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INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PERFORMANCE AUDIT OF

PAKISTAN: LAHORE WATER SUPPLY, SEWERAGE AND DRAINAGE PROJECT

April 12, 1974

Operations Evaluation Department

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PREFACE

IDA Credit 106-PAK to the Government of Pakistan was finally closed in July 1972 and the following report represents an audit of achievements under the credit against the objectives on the basis of which it was approved.

The valuable assistance provided by the Government of the Punjab, the Lahore Improvement Trust Water Wing and the Lahore Municipal Council is gratefully acknowledged.

Note: Currency Equivalent (Pakistani Rupees)

US\$ 1.00 = PRs 4.76 to May 1972, applied throughout this report.
(Following the devaluation of PR in May 1972,
US\$ 1.00 = PRs 10.90)

Abbreviations:

cusecs = cubic feet per second
gcd = gallons per capita per day
IMgd = million Imperial gallons per day
Mgd = million gallons per day

SUMMARY

In May 1967, IDA and the Government of Sweden jointly extended a credit to the Government of Pakistan, each for the amount of US\$1.75 million, to be lent to the Lahore Improvement Trust (LIT) to help finance a pilot project to rehabilitate and expand water supply, sewerage and drainage facilities in metropolitan Lahore. The project was initially conceived as the first portion - a five-year (1967-72) construction and rehabilitation program - of a Master Plan, prepared in 1964, by a U.S. consulting firm, Hydrotechnic Inc., of New York, and designed to serve 80% of the population of Lahore by 1981. However, in light of earlier institutional difficulties with water supply projects in Dacca and Chittagong (41-PAK and 42-PAK), IDA finally decided to reduce rehabilitation and construction works to a small initial part of the 1967-72 program, including only one pilot well center (instead of the five originally envisaged) which would have increased supply only in limited areas adjacent to the well. IDA's strategy was to concentrate the project on building within LIT an efficient utility organization that would be capable of undertaking larger works in a second stage project. About 40% of the IDA/SIDA credit was allocated for consulting services consisting of management assistance and engineering services to do detailed design of project works and to elaborate the long-term Master Plan for Lahore.

As a result of IDA's decision to reduce capital works to a mere start on a pilot basis, LIT apparently felt compelled, early in 1967, to build a number of scattered wells outside the project, evenly distributed throughout the city, which improved the supply situation in Lahore considerably beyond what IDA's project would have accomplished. The extent of LIT's "own" works, realized in August 1968 by an IDA supervision mission, required a major revision of the construction component appraised in 1967 in order to integrate it with LIT's own program and produce a coherent project within the framework of the Master Plan. The revisions resulted in an expanded version of the original project which included and supplemented LIT's own work and was planned as the first of two phases of a revised program to be completed by 1975. The technical solution for water supply, recommended in the Master Plan and adopted in the original project, was postponed because of doubts as to its suitability for Lahore. IDA accepted the traditional system of scattered wells continued by LIT, but made provisions for additional distribution works to absorb increased supply capacity. Revisions in costs and credit allocations led to significant increases in local currency costs and in the foreign exchange costs of consultants (75% higher than original estimates bringing the allocation for this item to 53% of the total credit), but due to lower sewer costs, the total amount of the credit remained unchanged. The revised project was scheduled for completion in December 1970 and the original closing date of the Credit, December 31, 1969, was postponed to June 20, 1971.

The revised project was almost fully completed and the credit finally disbursed in July 1972, a year and a half behind schedule, due to delays in contract awards and completion and in procurement of imported equipment. Total costs were 35% higher than the revised estimates due to higher local costs. The engineering consultants completed the detailed engineering for the revised project and prepared preliminary design for the second phase project, but could not effectively supervise construction or elaborate technical and economic alternatives for the intermediate phases or longer term programs of the Master Plan. A newly equipped water laboratory constructed under the project is operating satisfactorily, but the metering program provided for by the project ran into difficulties because of public resistance to metering and LIT's inability to make appropriate metering policies.^{1/}

The revised project has helped improve water and sewerage service in Lahore. Official estimates^{2/} indicate that water production in 1972 surpassed the 1967 forecast, but little progress was achieved in reducing unaccounted-for or wasted water still estimated at 40% to 50% of production. Between 65% and 70% of the population was served in 1972, a little short of the 75% forecast in 1967, and a 24-hour service has been achieved in parts of the city, while the rest receives a 16-hour continuous supply. Total connections in 1972 were 28% less than expected, and only 9% were metered as compared to a forecast of 18%. Sewerage service has become more efficient as missing links in the sewer system were filled. Some previously unserved areas are now covered by the system, but the proportion of population served is estimated at about 40%.

As agreed during the appraisal of the project, responsibility for the utility service was transferred, under an interim arrangement, from the Lahore Municipal Corporation to the semi-autonomous Lahore Improvement Trust. With the assistance of management consultants, a new organization was established within LIT - the Lahore Improvement Trust Water Wing (LITWW) - which has shown progress in administrative and engineering capabilities. However, the LITWW's uncertain status has produced a high turnover of personnel which interrupted continuity of management and limited the impact of the training efforts of the management consultants. Contrary to agreed objectives, LITWW's financial performance has remained weak due to the inadequacy of water and sewer rates, and to shortcomings in billing and collection, budgeting and accounting. The latter are partly due to inadequate performance by the management consultants in assisting LITWW to set up systems and procedures appropriate to local needs.

The performance of the engineering consultants, Nihon Suido, and management consultants, Booz, Allen and Hamilton, has been disappointing; the benefits to LITWW were disproportionately low compared to the cost (each

^{1/} Subsequently, a brief study, made in connection with a proposed second IDA project, raised serious doubts as to whether metering on the scale envisaged is economic in Lahore.

^{2/} Since water production is not metered at the source and over 90% of consumption is unmetered, these figures should be regarded as indicative only.

approximately US\$1.0 million equivalent and about 45% of IDA/SIDA credit allocations).^{1/} The shortcomings of the engineering consultants referred to earlier were due to their lack of experience in handling project work in a foreign country, inflexibility in planning and poor communication with LITWW because of their lack of proficiency in English. Their contract had to be discontinued and supervision of construction was entrusted after January 1970 to two engineering advisors who performed satisfactorily and gave training to LITWW staff. The management consultants made a rather limited contribution to LITWW's institutional development. Delays in accomplishing the tasks envisaged in their original contract and shortcomings in implementing operational systems and financial procedures were due partly to the consultants' over-theoretical approach and sophisticated methods to the neglect of simple methods and practical on-the-job training better suited to local requirements.

Despite delays and remaining weaknesses in financial management, our main conclusion is that, thanks to intensive efforts of the local authorities and IDA, the revised project has largely attained the objectives of meeting Lahore's urgent water supply requirements and of improving water and sewer service. A functioning utility has been established which shows promise for improving its capabilities in operations and finances. At the suggestion of IDA, the Government of the Punjab recently proposed changing the status of LITWW into an autonomous authority.

Our analysis of the reasons for the drastic revision of the 1967 project suggests that IDA's original strategy proved infeasible because it fell short of resolving the dilemma posed by the Lahore situation, namely, how to balance LIT's limited institutional capabilities to undertake a major project with the urgent demand for increased water supply throughout Lahore. IDA's approach was perhaps overly influenced by the earlier experience in Dacca and Chittagong and did not recognize the dilemma in Lahore sufficiently to consider alternate, more flexible solutions. By focussing narrowly on the progress of the project, IDA's early supervision missions, which due to staffing constraints were limited to one man, did not detect the extent of the works undertaken by LIT outside the project. Further, the well center concept turned out to have been applied too rigidly to the conditions of Lahore and indeed, in view of Lahore's resources and requirements, it may not have been the most economical and technically effective solution. In the appraisal of a second project (suspended in 1971 due to the political situation in Pakistan) the concept was abandoned in favor of the traditional scattered wells system.

The reasons for the difficulties encountered in implementing institutional improvements suggest that the institution-building effort, despite the emphasis given to it, was not sufficiently planned to take into account local needs and capabilities and was inadequately supervised until late in 1968. Finally, the high cost and disappointing performance of both engineering and management consultants indicate that a better selection might have been made to ensure better project preparation and implementation.

^{1/} This is 8 percentage points less than the allocation agreed in the revision of the project; the savings were due to the suspension of Nihon Suido's services and continuation of supervision construction by less expensive advisors

PAKISTAN

LAHORE WATER SUPPLY, SEWERAGE AND DRAINAGE PROJECT

Performance Audit Basic Data Sheet

Technical Report No. TO-5516
(April 25, 1967)

President's Report No. P-541

Credit No.: IDA 106-PAK

1. Borrower	:	Islamic Republic of Pakistan
2. Sub-borrower	:	Government of Punjab
3. Beneficiary	:	Lahore Improvement Trust Water Wing (LITWW)
4. Amount of Credit	:	US\$ 1,750,000.00
5. Amount Disbursed	:	US\$ 1,746,559.55
6. Amount Undisbursed and Cancelled	:	US\$ 3,440.45
7. Amount Outstanding to Sept. 30, 1973	:	US\$ 2,106,583.41 ^{a/}
8. Amount Repaid to Sept. 30, 1973	:	nil
9. Date of Credit Agreement	:	May 12, 1967
10. Date of Effectiveness	:	July 18, 1967
11. Closing Date - Original	:	December 31, 1969
- First Extension	:	June 30, 1971
- Final	:	May 31, 1972
12. Month of Final Disbursement	:	July 1972
13. Terms of Credit	:	50 years
14. Grace Period	:	10 years

a/ Includes exchange adjustment of US\$ 360,023.86.

15. Service Charge : $3/4$ of 1%
16. On-lending Terms : The Borrower would relend the proceeds of the credit to the Government of Punjab on the same terms and conditions, except that the principal amount of, and service charge on, the credit would be denominated in Pakistani rupees. The Government of Punjab would relend the funds to the Lahore Improvement Trust at $3 \frac{1}{2}\%$ per annum for a period of 25 years, including a $5 \frac{1}{2}$ year grace period.
17. Number of Supervision Visits : 13 b/

b/ Schedule of Supervision Missions:

July 2-9, 1967
Dec. 4-9, 1967
May 19-26, 1968
Aug. 15-21, 1968
Nov. 13-23, 1968
Mar. 18-27, 1969
Sept. 7-18, 1969
Jan. 8-31, 1970
July 6-22, 1970
Nov. 18-Dec. 8, 1970
Mar. 17-26, 1971
Jan. 25-Feb. 2, 1973

PERFORMANCE AUDIT OF
PAKISTAN: LAHORE WATER SUPPLY, SEWERAGE
AND DRAINAGE PROJECT

In May 1967, IDA signed a Development Credit of US\$1.75 million with the Government of Pakistan to be lent to the Lahore Improvement Trust (LIT) through the Provincial Government of West Pakistan. The credit was part of a joint financing operation with the Government of Sweden, which provided an equal amount, for the purpose of carrying out a water supply, sewerage and drainage project to meet pressing needs of the rapidly growing population of metropolitan Lahore. The total amount of the IDA/SIDA credits, US\$3.5 million, was intended to cover the foreign exchange and part of the local currency costs of the project. The closing date of the Agreement was December 31, 1969.

A. Background

Water Supply and Sewerage Services in Lahore - 1967

Lahore, the second largest city in West Pakistan, had a population of 1.5 million in 1967 with an annual growth rate above 4%. The existing water supply, sewerage, and drainage facilities were considered inadequate for the needs of the population.

The water resources available in Lahore are unusual in that they are obtained from extensive groundwater reservoirs, recharged by rainfall and infiltration from a large system of irrigation canals and rivers of the Indus Basin. The municipal water system, operated by the Lahore Municipal Corporation (LMC) until 1967, was inefficient. It developed piecemeal over the years and in 1967 comprised 106 isolated wells pumping about 34 million gallons a day into separate, small distribution systems that connected mainly the central part of the city. Due to age and poor maintenance many of the wells were operating far below capacity; storage reservoirs (2.5 million gallons total capacity) were inadequate and the distribution system, consisting of 4 miles of mains and 130 miles of street distribution, was both inadequate and needed rehabilitation. Wasted or unaccounted-for water was estimated between 40% and 50% of total production. The municipal system served in 1967 approximately 60% of the population of Lahore; however, supply was available only 13 to 15 hours a day and pressure was low. The system covered 50,000 authorized connections, of which 4,333 metered. It also served a large number of consumers, particularly in the Old City, through 1,100 public stand pipes, generally in poor condition. Many parts of the city and outlying areas are served by independent water systems operated by public agencies and private consumers.

