economic Control – Budget Review and Reconciliation

The economic control issue for UDP-3 was done by ACE. Monthly reports prepared by ACE were sent to HUDC to insure that issue, and these reports were reviewed, discussed with ACE (for any modifications if any) and finally approved by HUDC.

According to the contract, the following items were checked to be fulfilled:

- The submittance of the security bid bond whose value was 56,000 US\$.
- The submittance of the good-performance bond whose value was 10% of the value of the two contracts.
- The submittance (after the initial delivery) of the maintenance bond whose value was 5% of the actual executed approved works.
- A retention whose value wae 10% of the approved value of each submitted invoice was deducted for invoice, but the accumulative retention, according to the contract, was not to exceed 5% of the the contract value. The retentioned money was paid back to ETCC after the initial delivery where it was included in the final payment for ETCC.
- The time limit to cash the payment was 60 days after HUDC’s approval of the invoice.
- The minimum value of each invoice was 214,000 US\$.

ACE was sending weekly and monthly reports of the quantities and values of the actual approved executed works. The draft of these reports were first done by ETCC.

The advanced payment by HUDC to ETCC was 10% of the contract value on the condition that ETCC submitted a bank guarantee of the same amount. The repay of the advanced payment was distributed over the first ten invoices submitted by ETCC.

ETCC was submitting the invoices together with statement of works to ACE to be reviewed and verified. If the invoice under consideration is approved by ACE, it was submitted to HUDC for final approvement. Finally, the invoice was sent to Ministry of Finance, via MPWH, so that its value was received by ETCC within the time limit mentioned above.

Diversion of the Production Plan

ETCC, which was executing other projects at the same time he was executing Manara-3, has been suffering a lack of liquidity which severly affected his cash flow plan. Consequently, he could not manage to follw the programmed time plan for the project.

ACE and HUDC drew ETCC’s attention to that issue through meetings and message correspondances. At the beginning it was difficult for ETCC to handle the situation despite the efforts that was supplied by him.

At last, a unique rare opportunity happened which enabled ETCC to overcome his problems. There was a foreign construction company whose local office in Amman has started its works recently, at that time, and this company was looking for a project as a starting point. When the office manager knew about ETCC’s problem in Manara-3, he offered ETCC to sign an agreement which stated that ETCC will be supported by money and supporting staff from this company to be utilized in the project. In exchange an agreed upon part of the projects’ profits will go to this

company. It was a sort of non-nominated joint venture, and the deal was accepted by ETCC and an agreement was signed between the two parties.

The above mentioned issue was informed orally to ACE and HUDC. HUDC orally approved this issue on the condition that ETCC was still solely holding the legal and contractual responsibility of the project towards the nominated sub-contractors and towards HUDC.

The oral approval of HUDC was for the sake of getting ETCC to manage his problems and the idea was to get the works finished with less time delay for the benefit of all parties and especially for the beneficiaries.

Finally, the works were finished at the end of 1999 with a time delay of six months which was considered an approved extension time for the project, and although ETCC's profit was not that much due to the reasons mentioned above, but things were much better if ETCC was to face the problems alone because then the high increase in the total cost will cause several bad consequences; for example, marketing delay which will severely affect the beneficiaries in the first degree and financing-related problems which will affect the subcontractors to a high extent.

Conclusions

The progress of works during the production stage depends mostly on the interaction and cooperation between the three parties: the client, the consultant and the contractor. The problems usually faced during this stage include lack of enough liquidity by the contractor side, time-progress delay and getting an acceptable level of works quality. These problems are not easy to handle, but with honest mutual efforts from all the parties problems eventually are solved one way or another because it is beneficial to all parties to finish a project with less time delay and less total cost especially if the project is a housing type because here there are other indirect parties like the beneficiaries and the commercial investors who are waiting to make such project of an alive nature.

Also, it is very important to realize that decisions taken during the early phase of the production stage, especially from the contractor side, have a high effect on the progress of works during the later phases of the production stage. That is why, it is essential for the contractor to employ a planning engineer at site even if this engineer is not required in the contract. In this case, the contractor may avoid later uncounted for losses by taking the right decision at the right time.

Property Management

The property management issue for UDP-3 is a very important aspect both for HUDC and for the projects' beneficiaries themselves. It helps, even in the design stage, the HUDC designers to take into consideration the issue of trying to obtain a design that will give good quality and, at the same time, economically-controlled project elements. Also, the other goal for HUDC when considering the property management aspect, was to keep the maintenance and running costs within an affordable level which is advantageous both for HUDC and the beneficiaries.

Life Cycle Economy

For UDP-3, it can be considered that life cycle economy started since the production stage had been finished. When ETCC had finished the projects' works, he requested ACE to inform HUDC to start the initial-delivery procedures of UDP-3.

Upon ACE's letter to HUDC which approved ETCC's request, HUDC formed a committee which included representatives of the following parties:

- MPWH.
- Directorate of Laboratories and Researches (DLR).
- HUDC Design Department.
- HUDC Supervision Department.
- ACE.
- Audit Bureau (MPWH unit).
- ETCC (as an observer only).