In 1967, modern sections of the city were served by 12 independent sewer systems, with a combined length of about 100 miles, but most other sections remained without service. Sewage was discharged for the most part, through pumping stations, into the Ravi River or for irrigation. The system was grossly overloaded and dilapidated and needed major rehabilitation and expansion. The drainage system was

in a state of disrepair and needed urgent rehabilitation and expansion, particularly in the northern part of the city drained by the Chota Ravi Channel.

In addition to technical and operational inefficiencies, the LMC suffered from poor management, particularly in such matters as metering, billing, collection of revenues and control over outstanding accounts. Water rates were inadequate to cover even operating expenses, and a large proportion of water produced was supplied free of charge. The LMC had accumulated heavy financial deficits with repeated annual losses of Pakistani Rupees (PRs) 1 to 3 million.

History of the Project

The Government of West Pakistan requested as early as 1963 Bank/IDA assistance in preparing a proposed water supply and sewerage project for Lahore. In 1964, a U.S. consulting firm, Hydrotechnic Corporation, prepared for the Government of West Pakistan a feasibility study encompassing a long-term development plan designed to serve 80% of the population of Lahore by 1981. This program, known as the Master Plan, was commented upon and found technically acceptable by the Bank/IDA and formed the basis for preparing an IDA project.

In view of the institutional weaknesses of the LMC, IDA proposed during the preparation of the project that an independent "Authority" be set up to take over from the LMC responsibility for municipal water supply, sewerage and drainage. The Government of West Pakistan decided instead in November 1965 to transfer responsibility for these services and for the implementation of the proposed project to the LIT - a semi-autonomous agency created in 1936 to carry out, with Government funds, housing and other development projects within metropolitan Lahore. After completion of the project, the Government would have determined whether to return to the LMC responsibility for operating and expanding the utility services or to keep them under LIT's tutelage. IDA accepted the Government's decision apparently in order to avoid setting up yet another agency but particularly in view of the Government's agreement to build, within LIT, a well-organized and self-sustaining operation. Accordingly, the Government issued an Ordinance in February 1967 effecting the above transfer to LIT and embodying the organizational and operational measures agreed upon with IDA.

The project was appraised during February 1966, negotiated in November, and approved in May 1967. IDA first thought in 1965/66 in terms of a substantial project covering a five-year construction program. However, in view of the serious institutional difficulties IDA experienced earlier with large water supply and sewerage projects in Dacca and Chittagong,^{1/} the Association decided in May 1966 to reduce the Lahore project to a small initial "pilot" phase covering a two-year program

^{1/} Credits 11 and 42, both of August 1963.

(1967-1969) to start rehabilitation works and minor expansions. Substantial works were postponed to a second phase (1969-1972) in order to give time to LIT to develop within it an effective organization capable of carrying out the long-term program and of efficiently operating the services. The reduced project approved in May 1967 (henceforth, the IDA project), included a large institution-building component (about 40% of IDA/SIDA credits), which was part of IIA's earlier appraisal and which provided for management consultants' assistance to LIT for setting up the organization on a commercial basis. Training in engineering was to be provided by the consultants assigned to the engineering works of the project.

B. The Project

Objectives

The project had two important objectives: (i) to assist in financing an urgently required program of works to rehabilitate and expand the water supply, sewerage and drainage facilities for the city of Lahore; and (ii) to help establish an institution capable of efficiently operating existing facilities and carrying out a long-range expansion program. Although it was not explicitly stated in the Appraisal Report, IDA's approach clearly gave top priority to the second objective, since construction works in the project were kept at a minimum and the larger works to be taken up in a second phase project were made conditional upon satisfactory institutional progress. In fact, to obtain maximum leverage on the borrower and to avoid the experiences of Dacca and Chittagong, IDA, in June 1966, considered without approving a proposal from the Projects Department, to make the entire credit an "institution-building and engineering credit," to be repaid over eight years; if the institution progressed satisfactorily the credit would have been refinanced as part of a subsequent larger credit involving a major construction project.

While project objectives remained the same, the scope and design of the physical component began to undergo a drastic revision, particularly with regard to water supply works, when an IDA supervision mission found out in August 1968 that LIT had proceeded since 1967, on its own and apparently without adequate funding, with major expansion works outside the program agreed with IDA. It took almost a year of intensive work by IDA staff to arrive at a final redefinition of the technical and physical components of the project and a revised version was adopted in August 1969. We shall discuss first the evolution of the physical and engineering components of the project, and then proceed to the institution-building component which remained the same as in the 1967 appraisal.

Project Revision: The Evolution of Technical and Physical Works

The Master Plan was broadly divided into two periods: 1967-1972 (consisting of Phases Ia and Ib) for which a program of works was closely defined, and 1973-1981. With regard to water supply, the Master Plan's basic concept departed from the existing system of isolated wells of 1 to 2 cusecs capacity and called for the construction of a number of

"tubewell centers" at various locations throughout the city, each containing six wells of 4 cusecs capacity and a 1-IMg storage reservoir which included the necessary chlorination and control equipment. A large size main grid was to interconnect the well centers. The IDA project consisted of a small portion (Phase Ia) of the 1967-1972 program to be completed during 1967-1969 and was limited to (a) construction of one "pilot" tubewell center (comprising six wells) and about 6 miles of distribution mains; (b) construction of 5 miles of sewers and three sewage collection centers, 3 miles of unpaved drainage channels and two main drainage pumping stations; (c) rehabilitation of water supply, sewerage and drainage facilities; (d) a metering program providing for the installation of 4,000 water meters; (e) engineering consultants to do detailed design, specifications and cost estimates for the entire 1967-1972 program, to supervise project construction (1967-1969), and to elaborate the Master Plan by updating projections and closely defining the plans and intermediate phases of the long-range program. (Appendix Table 1 and Maps I-III).

The sizable program of improvement works undertaken by LIT on its own in 1967/68 was apparently a result of a decision of the Provincial Government of West Pakistan to immediately alleviate supply conditions in Lahore without waiting for the completion of the IDA project, which in any case was not intended to substantially improve supply. LIT's own works involved the construction of 18 single wells evenly distributed in different locations and the installation of about 75 miles of small distribution pipes. These works, carried out for the most part in 1967/68, had dramatically improved the supply situation in the entire system to the point that what was needed essentially was expanding the distribution system to absorb an adequate supply capacity.

The IDA project was further complicated by the work of the engineering consultants, a Japanese firm, Nihon Suido. Instead of proceeding first with detailed design, the consultants concentrated, during 1967/68, on reviewing the Master Plan and mistakenly arrived at excessive demand projections (more than double the Hydrotechnic/IDA projection for 1981) resulting in a very large investment program. Nihon Suido's plan arrived at total requirements of 31 well centers by 1975 (as compared to Hydrotechnic/IDA's 15). On this basis, the consultants began to design future works including the distribution system.

LIT apparently at some point during 1967/68 adopted Nihon Suido's plan and selected and reserved the sites for all 31 well centers; the 18 single wells already built by LIT were integrated in Nihon Suido's plan to become the first wells at 18 tubewell center locations.

While water supply in Lahore improved significantly, LIT's own program and Nihon Suido's plan jeopardized the coherence of the original Master Plan and invalidated IDA's strategy to concentrate first on institution-building while making a start on rehabilitation and expansion. At the same time, LIT's investments outside the IDA project caused it financial difficulties (also discovered only in August 1968), that threatened IDA's objective of steering the utility operation toward financial solvency.^{1/}

^{1/} The 1967 forecast cash flow statement for 1967-1969 made no provision for ex.itures outside the project.

Upon assessing the situation and after ascertaining that adequate funds would become available from the Government, IDA and the Government decided to redefine the 1967 project to fit into and supplement the already completed works. Accordingly, from September 1968 IDA set out to (a) re-define the scope, costs, and construction schedule of the project, and (b) make the engineering consultants revise the changes they made in the Master Plan after agreeing on substantially reduced demand projections.

The Revised Project:

After intensive supervision missions, essentially reappraising the project, IDA and LIT reached in April 1969 a basic agreement on a revised project integrated with LIT's "outside work." The revised project was planned as part of an expanded program (1967-1975 as compared to the original 1967-1972) based on the Master Plan revisions that it demanded from the consultants. (Annex 1 details the evolution of work plans and phases.) The new program of works was divided into two phases, the first phase (1967-1970) consisting of the revised project and a second phase (1971-1975) to be appraised by IDA early in 1970.

Table 1 below summarizes a comparison between the original 1967 appraisal and the revised IDA project with regard to composition and costs (Appendix Tables 1, 2, and 3 show the details). The major differences were:

- a. The revised project provided for the construction of 21 single wells (of which 18 already completed by LIT) instead of the original one tubewell center. Construction of well centers was postponed. Eventually, the concept was abandoned as unsuitable for Lahore.^{1/}
- b. To ensure that available capacity could be fully utilized, the revised project provided for the installation of a main distribution grid and for increasing the street distribution system beyond the works completed by LIT. The original project included minimal distribution works.
- c. Increase in water meters from 4,000 to 10,000.
- d. Emphasis on lateral sewers, shown necessary by detailed engineering studies made by the consultants.

^{1/} The concept was applied too rigidly in earlier planning. It called for completion of a six-well center producing a large output at each location while the need was to gradually increase supply throughout Lahore. Also, such output involved huge expenditures for the 1-IMg Storage reservoir and for the required large diameter distribution trunk lines. A more flexible approach, combining the traditional system of isolated wells, along with a reduced number of wells of varying capacity per center, was suggested by IDA but the engineering consultants could not elaborate economic combinations that would best serve long-term needs. Further studies had shown that it was more economical to continue with the system of scattered wells which cost 17% less than the well centers. The concept was abandoned when IDA prepared the appraisal of a second project.

Table I

Comparison of Original and Revised Project Composition and Costs

<u>Principal Items</u>	<u>Composition</u>		<u>Costs</u>	
	<u>Appraisal</u>	<u>Revised^{1/}</u>	<u>Appraisal</u>	<u>Revised</u>
			<u>('000 US\$ equivalent)</u>	
	<u>Water Supply</u>			
Tubewells (no.)	6 (1 Tw-Center)	21 (18)	Local:	987 2,595
Distribution Main (miles)	2	18	Foreign:	1,071 942
Street Distribution (miles)	4	103 (74)	Total	2,058 3,537
Water Meters (no.)	4,000	10,000		
	<u>Sewerage and Drainage</u>			
Main Sewers (miles)	5	5		
Lateral Sewers (miles)	-	32 (13)	Local:	1,428 1,923
Pump & Treatment Station	3	1	Foreign:	945 374
Channels & Conduits (feet)	-	5,800	Total:	2,373 2,297
Drainage Chota Ravi (miles)	3	2		
Operational Equipment & Miscellaneous			Local:	- 603
(Water Supply & Sewerage)			Foreign:	- 223
			Total:	- 826
Engineering & Management Consultants			Local:	609 1,234
			Foreign:	588 1,058
			Total:	1,137 2,292
Contingencies			Local:	300 ^{2/} 305
			Foreign:	200 210
			Total	500 515 ^{2/}
Total Project Costs & IDA/SIDA Financing ^{3/}			Local:	3,171 6,660
			Foreign:	2,604 2,807
			Total:	5,775 9,467

^{1/} Quantities shown in parentheses are LIT's works executed in 1967/68 "outside" the IDA project.

^{2/} Included in construction cost estimates.

^{3/} IDA/SIDA included local financing of US\$700,000 equivalent.

Revisions of cost estimates and credit allocations led to a significant increase in local currency requirements and a substantial decrease in foreign exchange costs for sewerage works. Consultant costs almost doubled due mainly to a one-year extension of the services of management consultants who needed more time to complete contracted work and undertake additional tasks. Increases in the availability of local

currency were assured by the Government. The revised program was adjusted to fully utilize the available foreign exchange, with the provision that possible savings could be used against additional imports of water and sewerage equipment.

With substantial modifications, the size of the construction component of the project had thus travelled full circle beginning in early 1966 as a large program, finalized as a reduced project in 1967, and again expanded through the 1969 revision. However, the intensive work of IDA staff - which rescued the project in the face of drastic complications - also produced the added advantage of having closely defined a program of works up to 1975, ensured adequate distribution works to absorb the available supply, and placed the project on sounder technical and economic grounds.

Institution-Building

In accepting the principle that the utility operation under LIT should become self-sustaining and efficient, the Government of West Pakistan agreed with IDA to implement the following measures:

- a. Appointment of a Project Director supported by appropriate staff;
- b. Engagement of management consultants to set up the organization and its administrative, operational and financial systems;
- c. Setting up water and sewerage budgets and accounts separate from LIT's other operations and appointing independent auditors to audit the accounts;
- d. Improvement of system operations and services and establishment of adequate water and sewer rates.