The committee, after inspection of the executed works and going through the projects' files, prepared a list of notes of ETCC works' discrepancies. The notes covered the following items: facades, painting, water network, sewage network, drainage pipes, electrical and mechanical works. As can be seen, the mentioned items were those relevant to property management aspect since other items; for example, the works under tiles surface level were covered by ACE through the quality control process during the production stage.

After ACE officially informed HUDC That ETCC had done the works which were listed in the committee's initial report, an acceptance report was submitted from the committee to HUDC. HUDC sent ETCC a letter approving the initial delivery of the projects. ETCC, upon HUDC letter, received back the good-performance bond and submitted a maintenance bond whose value was 5% of the value of actual executed works in accordance with the projects' specifications and as approved by HUDC.

Running Costs

Property Taxation Cost

For UDP-3, the households were assigned to pay fixed annual amount of property taxation. This amount was to be proportional to the value of construction as estimated by the tax officer.

Water and Electricity Costs

Water and electricity services were conducted to the dwellings through the Water and Sewage Authority and Jordan Electricity Company respectively. First, an accomplishment of certain minimal technical requirements were required then a formal signed permission by HUDC site staff was given to the individual dwelling, then upon that permission water and electricity services were connected to the respective dwelling. After that, the water and electricity costs are paid by the household directly to the above mentioned authorities through monthly invoices.

Waste Water and Sewage Costs

The waste water and sewage service was available through the provided internal plot pipe connected to the main sewage network system of the project. After getting the HUDC site staff written permission, the household was to link his plot pipe with the project network by establishing a proper manhole. After that, this service cost was included in the water voucher sent monthly to the household.

Heating Cost

Jordan is a Mediterranean country with cool to cold winter. Also, the project was located in a high region. That is why, heating was a very necessary service for this project. A central heating system installations were taken into consideration for the dwellings, but the connections to the system were made only by the households who can afford the costs of such system. For those who could not afford, portable gas, kerosine, or diesel stoves were used. The heating cost was not constant depending on the temperature and the household affordability.

Garbage Collection and Cleaning Costs

These services were under the charge of Greater Amman Municipality (GAM) which provided, distributed large garbage containers at certain locations all over the project, under took the garbage collection and monthly distributed garbage bags to the households. Also, GAM hold the responsibility for cleaning of the streets, pathways all over the year and removing the snow during cold seasons. In return, this service cost was included in the electricity invoices sent monthly to the households.

Maintenance Planning

Maintenance During the First Year

According to the contract, ETCC was holding the responsibility of UDP-3 maintenance for 12 months started from the day on which HUDC issued the certificate of initial delivery. For such purpose, ETCC submitted the following to HUDC:

- 3 copies of each catalogue and operation-instructions manual for each machine and instrument installed in the project.

- 3 copies of schedule of maintenance and spare parts necessary for each machine and instrument installed in the project.
- 5 copies of as-built drawings for the project structures and the underground services network.

At the end of the above mentioned ETCC-reponsibility maintenance period, formalities similar to those done prior to initial delivery were followed for the sake of final delivery. And finally, after ETCC executed the maintenance items required by the formed committee, HUDC issued him the certificate of final delivery upon which ETCC received back the maintenance bond which was in the form of a bank guarantee as all other bonds of the project.

Maintenance After The First Year

After the final delivery of UDP-3, the maintenance responsibility was divided between the households and the governmental institutions as follows:

The Governmental Institutions Maintenance Part

Greater Amman Municipality held the maintenance responsibility for the roads, pathways and the municipality community service buildings within the project area. Jordan Electricity Company held the responsibility to maintain the streets illumination, the external network and the project units electricity meters. The Water and Sewage Authority held the responsibility to maintain the project external water and sewage network. Other maintenance issues were related to the relevant ministries; for example, Ministry of Education, Ministry of Health and Ministry of Community Affairs held the responsibility of the education institutions, the health centers and the community buildings respectively.

The Households Part

The maintenance inside the residential and commercial units was the responsibility of the beneficiaries and the relevant investors. That included; for example, periodic roof water insulation, heating insulation by building block sandwich walls for those who were able to afford such building cost and other routine maintenance items usually required from time to time.

Connection to the Design Stage – the Feedback Process

After the end of the production stage, it is an important issue that the actual existing project-components running situation is backwardly related to the design aspects of these components respectively. This is done through the feedback process, because the relationship between the different stages of any construction project should not be considered as a 'linear' relation but instead considered as of a circular-nature type of relation. Since eventually, the essence of the construction management, throughout its developing stages, is that things should be related in order that the learned lessons and the gained innovations are applied at least in future projects.

For UDP series, and since HUDC Beneficiaries Affairs Department is still holding the residential-units administrative managing affairs until the final delivery of these units to the beneficiaries, so HUDC usually forms site teams that collect periodic data about the drainage structures, the dwellings structural components and other project components conditions. Meetings with Greater Amman Municipality and other related services authorities representatives are arranged to discuss the collected data. Follow-up maintenance programs are set in these meetings and these programs items are executed on site according to each authority affordability and sometimes a sort of cooperation between two or more authorities is done to achieve some maintenance required works. Also, the collected data for UDP-3 has been documented as an MPWH Library reference which serves as helping guidelines for the designers of UDP-4.