The Ordinance of 1967 included the above measures. Nevertheless, in two key aspects, the Ordinance was detrimental to establishing a permanent organization intended to function independently and more or less on a commercial basis: (a) the water supply and sewerage organization under LIT was kept subject to Government Civil Service regulations and to Government control over its policies and powers; (b) as pointed out earlier, the new organization was conceived by the Government and perceived by LIT and the utility staff as an interim arrangement. The new organization, in fact, was known as "the Project," headed by a Project Director (rather than a General Manager) and only later acquired the more stable title of the LIT Water Wing (LITWW).

Operational and Financial Targets

When the full program (1967-1972), envisaged in the 1967 appraisal, was completed water production was expected to reach an estimated 53 mgd plus reserve capacity for peak loads; wasted or unaccounted-for water was

to be reduced to 25%-30% and water consumption was supposed to reach 39.7 mgd with 75% of the population served a gross 36.8 gpcd, on a 24-hour supply basis in most parts of the city. Also by 1972, water connections were expected to double to 109,000 and a metering program was supposed to install 19,000 meters (of which 4,000 during 1967-68) including metering of community standposts; a meter shop was to be set up for meter testing and repair. With regard to sewerage, the program to 1972 emphasized rehabilitation works, extensions to fill gaps in the existing system, and new construction towards the goal of establishing a coordinated sewer system for Lahore. Sewerage treatment was not contemplated until post-1972 works.

The above operational targets set out in the 1967 appraisal were not revised in 1969^{1/} when the project was modified. However, because the revised project approximates the original 1967-1972 program (Annex 1), we can consider these targets valid for comparison with actual performance.

The main financial targets set out in the 1967 appraisal required the LITWW to set water, sewerage and drainage rates to yield sufficient revenues to cover operating costs, interest, depreciation, and debt repayments, including repayments on long-term indebtedness exceeding depreciation, costs of normal extensions and about 15% of the cost of major future expansions. To meet this requirement, average rates for the combined services were almost doubled when the 1967 Ordinance took effect. The 1967-1972 investment program was expected to earn a rate of return of 4.5% in 1972. To improve the financial management of the water and sewerage operation by 1969, collection was supposed to average 90% of all current bills within 60 days of issuance, after which unpaid accounts would be closed. Accounts and operations would be subject to review by internal audit. These financial requirements were specified in the 1967 appraisal report and embodied in covenants and side letters.

In light of LITWW's poor financial situation resulting from its "outside program," the above financial targets were summarily revised downwards in 1969 without specifying details. Nevertheless, since the Government provided adequate funds for the capital program, IDA expected LITWW to remain solvent for the period of the revised project, 1969-1970. Thereafter, IDA staff predicted that cash operating expenses would exceed cash revenues, necessitating a rate increase by 1971.

C. Project Implementation and Results

Project Works

Final credit disbursements took place in July 1972 with a small amount cancelled from both IDA/SIDA credits. Project works were completed satisfactorily (except for very minor items) with a foreign exchange saving of \$0.5 million which, in agreement with IDA/SIDA, was utilized

^{1/} The upcoming Phase II appraisal in 1970 made it unnecessary to review targets in detail in 1969. As will be explained below, Phase II did not materialize in a credit. We have, however, made use of the appraisal's up-to-date forecasts where appropriate.

against additional imports of required mechanical equipment, spare water pipes and engine spare parts. The one-and-a-half year's delay beyond the forecast completion for December 1970 was caused initially by a delay in contract awards and some contract cancellations. In 1971 some sewer and drainage works fell behind schedule; finally, small import procurements arrived only in 1972.

There were no significant departures from the composition of the project as revised in 1969 (Appendix Table 1 and Maps IV-V), except for the purchase of 5,000 instead of 10,000 water meters, for reasons which will be discussed below. Total actual costs were higher than forecast by 35% (Appendix Table 2), mainly due to increases in contract prices, duties, higher taxes, and higher land values. On the side of IDA/SIDA allocations (Appendix Table 3), higher costs for project works were offset by a reduction in the costs for engineering consultant services due to early termination of contract.

The engineering work performed by the Nihon Suido consultants was limited, after the project revision, to completing detailed design of distribution works and supervision of construction. Due to continued technical difficulties and language problems, the consultants could not effectively supervise construction and their contract was discontinued on January 31, 1970. Supervision was temporarily (until December 1970) entrusted to two engineers from a local consulting firm and later entrusted to one of two foreign engineers (from Camp. Dresser and McKee, Inc.) acting as advisors for one year, 1971. The advisors also helped train LITW engineers and their performance was satisfactory.

Operations

Table 2 below highlights Lahore's available water supply and sewer facilities in 1972, including the contribution of IDA's project, and estimates of operational indicators. (For details see Appendix Tables 1 and 5.)

Table 2

Water and Sewer Facilities and Operations

	<u>Total 1972</u>	<u>IDA Project</u>		<u>1972</u>	
				<u>Forecast (1967)</u>	<u>Actual</u>
Tubewells	100	21	Water Production	53 mgd	60 mgd
Mains	27 miles	22 miles	Water Consumption	40 mgd	36 mgd
Distrib.	212 miles	82 miles	% Pop. Served	75	70
Sewers	138 miles	138 miles	Total Connections	109,000	78,828

These are the best available estimates based on adjusted LITWW official figures. Nevertheless, they should be regarded as indicative because most water production is not metered at the source and over 90% of consumption is unmetered. Water production in 1972 was 13% above the 1967 appraisal forecast, but slightly less than the latest forecast made during the Phase II appraisal (1971). Little progress has been achieved in reducing losses estimated at between 40% and 50%. Water consumption (production minus losses) approximates both 1967 and 1971 forecasts. Although, according to official statistics, population served has increased from 60% in 1967 to 70% in 1972, a more realistic estimate offered by LITWW engineers would be 65%, which is short of the 75% forecast in 1967 for 1972. The objective of 24-hour service has been achieved in parts of Lahore but much of the city receives a 16-hour continuous supply. The total number of connections in 1972 was about 79,000, or 28% less than expected in 1967, and 13% less than the 1971 forecast. Only 2,000 new meters were installed between 1967 and 1972 as compared to 20,000 forecast in 1967 and 18,000 in 1971; metered connections in 1972 were less than 10% of the total.

LITWW's inadequate metering policies and programs are a central weakness in its technical and financial operations. Most meters inherited by LITWW were defective and programs for new meter installation and meter reading encountered many difficulties due to lack of trained staff. Most meters installed were stolen or damaged. Unauthorized connections continue despite efforts by LITWW to detect them. Above all, LITWW has not been able to overcome the resistance of a public that does not accept the need for water metering and which is unwilling to pay more than nominal charges for water and sewerage service. This has hampered LITWW's progress in reducing waste and in achieving higher revenues. In view of the disappointing progress of LITWW's metering program, IDA decided during the course of supervision in 1970 that the implementation of an adequate metering policy should be a condition for the Phase II credit. The 1971 Phase II appraisal aimed at increasing metered connections to 40% of total connections by the end of 1974. However, subsequently in April 1971, a quick preliminary study by IDA questioned the justification of the proposed metering program. The study argued that as long as water production in Lahore remained particularly inexpensive - given the large groundwater resources available - metering would have to result in substantial water savings (an average of over 50% per connection or 300 gallons) to show net benefits in terms of savings in investment costs. The question remains unsolved today pending a more rigorous and thorough assessment of the costs and benefits of an extensive metering program. The matter may, however, soon require serious attention as there are indications that the groundwater table might drop at a faster rate than anticipated suggesting that conservation measures and restrained consumption may be called for.

The newly constructed and equipped laboratory under the project is operating satisfactorily with regular daily testing of the water supply. Ten meters are repaired daily in the new meter shop, but the facility is still underutilized and, in any case, it cannot catch up with the rate of meter damage. The program for routine and preventive maintenance of

machine installations has improved. Operations have been decentralized to improve handling of facilities and to promptly meet customer complaints. Scraping and rehabilitation of the distribution system has improved efficiency of operations.

Sewerage service has improved, as "missing links" in the old sewer system were filled allowing it to operate more efficiently. Previously unserved areas to the north and west of the city are now provided with the service, but at least 60% of the population remains without direct sewer service. Existing pumping facilities have been repaired and new pumps added. Diesel generators were installed to permit operation during power failures. Many of the existing sewers are still being rehabilitated.

Financial Position

Despite some early progress in reducing the level of losses that characterized LMC's operations, LITWW's financial performance has consistently fallen short of expectations, resulting in significant deficits. Table 3 below compares forecast and actual key financial indicators.

Table 3

Comparison of Key Financial Indicators: Forecast and Actual for 1972

	Forecast		Actual 1972
	1967 Appraisal	1971 Phase II Appraisal	
Net Revenue (PRs. million)	5.2	(.7)	(1.4)
Rate of Return %	4.5	2.5	negative
Operating Ratio %	77	n.a.	103
Cash Surplus/Cash Carried Forward	0.3/3.6	(3.5)/7.7	(6.9)/2.4
Debt/Equity Ratio	71/29	75/25	71/29
Collection as % of Billing	90	n.a.	56

LITWW's deficit for the 1967-72 project period amounted to \$1.8 million equivalent which, as shown in Appendix Table 6, has been covered by an increase in government capital contribution. As shown in the 1968-72 Income Statements (Appendix Table 7), except for 1971, the LITWW had a deficit every year and only in 1971 is there a positive rate of return on the value of fixed assets.^{1/} The Balance Sheets (Appendix Table 8) show that accounts receivable have reached in 1972 a total of PRs 11.4

^{1/} Assets have not been revalued.

million, well in excess of the year's revenues of PRs 10.1 million (receivables at the end of 1972 represented 150% of water sales for that year; the increase in receivables for 1972 was 54% of water billing). The debt/equity ratio deteriorated in 1972 due to increased borrowing from the Government and continued erosion of equity due to accumulated losses. The Cash Flow Statement (Appendix Table 9) further confirms the unsatisfactory cash position of LITWW.

This financial picture is likely to get even worse in the future because: (a) loan repayments for the IDA credit are due to begin soon; (b) Pakistani Rupee and US\$ devaluations are to be adjusted. The disturbance of IDA funds (Appendix Table 4) resulted in a surcharge of \$360,000 to an exchange adjustment due to the devaluation of the dollar in 1972 and the change in its parity value in February 1973. Far more serious is the devaluation of the Pakistani Rupee in May 1972 (US\$1.00 = PRs 10.90 as against the previous rate of US\$1.00 = PRs 4.76), a matter currently under discussion between LITWW and the Government of the Punjab within the framework of onlending terms agreement. The resulting increase in loans outstanding might be offset by a revaluation of assets and an increase in deferred charges but debt servicing charges to be paid by LITWW would be much higher than originally forecast; (c) deferred charges amounting to PRs 10.4 million shown in the Balance Sheet cover engineering and management consultants' fees. Although no decision has been taken by LITWW on these charges, one solution being considered is for most of the engineering consultants' fees to be absorbed into assets, in which case depreciation charges would increase accordingly; management consultants' fees might be written down as loans are repaid and the amounts so written down would be charged against revenues.

The principal factors that explain LITWW's poor financial performance are inadequate revenues, due to inadequate metering policies, insufficient rates, and poor billing and collection, a point which will be discussed below in connection with management problems.

Institutional Development

The uncertain institutional status of the LITWW has been a major handicap to building an effective organization. Given the widespread administrative adjustments that followed the division of West Pakistan into four provinces in July 1970, it is understandable that the matter did not receive the necessary attention by the authorities. Perhaps the most important consequence of this uncertainty was the high turnover of management and staff. Continuity of management was seriously undermined particularly by the system of deputations (Senior Officers assigned from other well-established agencies, such as Public Health, to top management positions in engineering and operations) rotating at frequent intervals. In six years since 1967, LIT had 7 Chairmen, 6 Project Directors, 5 Directors of Administration (until the position was abolished in 1971), 12 Directors of Operation, 5 Directors of Finance (the position is vacant today), 5 Directors of Procurement and Stores (the position is vacant today), 6 Directors of Construction and 9 Directors of Planning and Design. Between 1967 and 1973, 33% of low- and middle-level officers, mostly

engineers and accountants, left the organization. Another detrimental consequence of the utility's uncertain status was the absence of service rules and By-laws, a matter affecting the job security of regular staff which, in the highly developed civil service tradition of Pakistan, is of greater importance than salaries. Rules and By-laws were prepared by the LITWW in 1971, some of which have been adopted and the rest are under consideration by the Government. This has apparently helped reduce staff turnover and may help attract qualified staff.

Other provisions regarding the status of the LITWW have delayed progress toward a self-sustaining capability. Among them the most important are: (a) important decisions of the Project Director (General Manager) have to be referred to the LIT Chairman for approval; (b) policy decisions taken by the LITWW Board (the Implementation Committee) have to be ratified by the LIT's own Board before approval; (c) the power to make administrative and operational rules and regulations rests with the Provincial Government. For example, some of the Manuals recommended by the management consultants and approved by the LITWW in 1971 were finally approved by the Government at the end of October 1973; (d) LITWW has no powers to appoint consultants, experts or commercial auditors or to fix salaries. For example, when after considerable delay, it became clear that a chartered accountant would not be available from the Government, LITWW was authorized to hire one on the market but within an uncompetitive Government salary range. As a result, LITWW could not obtain an experienced candidate. Further, although IDA and the Government agreed that commercial auditors would be appointed from 1968 onwards, they were appointed only for 1970 and 1971 while 1972 accounts are expected to be audited only in early 1974; (e) the power to establish water rates rests with the Government. Despite LITWW's increasing financial losses in 1967 water rates were increased only in July 1973 by 33-1/3%. Moreover, as will be shown below, existing rates were not fully paid or charged as planned in the 1967 appraisal.

These handicaps notwithstanding, the Provincial Government for a while, during 1972, seriously considered transferring the LITWW back to the LMC. IDA's last supervision mission in January-February 1973 urged instead that LITWW be made autonomous and recently the Provincial Government took a preliminary decision to change the LITWW into an autonomous Water Supply and Sewerage Authority. The decision is yet to be approved, pending amendments to the 1967 Ordinance and a review of LITWW's financial position, including a proposal to convert Government loans to LITWW into grants. The Association is currently following this new development with a view to assist the Government in finalizing the legal and financial status of the utility institution.

Organization and Management

Within the framework of the constraints outlined in the previous section, there has been, since the establishment of the Water Wing in 1967, satisfactory progress in three areas: (a) internal structure, (b) administrative procedures, and (c) engineering capability. Partly due to deficiencies in consultant assistance, progress in financial management has been slow.

After initial problems connected with the transfer of utility personnel, assets and liabilities from the Lahore Municipal Corporation were overcome with the assistance of management consultants, the organization was set up along functional lines, as shown in Chart I. This structure has worked well, with some revisions made by the LITWW in 1970 and 1971, to meet evolving needs (Chart II). The most notable changes have been the replacement of the position of Director of Administration by an Administrative Officer under whose jurisdiction administrative personnel training services are centralized. The Chief Commercial Officer has been integrated in the directorship of Finance and Accounts thus completing the centralization of financial services. More recently in 1973, in order to improve billing and collection, the Chief Commercial Officer's position has been strengthened and he is to be made directly responsible to the Director. Also, in early 1973, a Manual of Instructions was issued codifying rules, regulations, and administrative procedures governing the LITWW. In the future, as the organization will grow, the Manager may require a deputy position to help coordinate functions.

The engineering capability of the LITWW has improved, despite the turnover of engineers, because of locally available engineers qualified to handle normal water supply and sewer works and due to experience and training received in connection with the work of the consultants and advisors. The LITWW considers that only limited outside engineering assistance will be needed in the future for specialized and complex designs.

Financial Management

An important institutional objective of the project and a central task of the management consultants was to establish in LITWW modern financial systems to help the utility operate on a commercial basis. This task has met with considerable difficulties and is yet to be completed. The accounting system installed by the consultants has not been fully implemented because many concepts described in the Accounts Manuals were too sophisticated for existing needs and level of skills, or not sufficiently detailed in simple language for absorption by the LITWW's accounting staff. Further, training by the consultants has been hampered by high staff turnover. These were the main causes for the delay in setting up proper commercial accounting using the double-entry system. Accounting deficiencies pointed out by the Auditors in 1970 and 1971 continue, particularly in record keeping and control; cost accounting has not been established. Accounting procedures are presently based partly on the consultants' manuals and on LITWW's own revisions, described in memoranda of instructions, and may need, as suggested by the Auditors, a more comprehensive revision to make them fully workable. In such case further training and hiring of qualified supervisory staff would be required.

A so-called Performance Budgeting system was introduced by the consultants but for reasons similar to the above has not been implemented. The system was contrary to long standing practice and LITWW apparently was not persuaded of its workability. The Budget continues to be drawn on the basis of estimates of billings and collection and of expenditures. Programming is difficult due to uncertainty about availability of funds. Because

funds are transferred from one program to another, control of accomplishments against budgeted plans and objectives is also difficult.

Financial reports are prepared upon request by management, otherwise there is no regular reporting for management decision-making. Monthly and quarterly reports are, however, submitted to IDA.

Billing, cash control and collection are perhaps the critical weaknesses in LITWW's financial management and a major cause for LITWW's poor financial position. Except for the monthly billing of about 7,000 metered accounts that are handled by LITWW, all other 72,000 or more unmetered accounts are in the hands of LITWW's billing and collection agent, the National Bank of West Pakistan. The billings are made on the basis of records carried in the Bank's computer at Karachi and from new information supplied by LITWW. A quarterly tabulation is produced when the billings have been completed. Actual distribution and collection are made by the main branch of the National Bank in Lahore. This fragmentation of responsibilities, compounded by incomplete records inherited from the LMC, causes inaccurate billing and inadequate collection; it results in LITWW having no control over the accounts since it could not make positive verification of revenue against individual collections and billings. In particular, the system as it is could not be utilized to show key financial movements, such as reconciliation of accounts receivable with the computer printout of billing, aging of accounts receivable, or surcharges due to delayed payment. Arrears could not be followed up for lack of a defaulters' list. Part of the confusion has apparently been created by the consultants' manual, which the LITWW Revenue Unit claims to have found incomplete and, in many aspects, unsuitable for LITWW's requirements. Consequently, LITWW has now revised the organization and procedures for billing and collection into a new manual. A revised computerized billing system is also under consideration and LITWW may seek the assistance of its auditors to study and finalize it.

Water and Sewer Rates

In a side letter to the credit documents of 1967, it was agreed, subject to further review, that LITWW would maintain an average combined revenue for water supply and sewerage services equivalent to at least PRs 1.35 per 1,000 gallons of water sold. Water rates were set at the basic rate of PRs 1.50 per 1,000 gallons for metered domestic connections and a monthly rate for the vast majority of unmetered domestic connections, varying (above a minimum level) according to the annual rental value of buildings (Annex 2). As regards sewer rates, an arrangement was later worked out whereby LMC would pay PRs 3.0 million annually to LITWW for sewerage service. These rates have proven inadequate to meet revenue objectives (Appendix Table 7). Assuming that total water sold in 1972 amounted to 11 billion gallons (considering a 50% loss from production), LITWW's revenues from water and sewerage operations in 1972 (PRs 9.4 million) would be equivalent to PRs 0.85 per 1,000 gallons. This is partly due to poor billing and collections, to the fact that 70% of unmetered connections are billed the minimum rate, and to LMC's paying

only PRs 1.8 million instead of PRs 3.0 million. Even if LMC paid its total commitment and including the recent 33-1/3% increase (total annual revenues reaching approximately PRs 15 million), revenues would be equivalent to PRs 1.36 per 1,000 gallons, which in any case would be insufficient to maintain a reasonable rate of return. At IDA's suggestion, LITWW is considering to do a study to find an appropriate level and structure for water and sewerage rates and it may require outside assistance to carry it out.

The Performance of Consultants

The LITWW experienced an unusually disappointing performance on the part of Nihon Suido and Booz, Allen & Hamilton (BAHINT), respectively, the engineering and management consultants. Nihon Suido's services ran from August 1967 to October 1969 at a cost of \$945,000 equivalent; BAHINT's services ran from March 1967 to November 1969 at a cost of \$1,042,000 equivalent. Consulting costs were high: 24% of construction costs and, in terms of foreign exchange, about 45% of IDA/SIDA credits; the benefits to LITWW were disproportionately low. The substantial problems encountered in all but detailed engineering works were due to Nihon Suido's lack of experience in handling project works in a foreign country. Despite a very positive attitude and extraordinary efforts, Nihon Suido's staff in Lahore was not able to overcome the basic shortcomings it had shown from the beginning, namely, lack of understanding of planning criteria and techniques essential to elaborate alternative technical and economic combinations for the long-range program and its intermediate phases, and to arrive at optimal solutions; insufficient ability to organize its own work and to present the results of its study in an adequate form or to critically assess its own assumptions and criteria; and finally, language problems which prevented adequate communication with LITWW staff. Nihon Suido's contribution to training of LITWW staff was minimal. To correct their shortcomings and set the project on sound technical grounds demanded intensive work and frequent IDA supervision missions^{1/}, whose task was aggravated by the failure of both Nihon Suido and BAHINT to coordinate their work, as originally intended.

The institution-building task of BAHINT was complex due to staff resistance to new methods, sometimes inadequate counterpart support and above all to LITWW's inability to retain staff that received some training from BAHINT. Further, the problems related to LITWW's uncertain status and limited autonomy have probably diminished the consultants' contribution. However, as pointed out by IDA supervision missions, these factors do not fully explain the disappointing progress in institutionalizing key systems and tools, particularly in financial management. By October 1968, when the consultants' original contract expired, BAHINT had not yet accomplished its two major tasks, to set up the organizational structure, including staffing requirements and detailed job descriptions, and an accounting system. The delay, which required a one-year extension of their services, was due in large measure to BAHINT's over-theoretical approach to the neglect of simple methods and practical on-the-job training better suited to local requirements. It is not clear why supervision missions during

^{1/} See Basic Data Sheet for schedule of missions between August 1968 and September 1969.

1967-1968 did not attempt to correct BAHINT's shortcomings - something which supervision missions in 1969 did with some success. During the one-year extension of contract, BAHINT was charged with three special tasks in addition to completing previous work: to provide assistance and training to LITWW in project control techniques, to prepare a rate study, and a report on the financial feasibility of the Master Plan. BAHINT's training in project control was based on very advanced techniques (including a course in Critical Path Methods) which, according to IDA supervision and LITWW staff, resulted in small, if any, benefits to LITWW staff and did not justify the costs. The rate study and the financial feasibility report were of little use to the analysis of LITWW's financial problems and the preparation of feasible alternatives. BAHINT had concluded that the proposed projects for water supply, sewerage and drainage were not financially feasible. The IDA mission that reviewed the report stated that these conclusions were arrived at mainly on the basis of theoretical and oversimplified assumptions and noted that, besides misconceptions in financial principles and inconsistencies in conclusions, the report also contained rather awkward platitudes. BAHINT's problems and overall limited contribution to the LITWW efforts to build an effective organization are apparent in BAHINT's Final Summary Report of Progress of December 1969 and finally evidenced by LITWW's extensive revisions of key systems of financial management and continuing efforts to improve them.

Phase II Project Appraisal

The satisfactory progress of physical works, despite understandable delays, together with slow, but encouraging, improvements in management, prompted IDA to consider helping finance the second phase (1971-1975), again with Swedish participation. Earlier, Nihon Suido had prepared preliminary designs for the first two years of Phase II. An IDA appraisal was completed in March 1971, but had to be suspended pending resumption of Bank/IDA operations in Pakistan. Financing of Phase II has since been under consideration by IDA, although project supervision was interrupted for two years between March 1971 and March 1973. This second phase project is expected to receive more active consideration pending clarification of the status of LITWW and its financial management. In the meantime, LITWW proceeded with some water supply and sewerage works begun in 1971 on the basis of a revised Phase II program,^{1/} amounting to \$3 million. Further, to improve sanitary conditions in Lahore, the Government of the Punjab made a grant to LITWW of \$3 million to carry out a program of water and sewerage works in 1973-74.

^{1/} It is not known how this program fits in with long-range plans.

C. Conclusions

The revision of the scope and design of the project and of its underlying technical and financial assumptions make it difficult to assess precisely the performance of the project from the perspective of the 1967 appraisal.^{1/} From the point of view of Lahore's long-run development of water, sewer and drainage services, it is clear that, despite many complications, the broad objectives of the Government of Pakistan and of IDA/SIDA have been largely achieved. This accomplishment is due to the careful and intensive efforts of the IDA team and local authorities to correct the problems that emerged in August 1968. The revised project has met Lahore's urgent water supply requirements, helped improve water and sewerage services, and helped set up a functioning water and sewerage utility which shows promise for improving its capabilities in operations and finances, perhaps with some further outside assistance. The recent Government decision to emancipate the utility to an independent "Authority" is a sign of growing confidence in the Water Wing's effectiveness. Undoubtedly, LITWW's institutional progress would have advanced further had the Phase II IDA project proceeded normally.