Conclusions

Obtaining a high quality and a low cost property has always been a major aim for designers and planners. Without considering the property management aspects, the previously mentioned aim will not be satisfied and on the contrary the results may be opposite to the sought goals which were set during the briefing and the design stages. Also, it is essential to consider the property management aspects in the early phase of the design stage because the ultimate goal is to relate the designed structure

to its future function and service which is basically the definition of property management.

Experiences

Through the implementation of UDP series, the Jordan government represented by MPWH and HUDC aims to meet the housing needs of low-income beneficiaries keeping in mind that future projects are still in need because the task is not easy to handle and it is of a long term nature. In these future projects, the original approach of UDP-1, UDP-2 and UDP-3 is replicated so that a revolving program is kept in track.

With the above mentioned overall view in mind, some of the experiences of UDP-3 are:

- The urgent need to modify the current building regulations to accommodate for four floors plus a roof instead of three floors plus one service room on top, because the current regulations are widely violated due to the increasing housing needs, further prohibited extensions are executed on the roof or in the setbacks.
- Redesign of the road retaining walls as an L-shaped footing instead of T-shaped to prevent the penetration of the footing into the private plot property, the latter imposed shifting the dwellings foundations inwards at positions where the dwellings had zero setback which caused an unpleasant change of the architectural design.
- Building larger capacity schools in future projects to accommodate not only the beneficiaries' children but also for children from the surrounding areas on the condition that Ministry of Education will participate for the extra cost. The idea was accepted by the ministry. This lesson was learned from UDP-3 since low capacity schools were constructed and it was found that these newly built schools formed centers of attractions for surrounding areas children, the issue which was not taken into account at the design stage.
- Factors other than the least-price basis must be considered when selecting the contractor or the consultant. One of the proposals, which are discussed on the top government concerning this issue, is to disregard the highest and the lowest offered prices and the price within accepted standard deviation from the new average is then chosen. But in general, it is agreed that some other factors must be taken into consideration; for example, whether the contractor has other big projects at the same time which may affect his planned work progress plan as was the case for UDP-3. Also, the contractor's turnovers, bank accounts and the issue of a reasonable price analysis supplied by the contractor should be considered.
- Earlier arrangements by the consultant and the client are needed to overcome the works delay and to limit the cost increase. Otherwise, the time will come when the things are out of hand and the problems are fastly propagating and the result will not be for the benefit of any party of the project.
- To activate the feedback to design stage issue. Site meetings and inspections including the client, the site staff and the consultant can be held after the delivery of works. The project components; for example, the heating system, the drainage structures, the painting and the roads ditches are now at work and referring to the relevant design items can be of great advantage especially for future projects. The advantages are fully utilized if the minutes of meetings are documented together with other technical observations made and the documents to be available as an MPWH Library reference to whom it may concern especially for future projects designers like UDP-4.

List of Abbreviations

ACE	Associated Consulted Engineers
BOQ	Bills of Quantities
DLR	Directorate of Labs and Researches
ETCC	Engineering Technical Contracting Company
GAM	Greater Amman Municipality
GCC	General Contracting Company
GFA	Gross Floor Area
GNP	Gross National Product
GTD	Governmental Tenders Department
HDM	Housing Development and Management
HUDC	Housing and Urban Development Corporation
ICC	Al-Ittihad Contracting Company
JD	Jordan Dinar
MCC	Al-Masar Contracting Company
MPWH	Ministry of Public Works and Housing
NCC	National Contracting Company
RSCC	Ritt-Ser Contracting Company
S&C	Schools and Community
SCT	Slovenia Cest Tehnica Obnova Company
S&S	Site and Service
UDP	Urban Development Projects
US\$	United States Dollar

List of References

- The Government of Jordan
1999 *The Budget Report*. Amman, Jordan.
- Habash, Jeries
1990 *MPWH Participation for the National Housing Strategy Preparation*. Amman, Jordan.
- HUDC Report
1999 *The HUDC Accomplishments (1995-1999)*. Amman, Jordan.
- Ministry of Planning Report
1993 *Economic and Social Development Plan in Jordan (1993-1997)*. Amman, Jordan
- MPWH Report
1993 *The Feasibility Study of UDP-3*. Amman, Jordan.
1999 *Public Housing Projects in Jordan: UDP-3*. Amman, Jordan.
- Söderberg, Jan and others
2000 *International Construction Management (Course Lectures Notes)*. Department of Construction Management, Lund University, Lund, Sweden.

Acknowledgements

At the end of this report, I want first to thank God for the ability he gave me to do such work. Then I want to thank the following parties:

- SIDA.
- The crew of Department of Construction Management of Lund University.
- The crew of HDM of Lund University.
- Mr. Jan Aldoson, my tutor.
- All ICM 2000 classmates.