An analysis of the reasons for the drastic revision of the water supply component of the 1967 project and of shortcomings in accomplishing institution-building objectives suggests several issues:

First, in light of Lahore's urgent water supply needs it appears, in retrospect, that IDA's strategy to finance only a small portion of the first phase (1967-72) program while concentrating the project on institution-building did not turn out to be an effective solution to the problem of balancing LIT's limited institutional capabilities to undertake a major project with the urgent demand for increased water supply throughout Lahore. The basis for IDA's strategy was the earlier experiences in Dacca and Chittagong which suggested that, to minimize the risks of the project running into similar problems and to exercise greater leverage on the borrower, care should be taken to ensure that LIT was competent technically and institutionally to carry out a major project. However, IDA's decision to limit capital works to merely a start of the program, one pilot well center which would have met demand of only the areas adjacent to the well, seems to have compelled LIT to undertake works outside the project in order to meet Lahore's immediate needs, which it duly did with the effect of substantially improving the supply situation over what it would have been with the IDA project only. IDA's approach implied insufficient recognition of the dilemma posed by the Lahore project resulting in its underestimating the urgency of the need and perhaps over-emphasizing institutional constraints. A more flexible solution that might have reasonably met immediate demand without overtaxing LIT's capabilities, was considered only during project revision, namely, instead of building one fully equipped well center at one location at a time, beginning with one pilot center, a number of separate wells evenly distributed around the city

^{1/} The staff of the Bank and of LITWW that prepared the 1967 appraisal are no longer with their respective institutions.

might have been built and designed as potential nuclei of future well centers to be completed gradually over successive projects. Part of the reason for the divergence between IDA's intentions with regard to the scope of the project and LIT's subsequent actions may have been the lack of close involvement of the operating agency in the early stages of the project preparation - worked out mainly with the Planning Department of the Provisional Government of West Pakistan - and inadequate consultation with local authorities regarding IDA's decision to reduce the original project.

Second, the early supervision missions (before August 1968) were narrowly focussed on the progress of the project, including such matters as procurement procedures, consultant arrangements, engineering and technical details, and did not correctly assess the extent of works that LIT began undertaking outside the project. Due to staffing constraints, these were one-man missions and did not include a financial analyst who might have been able to detect much earlier the nature of the large expenditures outside the project.

Third, technical questions raised during the revision of the project in 1968-69 suggested that, given existing bountiful resources in Lahore, the well center concept was originally applied too rigidly; combinations of isolated wells along with a reduced number of wells of varying capacity per center might have served Lahore's long-term needs more economically. In light of Lahore's resources and requirements, the suitability of the concept itself is open to doubt since it was considered again during the second stage project appraisal and was found to be more costly than the scattered well system. On the other hand, it can be argued that in the long run, the concept would have been more economical for Lahore given its supposed merits of greater dependability, greater distribution and storage capacity and safer chlorination arrangements, but a technical evaluation of this sort is beyond the scope of this audit.

Fourth, as to institution-building, the Government and IDA agreed on the objective to establish an effective more or less autonomous utility organization. IDA, however, accepted the Government's provisional tutelary concept for LITWW apparently underestimating, in the circumstances of local civil service traditions, the negative impact of an uncertain institutional status on continuity of management and personnel and on the utility's autonomy in operations and finances. In particular, high turnover of personnel limited the impact of the training efforts of the management consultants. Earlier consideration should have been given to alternate ways of fitting the new organization in Lahore's institutional framework and of ensuring that the Government give adequate support to LITWW in operational, financial and personnel policies. Further, despite the priority attached to building sound management and financial procedures, IDA left the matter almost entirely in the hands of the consultants without ensuring that their plans were responsive to local needs and capabilities or supervising their work until late 1968.

Finally, the engineering consultants were not carefully screened before selection. Subsequently, it became apparent that the Japanese consultants did not have much experience in the planning (as distinct from detailed engineering) of long-term sewer and water supply programs and virtually no experience in handling project work outside Japan. The selection of management consultants turned out to be inappropriate for the conditions of Lahore where a firm more sensitive to local needs might have done better.

Appendix Table 1: Credit 106-PAK: Lahore Water Supply, Sewerage and Drainage Project

Original, Revised and Actual Project Composition and Total Facilities

<u>Principal Items</u> ^{1/}	<u>Appraisal Report</u> <u>1967</u>	<u>Revised Project</u> <u>1969^{2/}</u>	<u>Actual</u> <u>1972</u>	<u>Total</u> <u>Facilities</u> <u>1972</u>
<u>Water Supply</u>				
Tubewells (no.)	6 (1 TW-Center)	21 (18)	21	100 ^{3/}
Distribution mains (12"-18") (miles)	2	18	22.7	27 ^{4/}
Street distribution (miles)	4	103 (74)	82	212 ^{5/}
Water meters (no.)	4,000	10,000	5,068	
Meter shop (construction and equipment)		1	1	1
Reservoirs			1 (50,000g)	20
Laboratory equipment				
<u>Sewerage & Drainage</u>				
Main sewers (miles)	5	5	5	(138
Lateral sewers (miles)	unspecified	32 (13)	32	
Sewerage pump & treatment station	3	1	1 Disposal Station	
Channels & conduits (feet)		5,800	5,800	
Drainage Chota Ravi (miles)	3	2	1.5	

^{1/} Does not include the rehabilitation of existing tubewells and distribution system, sewerage and drainage rehabilitation; and operational equipment and miscellaneous. For details, see Table .

^{2/} Parentheses indicate items executed by LIT in 1967/68 "outside" IDA/SIDA Project.

^{3/} Of the 106 tubewells inherited from LMC (1 to 2 cusecs capacity) only 69 were fit for production. Since 1972 LITWW has completed an additional ten tubewells.

^{4/} LITWW estimates a total of 40 miles.

^{5/} LITWW estimates a total of 322 miles.

Appendix Table 2: Credit 106-PAK: Lahore Water Supply, Sewerage and Drainage Project

Comparison of Estimated Costs, Completion Time and Actual

(in '000 US\$ Equivalent)^{1/}

	Appraisal Report 1967			Revision of April 1969			Actual 1972			Actual Costs as % of (Original) and Revised Estimates					
	Local	IDA/SIDA	Total	Local	IDA/SIDA	Total	Local	IDA/SIDA	Total	Local		IDA/SIDA		Total	
	Currency	Foreign Currency ^{2/}		Currency	Foreign Currency ^{2/}		Currency	Foreign Currency ^{2/}		(Orig.)	Rev.	(Orig.)	Rev. ^{2/}	(Orig.)	Rev.
Water Supply	987	1,071	2,058	2,595	942	3,537	3,700	1,201	4,901	(375)	143	(112)	127	(238)	139
Sewerage and Drainage	1,428	945	2,373	1,923	374	2,297	2,911	169	3,080	(204)	151	(18)	15	(130)	134
Operational Equipment and Miscellaneous ^{3/}				603	223	826	588	566 ^{4/}	1,154	(na)	98	(na)	254	(na)	140
Sub-total	2,415	2,016	4,431	5,121	1,539	6,660	7,199	1,936	9,135	(298)	141	(96)	126	(206)	137
Consulting Services	609	588	1,197	1,234	1,058	2,292	1,192	986	2,178	(125)	96	(167)	93	(132)	95
Interest During Construction	147		147				562		562	(382)	-	-	-	(382)	-
Administration							552		552	-	-	-	-	-	-
Contingencies ^{5/}				305	210	515	329	44	372	(na)	108	(na)	21	(na)	72
Sub-total	756	588	1,344	1,539	1,268	2,807	2,635	1,030	3,664	(248)	171	(175)	81	(272)	130
Total	3,171	2,604 ^{6/}	5,775	6,660	2,807 ^{7/}	9,467	9,834 ^{8/}	2,966 ^{2/}	12,799	(310)	147	(139)		(221)	135
Completion Dates	1967-1969			1967-1970			1967-1972								

^{1/} Inflation, 1973 US\$ devaluation and 1972 devaluation of the Pakistani Rupee are not taken into account.^{2/} The IDA/SIDA Credit is of US\$ 3.5 million in equal amounts.^{3/} The various equipment and works included under this heading have always been considered part of the project (meter repair equipment, water meters, laboratory equipment, self-closing hydrants, vehicles, etc.) but were not shown as a separate category and were included under "water supply" except in the 1969 revision and in actual cost figures.^{4/} The portions for water, sewerage and drainage were respectively US\$ 331,000 and US\$ 150,000. The balance, except for about US\$ 8,000 cancelled from the IDA/SIDA Credit were used for miscellaneous equipment and works.^{5/} About 15% contingencies were included in construction cost estimates.^{6/} The balance of the credit was allocated to local currency financing of consultants (US\$700,000) and to contingencies (approx. US\$200,000).^{7/} The balance of the credit, US\$700,000 equivalent, was allocated to local currency financing of consultants.^{8/} Higher local costs due mainly to increases in duties, taxes and higher land values.^{2/} The balance of the credit, approximately US\$600,000 equivalent, was allocated to local currency financing of consultants. US\$8,000 were cancelled from the credit.

Appendix Table 3: Credit 106-PAK: Lahore Water Supply, Sewerage and Drainage Project

IDA/SIDA Allocations (in equal amounts): Original, Revised and Actual

(in '000 US\$)

	<u>Appraisal 1967</u>	<u>Revision 1969</u>	<u>Total Actual IDA/SIDA</u>
Water Supply	1,080	1,000	1,470
Sewerage and Drainage	940	400	138
Operational Equipment and Miscellaneous	<u> </u>	<u>200</u>	<u>292</u>
Subtotal	2,020	1,600	1,900
Consulting Services: Foreign Exchange	600	1,050	986
Local Currency	700	700	606
Unallocated (contingencies)	<u>180</u>	<u>180</u>	<u> </u>
Subtotal	1,480	1,900	1,592
Total	3,500	3,500	3,492
Cancelled	<u> </u>	<u> </u>	<u>8</u>
Grand Total	3,500	3,500	3,500

Appendix Table 4: Credit 106-PAK: Lahore Water Supply, Sewerage and Drainage Project

IDA Disbursement (1968-1973)

<u>Year</u>	<u>Amount of Credit</u>
1968	290,482
1969	132,060
1970	805,166
1971	171,764
1972	494,398
1973	<u>212,713</u> ^{1/}
Total	2,106,583 ^{2/}

^{1/} Amount shown disbursed in 1973 in Statement of Development Credits is actually part of the exchange adjustment. The project was disbursed in 1972.

^{2/} Includes exchange adjustment of US\$ 360,023.86 and a cancellation of US\$ 3,440.

APPENDIX TABLE 2: CREDIT 100-700A: LAHORE WATER SUPPLY, SEWERAGE AND DRAINAGE PROJECT

System Operations: Forecast and Actual 1968-1972

	Existing 1967	1968		1969		1970		1971		1972		Actual as % of Forecast 1972
		Forecast	Actual	Forecast	Actual	Forecast	Actual	Forecast	Actual	Forecast	Actual	
Plant Capacity ^{1/} (mgd)	57.5	62.5	(56)	73.6	(67)	82.7	(70)	90.8	(72)	99.9	(74) ^{1/}	74
Total Production ^{2/} (mgd)	33.8	35.5	37	39.3	40	42.1	44	45.5/49*	49	52.9/65*	60	113/92
Unaccounted-for-water ^{3/} (mgd)	13.5	12.9	(15)	13.7	(16)	12.6	(17)	11.3	(19)	13.2	(24)	182
Water Consumption ^{4/} (mgd)	20.3	22.6	(22)	25.6	(24)	29.5	(27)	34.2/28*	(29)	39.7/38*	(36)	90/94
Population ('000)	1,575	1,639	1,788	1,704	1,790	1,772	1,861	1,845	1,950	1,918	2,040	106
Population Served ('000)	945	1,065	1,020	1,107	1,160	1,240	1,270	1,290	1,380	1,438	1,440	100
Percent of Population Served	60	65	57	65	65	70	68	70	70	75	70	93
Gross gpcd Served	35.7	33.3	36	35.5	34.5	33.9	34.6	35.3	34.7	36.9	41.6	113
(Net gpcd Served) ^{5/}	(21.5)		(21.5)		(20.6)		(21.3)		(21)		(23)	n.a.
Unmetered Connections	46,650 ^{6/}	53,000	52,069	59,000	55,866	67,000	61,083	77,000/65,800*	66,160	89,000/72,500*	72,028	81/99
Metered Connections	4,333	6,000	4,849	8,000	5,222	11,000	5,733	15,000/10,000*	6,347	20,000/18,000*	6,800	34/38
Total	50,983	59,000	56,918	67,000	61,088	78,000	66,816	92,000/75,800*	72,507	109,000/90,500*	78,828	72/87

1/ Parentheses indicate actual LITWW official estimate - The 21 wells built by 1972 have a combined capacity of 46.2 mgd.

2/ LITWW official estimate adjusted.

3/ Actual unaccounted for water can be estimated to be at least 40%.

4/ As over 90% of domestic connections is unmetered, it is not possible to estimate actual water consumption. Nevertheless, the figures in parentheses can give an indication of available water after deducting estimated losses from actual production.

5/ Figures in parentheses indicate actual estimate arrived at by dividing estimated water consumption by population served.

6/ This LITWW figure differs from the 51,000 figure given in the 1967 Appraisal Report. The LITWW figure has been confirmed in the 1971 Phase II appraisal of the second phase which has been suspended.

* Forecasts given in the 1971 Phase II appraisal.

Appendix Table 6: Credit 106-PAK: Lahore Water Supply, Sewerage and Drainage Project

Project Financing Plan 1967 - 1972

(US\$ million equivalent)

	Original (1967) <u>Plan</u>	<u>Actual</u>
<u>REQUIREMENTS FOR FUNDS</u>		
Project Construction Costs	4.4	9.1
Engineering and Management Services	1.2	2.1
Interest During Construction	0.2	0.6
Working Capital	0.2	0.3
Administrative Costs	<u> </u>	<u>0.6</u>
Total	6.0	12.7
<u>SOURCES OF FUNDS</u>		
IDA Credit	1.75	1.75
SIDA Credit	1.75	1.75 ^{1/}
Government	2.5	11.00 ^{1/}
	<u> </u>	<u> </u>
Total	6.0	14.5
Balance of Capital Funds Utilized for Operations		1.8

^{1/} Does not include works begun in 1971 outside the project.

Appendix Table 7: Credit 106-PAK: Lahore Water Supply, Sewerage and Drainage Project

Income Statements

Comparison of Appraisal Report Forecast and Actual
(1970 and 1971 Figures Audited)

(PRs millions)

Year Ending June 30	1968		1969		1970		1971		1972	
	Appraisal	Actual	Appraisal	Actual	Appraisal	Actual	Appraisal	Actual	Appraisal	Actual
<u>Revenue</u>										
Water Sales	10.1	4.9	11.6/4.9	5.0	13.5/7.0	5.7	15.8/5.5	6.7	18.5/7.1	7.6
Connection Fees	-	0.2	-	0.2	-	0.1	-/.3	0.2	-/.4	0.2
Sewerage LMC	2.7	1.0	2.9/2.6	1.0	3.2/1.4	1.0	3.5/3.0	1.8	3.2/3.3	1.8
Connection Fees	-	-	-	-	-	-	-	-	-	-
Meter Rentals	0.1	-	0.1	-	0.2	-	0.3	-	0.4	-
Other Income	-	0.5	-/.2	0.4	-/.8	0.3	-/.8	0.2	-/1.0	0.5
Total Revenue	12.9	6.6	14.6/7.9	6.6	16.9/9.2	7.1	19.6/10.6	8.9	22.8/11.8	10.1
<u>Expenditures</u>										
<u>Operating</u>										
Salaries and Wages	3.9	2.9	4.3	3.4	4.7	3.9 4/	5.2	4.4	5.7	4.9
Power	1.2	1.3	1.4	1.0	1.6	2.4 4/	1.8	1.7	2.1	3.2
Chemicals	-	-	-	-	-	0.4	-	-	-	-
Maintenance	0.1	2.1	0.3	2.1	0.4	2.0	0.6	1.1	0.7	1.2
Other	1.3	-	1.4	-	1.6	1.1	1.7	0.8	1.9	1.8
Contingencies	0.7	-	0.7	-	0.8	-	0.9	-	1.0	-
Sub-Total	7.2	6.3	8.1/5.8	6.5	9.1/6.8	9.9	10.2/6.6	8.0	11.4/6.9	10.7
Less Allocated to Capital	-	0.1	-	0.3	-	0.9	-	1.5	-	1.8
Net Operating Costs	7.2	6.2	8.1	6.2	9.1	9.0	10.2/6.6	6.5	11.4/6.9	8.9
Operating Profit (Loss)	5.7	0.4	6.5/2.1	0.4	7.8/2.4	(1.9)	9.4/3.0	2.4	11.4/4.9	1.2
<u>Non Operating</u>										
Depreciation	0.9	0.3	1.2	0.7	1.8	1.0	2.4/1.7	1.1	2.8/2.6	1.2
Bad Debts	3.2	0.3	3.7	0.2	3.4	0.1	3.9/.4	0.4	3.4/.3	0.3
Interest	-	-	-	-	-	0.7	-/2.2	0.8	-/2.7	1.1
Sub-Total	4.1	0.6	4.9	0.9	5.2	1.8	6.3/4.3	2.3	6.2/5.6	2.6
Net Revenue	1.6	(0.2)	1.6	(0.5)	2.6	(3.7)	3.1/(1.3)	0.1	5.2/0.7	(1.4)
Operating Ratio Including Depreciation and Bad Debts	88	103	89	102	85	142	84	90	77	103
Net Fixed Assets Year End including Work-in-Progress	26.0	39.1	44.5	48.6	68.8	52.3	93.9	61.7	114.7	73.2
Rate of Return %	6.2	-	3.6	-	3.8	-	3.3/1.2	-	4.5/2.5	-

1/ Figures following slash represent 1969 revised projections.

2/ Figures following slash represent 1971 Phase II Appraisal forecasts.

3/ 1972 Rupee devaluation not taken into account.

4/ Includes arrears for earlier years.

Appendix Table 8: Credit 106-PAK: Lahore Water Supply, Sewerage and Drainage Project
Balance Sheets

Comparison of Appraisal Report Forecast and Actual
(1970 and 1971 Figures Audited)

(PRs millions)

Year Ending June 30	Start July 1, 1967	1968		1969		1970		1971		1972		2/
		Appraisal	Actual	Appraisal	Actual	Appraisal	Actual	Appraisal 1/	Actual	Appraisal 1/	Actual 2/	
ASSETS												
Current Assets												
Other	-	-	1.7	-	1.7	-	2.9	-/1.5	2.3	-/2.0	2.5	
Cash	2.6	3.3	5.8	6.0	4.9	3.0	5.3	3.3/11.1	9.3	3.6/7.7	2.4	
Accounts Receivable	0.5	2.4	2.4	2.7	3.4	3.4	4.6	3.9/4.3	7.3	4.9/3.9	11.4	
Inventories	2.0	2.0	2.0	2.0	1.9	2.0	1.7	2.0/2.0	1.4	2.0/2.0	1.3	
Total Current Assets	5.1	7.7	11.9	10.7	11.9	8.4	14.5	9.2/18.9	20.3	10.5/15.6	17.6	
Fixed Assets												
Gross	19.1	19.1	30.8	26.0	45.2	44.5	42.7 ^{3/}	68.8/81.6	44.0	93.9/95.0	60.0	
Less Depreciation	0.3	0.2	0.6	1.2	1.2	1.8	2.8 ^{3/}	2.4/5.0	3.8	2.8/7.5	5.0	
Net	18.8	18.2	30.2	24.8	44.0	42.7	39.9	66.4/76.6	40.2	91.1/87.5	55.0	
Work-in-Progress	-	7.8	8.9	19.7	4.6	26.1	12.4	27.5/-	21.5	23.6/12.3	18.9	
Total Fixed Assets	18.8	26.0	39.1	44.5	48.6	68.8	52.3	93.9/76.6	61.7	114.7/99.8	73.9	
Deferred Expenditure	-	-	-	-	-	-	9.3	-	10.0	-	10.4	
TOTAL ASSETS	23.9	33.7	51.0	55.2	60.5	77.2	76.1	103.1/95.5	92.0	125.2/115.4	101.9	
LIABILITIES												
Current Liabilities												
Accounts Payable, etc.	-	1.8	4.9	2.0	5.2	2.3	5.5	2.6/11.2	6.6	2.9/9.6	6.6	
LIT. Debt Maturing	-	-	-	-	-	-	-	-	-	3.2	-	
Total Current Liabilities	-	1.8	4.9	2.0	5.2	2.3	5.5	2.6/11.2	6.6	6.1/9.6	6.6	
Long Term Debt												
LMC	0.3	0.6	0.3	0.6	2.6	0.6	2.5	0.6	1.4	-	1.4	
IDA	-	2.4	1.2	8.3	2.0	8.3	5.9	8.3	6.7	-	n.a.	
SIDA	-	2.4	1.2	8.3	2.0	8.3	5.9	8.3	6.7	-	n.a.	
Government	-	3.9	8.0	11.8	15.2	11.8	30.4	11.8	44.6	25.8	69.3	
Other	-	-	-	-	-	19.1	-	41.6	-	58.2	- ^{4/}	
Total Long Term Debt	0.3	9.3	10.7	29.0	21.8	48.1	44.7	70.6/57.3	59.4	84.0/79.6	70.7	
Equity												
Original	23.0	19.1	35.0	19.1	33.6	19.1	27.7 ^{1/}	19.1/31.1	29.7	19.1/31.1	29.7	
Earned Surplus (Loss)	0.6	3.5	0.4	5.1	(0.1)	7.7	(3.8)	10.8/(4.1)	(3.7)	16.0/(4.8)	(5.1)	
Total Net Equity	23.6	22.6	35.4	24.2	33.5	26.8	25.9	29.9/27.0	26.0	35.1/26.3	24.6	
TOTAL LIABILITIES	23.9	33.7	51.0	55.2	60.5	77.2	76.1	103.1/95.5	92.0	125.2/115.4	101.9	

1/ Figures following slash represent 1971 Phase II Appraisal forecasts.

2/ 1972 Rupee devaluation not taken into account.

3/ Reduction of PRs 3.9 million for previous over-statements.

4/ Includes IDA/SIDA debt for which a separate breakdown is not yet available.

Appendix Table 9: Credit 106-PAK: Lahore Water Supply, Sewerage and Drainage Project

Sources and Application of Funds

Comparison of Appraisal Report Forecast and Actual
(1970 and 1971 Figures Audited)

(PRs millions)

Year Ending June 30	1968		1969		1970		1971		1972		3/
	Appraisal	Actual	Appraisal	Actual	Appraisal	Actual	Appraisal	Actual	Appraisal	Actual	
SOURCE OF FUNDS											
Net Revenue	1.6	(0.2)	1.6	(0.5)	2.6	(3.7)	3.1/0.9	(0.1)	5.2/2.0	(1.4)	
Interest Charges	-	-	-	-	-	0.7	-	0.8	-	1.1	
Depreciation	0.9	0.3	1.2	0.7	1.8	1.0	2.4/1.7	1.1	2.8/2.6	1.2	
Accounts Payable	<u>1.8</u>	<u>4.9</u>	<u>0.2</u>	<u>0.3</u>	<u>0.3</u>	<u>0.3</u>	<u>0.3</u>	<u>1.1</u>	<u>0.3</u>	-	
Sub-Total	4.3	5.0	3.0	0.5	4.7	(1.7)	5.8/2.6	3.1	8.3/4.6	0.9	
Other Equity	-	12.0	-	1.4	-	-	-	-	-	-	
LOANS											
IDA	2.4	1.2	5.9	0.8	-	3.8	-	0.8	-	-	
SIDA	2.4	1.2	5.9	0.8	-	3.8	-	0.8	-	-	
Government	3.9	8.0	7.9	7.1	19.1	15.3	22.5	14.2	16.6	11.3	
Other	<u>-</u>	<u>-</u>	<u>-</u>	<u>2.3</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>(1.2)</u>	<u>-</u>	<u>-</u>	
Sub-Total	8.7	10.4	19.7	11.0	19.1	22.9	22.5/12.6	14.6	16.6/23.8	11.3	
TOTAL SOURCES	13.0	27.4	22.7/14.0	10.1	23.8/25.0	21.2	28.3/15.2	17.7	24.9/28.4	12.2	
APPLICATIONS OF FUNDS											
Project Costs F Exchange	3.7	-	8.8	-	8.7	-	6.8	-	4.6	-	
L Cost	4.0	-	10.3	-	16.0	-	18.4	-	15.8	-	
IDC	<u>0.1</u>	<u>-</u>	<u>0.6</u>	<u>-</u>	<u>1.4</u>	<u>-</u>	<u>2.3</u>	<u>-</u>	<u>3.2</u>	<u>-</u>	
	7.8	20.6	19.7	10.1	26.1	8.6	27.5/14.3	10.4	23.6/25.4	13.4	
Accounts Receivable	1.9	1.9	0.3	1.0	0.7	1.2	0.5	2.7	1.0	4.1	
Interest	-	-	-	-	-	0.7	-/2.2	0.8	-/4.7 ^{5/}	1.1	
Inventories	-	-	-	(0.1)	-	(0.2)	-	(0.3)	-	(0.1)	
Deferred Expenditure	-	-	-	-	-	9.3	-	0.7	-	0.4	
Other	<u>-</u>	<u>1.7</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>1.2</u>	<u>-</u>	<u>(0.6)</u>	<u>-</u>	<u>0.2</u>	
TOTAL APPLICATIONS	9.7	24.2	20.0/13.0	11.0	26.8/23.5	20.8	28.0/10.4 ^{4/}	13.7	24.6/31.9 ^{6/}	19.1	
Cash Surplus (Deficit)	3.3	3.2	2.7/1.0	(0.9)	(3.0)/1.5	0.4	0.3/4.8	4.0	0.3/(3.5)	(6.5)	
Cash B/F	-	2.6	3.3	5.8	6.0	4.9	3.0	5.3	3.3	9.3	
Cash C/F	3.3	5.8	6.0	4.9	3.0	5.3	3.3	9.3	3.6	2.4	

1/ Figures following slash represent 1969 revised projections.

2/ Figures following slash represent 1971 Phase II Appraisal forecasts.

3/ 1972 Rupee devaluation not taken into account.

4/ Total reflects reported deduction of PRs 6.1 million, increase in working capital.

5/ Includes debt amortization of PRs 1.6 million.

6/ Total reflects reported addition of PRs 1.8, increase in working capital.

Credit 106-PAK: Lahore Water Supply, Sewerage and Drainage ProjectEvolution of Work Programs: Appraisal Report (1967-72) and Master Plan and Project Revisions (1967-75)

APPRAISAL REPORT (April 1967)	TOTALS										
	1967-72 Program		1967	1968	1969	1970	1971	1972	1973	1974	1975
			-----IA-----			-----IB-----					
			(1967-69) (The Project)			(1970-72)					
<u>Water Supply</u>											
Phases: IA + IB											
Tubewells (no.)	30	(5 TW-Centers)	6	(1 TW-Center)	24	(4 TW-Centers)					
Distribution grid (miles)	30		2		28						
Street distribution (miles)	29		4		25						
Water meters (no.)	19,000		4,000		15,000						
<u>Sewerage & Drainage</u>											
Sewers/Main (miles)	?		5		?						
Lateral sewers (miles)	?		?		?						
Sewerage pump & treatment station	?		3		-						
Drainage channels (miles)	3		3		?						
<u>MASTER PLAN (as of Feb./March 1969)</u>											
1967-75 Program											
Phases: IA+IB+IIA											
<u>Water Supply</u>											
-----IA-----											
(1967-69) ^{1/}											
-----IB-----											
(1970-72)											
-----IIA-----											
(1973-75)											
Tubewells (no.)	48		(18)		6		24				
Distribution grid (miles)	90		15		43		32				
Street distribution (miles)	293		103 (74)		95		95				
Water meters (no.)	60,900		5,900		25,000		30,000				
<u>Sewerage and Drainage</u>											
Main sewers (miles)	47		5		23		19				
Lateral sewers (miles)	48		18 (13)		10		20				
Sewerage treatment & pump station	3		1		1		1				
Drainage channels (miles)	8		2		1		5				
<u>REVISED MASTER PLAN AND PROJECT</u>											
1967-75 Program											
Phases: I & II											
<u>Water Supply</u>											
-----I (the project)-----											
(1967-70) ^{1/}											
-----II-----											
(1971-75)											
Tubewells (no.)	50		21 (18)		29						
Distribution grid (miles)	90		18		72						
Street distribution (miles)	283		103 (74)		180						
Water meters (no.)	60,000		10,000		50,000						
<u>Sewerage & Drainage</u>											
Main sewers (miles)	40		5		35						
Lateral sewers (miles)	82		32 (13)		50						
Sewerage treatment & pump station	3		1		2						
Drainage channels (miles)	15		2		13						

^{1/} Parentheses indicate items executed by LIT in 1967/68 "outside" the IDA/SIDA project.

Credit 106-PAK

LAHORE WATER SUPPLY, SEWERAGE AND DRAINAGE PROJECTSummary of Water and Sewerage Rates of the LIT - Water Wing

(Except for minor changes, these rates were in use until July 1973 when they were raised by 33-1/3%)

Water

Unmetered Domestic: 1) 1/4 in. Ferrule - PRs 4.50/month for up to two taps
 2) 3/8 in. Ferrule - PRs 9.00 " " " "
 3) 1/2 in. Ferrule - PRs 12.00 " " " "
 4) 3/4 in. Ferrule - PRs 18.00 " " " "
 5) 1 in. Ferrule - PRs 24.00 " " " "
 6) Every additional tap PRs 0.50 per month
 7) Alternative for Scales 1 to 6: 7-1/2% of annual rental value of buildings, whichever is higher, subject to minimum of PRs 56.00 per annum.

Unmetered Commercial: Lodging houses, stables, dairies, etc. PRs 18/month.

Metered Domestic: PRs 1.50 per 1,000 gal subject to minimum charge.

Metered Commercial and Industrial: PRs 2.00 per 1,000 gal subject to minimum charge.

Minimum Charges per Month for Metered Domestic:

<u>Size of Ferrule</u>	<u>Consumption</u>	<u>Minimum Charge PRs</u>
1/2 inch	3,000 gal	4.50
3/4 "	6,000 gal	9.00
1 inch	10,000 gal	15.00
Above 1 inch	20,000 gal	30.00

Minimum Charge per Month Metered Commercial:

The domestic minimum charge plus 33-1/2%.

Religious and Charitable Institutions, Schools and Dispensaries:

Half the domestic rate.

Meter Rent per Month:

<u>Size of Ferrule</u>	<u>PRs</u>
1/2 inch	1.25
3/4 "	1.75
1 "	2.38
1-1/4"	3.63
1-1/2"	4.25
2 "	5.38
3 "	8.38

Community Standposts: PRs 0.75 per 1,000 gal. payable by the LMC.

Bulk Water Supply: PRs 1.00 per 1,000 gal.

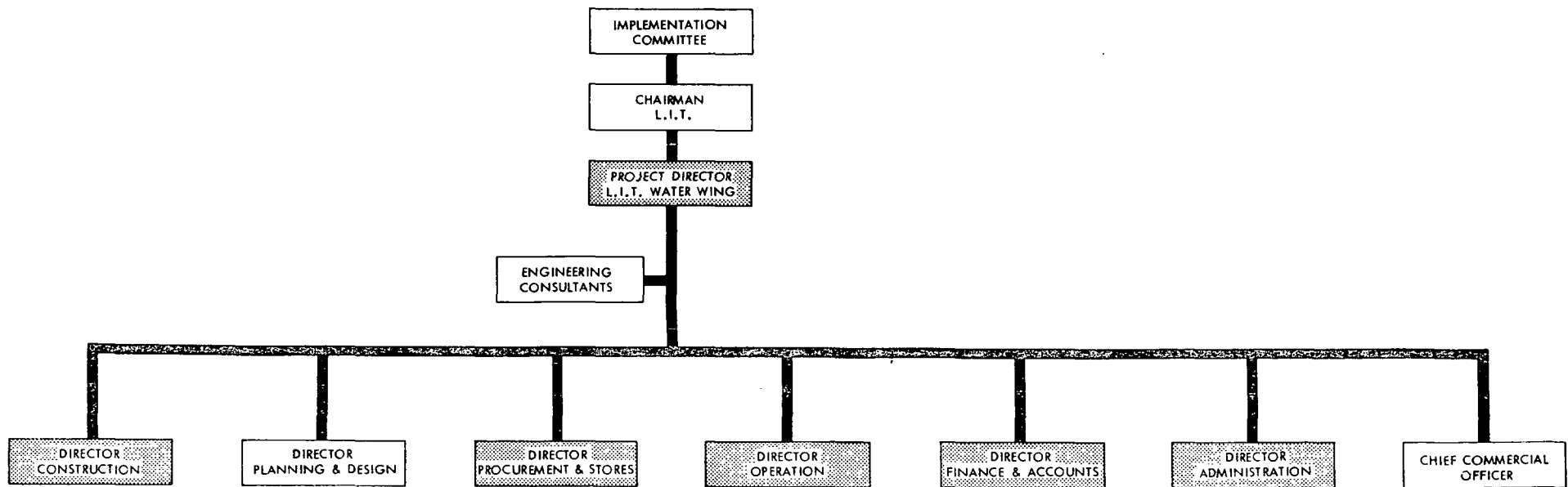
Hydrants: PRs 36.00 per month per hydrant.

Sewerage & Drainage - Domestic & Commercial:

In December 1970 the LIT and LMC signed an agreement that LMC would transfer annually PRs 3.0 million out of its collection of the house tax to the LIT, and that this amount would be increased proportionally with the collection of the house tax from newly sewered areas. The agreement will be effective from July 1, 1971 subject to cancellation of the present sewerage tax of 3-1/2%.

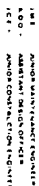
Bulk Rate:
For corporate bodies - PRs 200 per acre.
For factories - PRs 400 per acre.

PAKISTAN
ORGANIZATION CHART OF LAHORE IMPROVEMENT TRUST (L.I.T.)
(WATER WING) - 1971

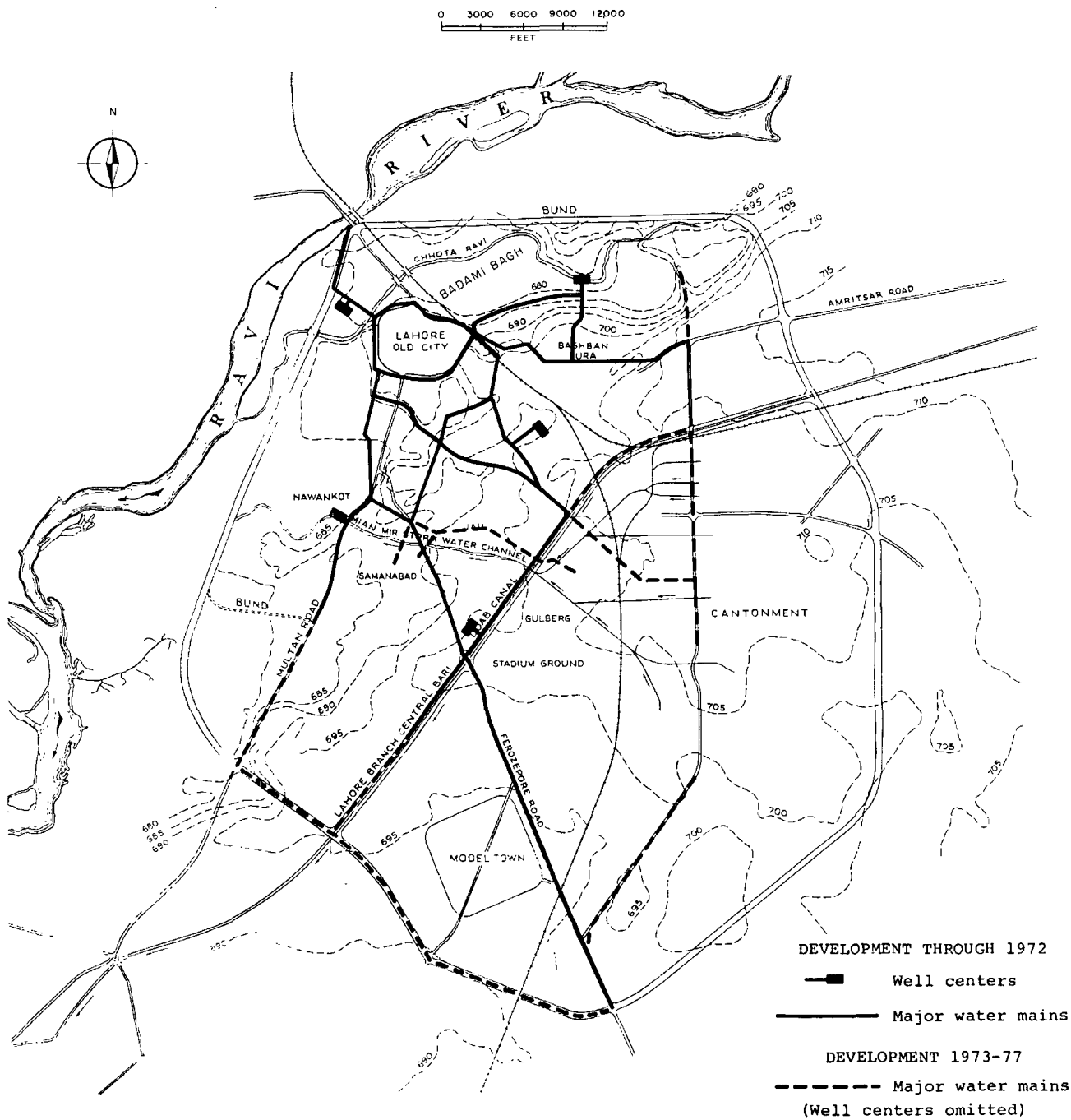


 NOTE: DEPUTED FROM GOVERNMENT DEPARTMENT

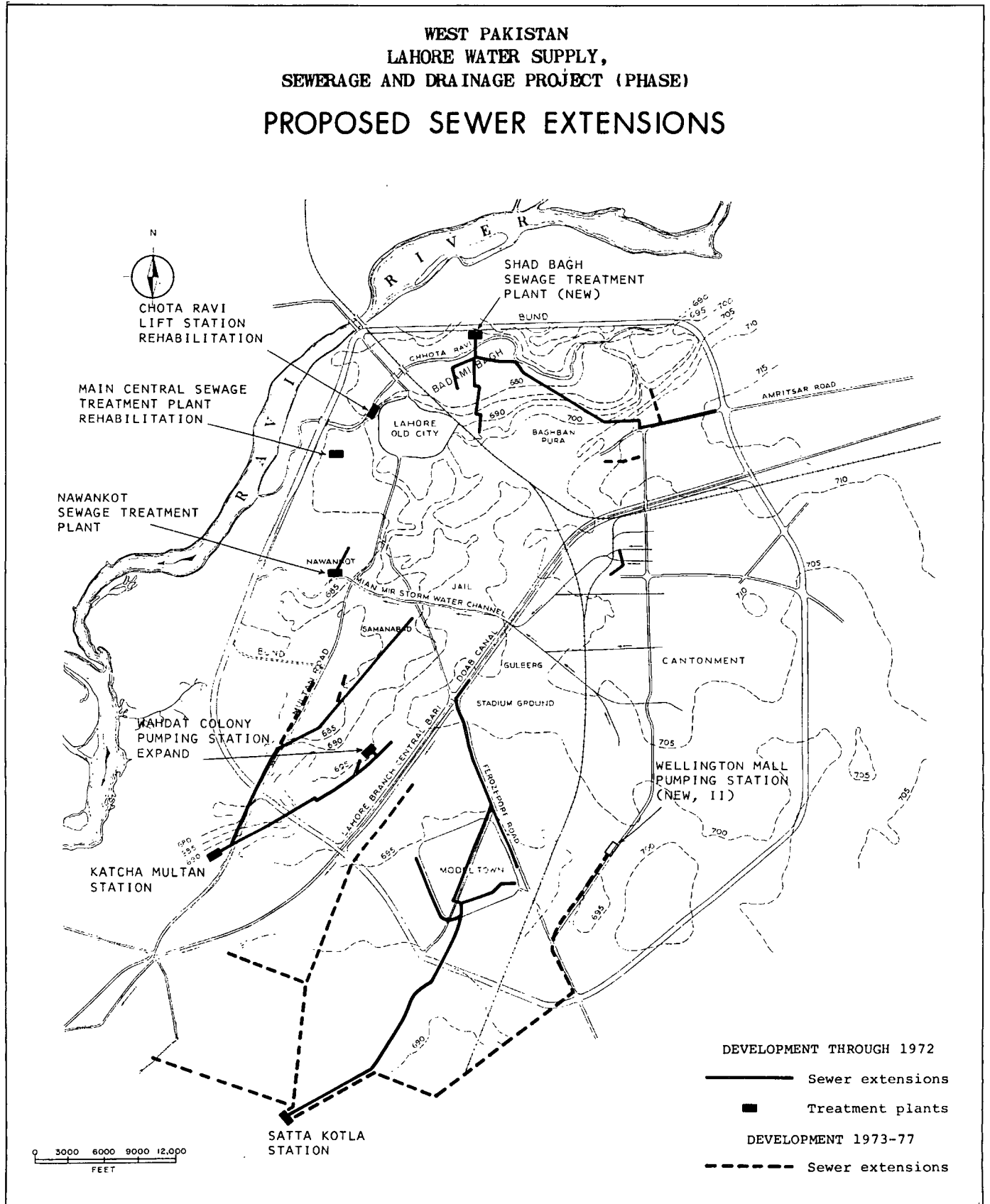
CHIA-CT 11



PROPOSED WELL CENTERS AND MAJOR WATER MAINS

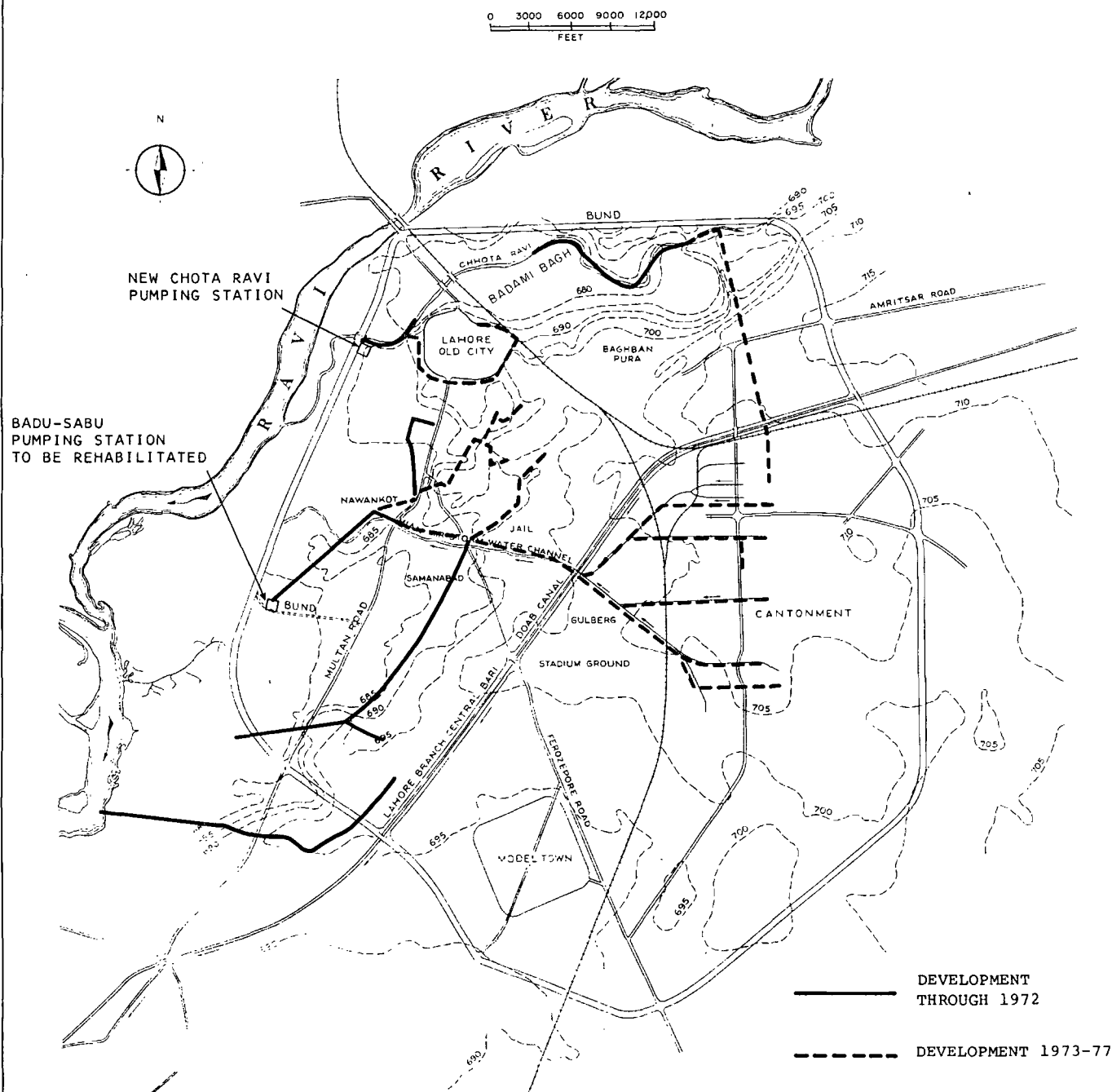


WEST PAKISTAN
LAHORE WATER SUPPLY,
SEWERAGE AND DRAINAGE PROJECT (PHASE)
PROPOSED SEWER EXTENSIONS

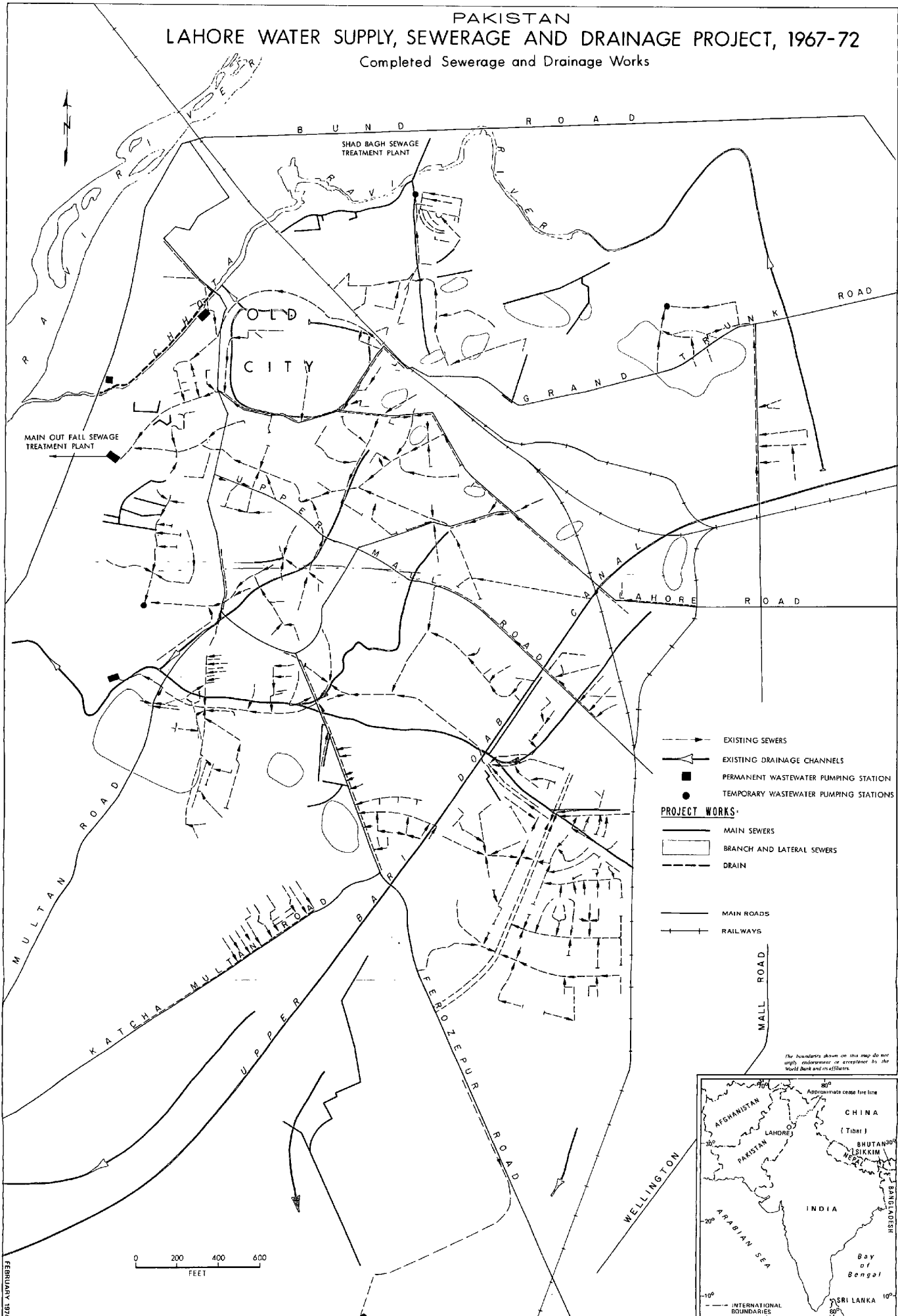


WEST PAKISTAN
LAHORE WATER SUPPLY,
SEWERAGE AND DRAINAGE PROJECT

PROPOSED MAIN DRAINAGE EXTENSIONS



PAKISTAN LAHORE WATER SUPPLY, SEWERAGE AND DRAINAGE PROJECT, 1967-72 Completed Sewerage and Drainage Works



PAKISTAN
LAHORE WATER SUPPLY SEWERAGE AND DRAINAGE PROJECT, 1967-72
Completed Water Supply Works

