Islamic Republic of Pakistan
Quetta Sewerage and Sanitation Project (QSSP)

Report of Evaluation Mission
25 October - 12 November 1992

Rotterdam, 5 January 1993

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Annexes

List of abbreviations and acronyms used

ACS	-	Additional Chief Secretary
B-WASA	-	Balochistan Water and Sanitation Authority
BDA	-	Balochistan Development Authority
BKH	-	BKH consulting engineers
CBO	-	Community based organisation
CCM	-	Centrifugated concrete (spinning) method
CSP	-	Civil Service of Pakistan
Dfl.	-	Netherlands Guilders
FY	-	Financial year
GOBAL	-	Government of Balochistan
GON	-	Government of the Netherlands
GTZ	-	German Agency for Technical Cooperation
HC	-	House connection
Lcd	-	liters per capita per day
LCS	-	Low-cost sanitation
MD	-	Managing Director
MGD	-	Million gallons per day
NEI	-	Netherlands Economic Institute
NESPAK	-	National Engineering Services, Pakistan (Pvt) Ltd
NFC	-	National Finance Commission
NGO	-	Non-governmental organisation
NMC	-	National Management Consultants
NWF	-	Northern well field
NWFP	-	Northwestern Frontier Province
O&M	-	Operation and maintenance
PC-I	-	Planning Commission proforma nr.I
PFL	-	Pour-flush latrine
PlanOp	-	Plan of operations
PM	-	Project manager
PMU	-	project management unit
QDA	-	Quetta Development Authority
QMC	-	Quetta Municipal Corporation
QSSP	-	Quetta Sewerage and Sanitation Project
QWSP	-	Quetta Water Supply Project
RC	-	Reference centre
RIVM	-	National Institute for Public Health and Environment
RNE	-	Royal Netherlands Embassy
Rs.	-	Pakistan Rupees
RWSG-SA	-	UNDP/World Bank Regional Water and Sanitation Group South Asia
SNE	-	Schedule of new expenditures
SWF	-	Southern well field
VM	-	Vibration method
WID	-	Women in development
WWF	-	Western well field

Executive summary

I Summary findings

1.1 Project Design

The Project was envisaged to comprise of a chain of activities which dovetailed one another: QSSP was designed as a "total" sewerage and sanitation project for Quetta. Not only was the population of Quetta to be provided with the facilities for sewerage and sanitation, but the collected sewage was also to be treated and re-used for irrigation, and an institution was to be created and set up for subsequent O&M. According to the Reformulation Mission report which assessed Project feasibility, this "total" concept for sewerage and sanitation would be cost effective.

In the Mission's view this was at once the strength and the weakness of the Project design: while it resulted in acceptable financial and economic rates of return (mainly on account of the sale of the treated waste water for irrigation), not all the shackles in the Project "chain" could be secured prior to Project implementation or controlled by the Project, resulting in very significant Project implementation risks.

In the Mission's view, this unusually large extent of the above Project risks should have led to deferment of Project implementation until some of these had been resolved, or built in as Project conditionalities. Alternatively, a more step-wise project implementation approach could have been selected. As it happened, however, GOBAL and GON proceeded on the basis of a large, but insufficiently prepared Project, with the result that predictable delays occurred during Project implementation.

1.2 Plan of Operations (PlanOp) benchmarks and achievements

Land acquisition
Land acquisition for the treatment plant and the transport main was envisaged to have been achieved by end 1987. This has not yet been fully completed todate.

Designs
Designs for the sewerage system have been completed in 1987. The proposed transport main has been rerouted to reach the revised proposed treatment plant site. Preparation of detailed designs for the transport main and treatment plant has not yet started.

Pipe factory
The pipe factory was completed in July, 1990, 30 months behind schedule. Pipe production for QSSP started in July 1991. Presently the factory is operating satisfactorily.

Implementation of sewerage contracts
The implementation of the sewer network contracts started in November, 1991, 32 months behind schedule. Contracts 1A and 1B, comprising about 18 km of concrete

sewer length (or about 17% of Project total), have almost been completed at present.

Sewerage house connections
The PlanOp envisaged 14,450 house connections. Based on detailed design estimates a total of 10,500 connecting boxes for house connections will be provided. No houses have been connected so far.

Low cost sanitation
The PlanOp envisaged a total of 13,850 low cost latrines to be constructed in areas outside the sewered area. As of 31 October 1992 a total of 2,034 latrines have been constructed (17% of target).

Institutional strengthening
The PlanOp provides for assistance in the establishment and development of B-WASA. Progress towards this objective is as follows:

- the B-WASA act, which was drafted in 1988, has been enacted in 1989;
- B-WASA organisation has been established and has an estimated nominal staff strength of 431 persons.

Numerous proposals to operationalise the provisions of the B-WASA Act have been made by the BKH and NMC consultants/advisors, but this has not led to implementation. This matter is discussed in more detail in section 8.10 below.

1.3 Water supply to QSSP sewers

The overall anticipated water supply (from QMC wells and the B-WASA well fields) to the area to be sewered by QSSP is expected to broadly meet the requirements of the sewers to be flushed, provided that all wells will continue to operate at their nominal production capacity and that this production volume is provided to the sewered area as per design. However, if GOBAL decides that the scarce water in Quetta is to be distributed equally to all its citizens, not enough water will be available in the sewered areas.

A proper set up for O&M of the entire water supply to Quetta to ensure that these water supply levels will be sustained in future is an essential prerequisite for the QSSP sewerage system to operate.

Presently , with only partial boosting to Quetta from the Northern well field, the water supply service levels vary in the QSSP area. Some areas are most likely better off than others, notably Tel Godam, Quaidabad and Nichari in the Northern part of the city, and Sirki/Satellite town in the southern part of the city. However, actual water supply volumes can not be accurately measured with bulk water meters, because of the direct boosting of water from the wells into the entire system and the ring pipeline network.

1.4 Discharging of domestic waste water in Quetta

Customarily Quetta residents discharge toilet and bathroom water separate from kitchen water. Toilet and bathroom water often passes through a "settlement tank" before discharge into a soakpit or in the municipal surface drains. Kitchen water plus solids pass directly into the municipal surface drains. Municipal sweepers keep the drains running.

For the proper functioning of the sewer system all domestic waste water should be collected into the sewer, and solids should be separated from the waste water prior to entering the sewer.

A public campaign to inform Quetta residents about these "needs" of the sewerage system will be required prior to connecting houses to the system.

1.5 Pipe Factory

The decision to build a VM pipe factory in Quetta was highly questionable both on technical and economic grounds, and should not have been taken in view of the very high implementation risks. After very significant implementation delays, which could not have been overcome without the substantial, but unanticipated GON financial and technical assistance to its establishment, the factory is presently running well. A large stock of sewer pipes is available in the yard. However, the sustainability of the pipe factory is vulnerable as it depends on questionable demand beyond the Project, intermittent electricity supply, unsecured spare parts supply and limited technical O&M expertise.

1.6 Low Cost Sanitation (LCS)

From a slow start, the LCS component of QSSP has progressed to a stage where four Reference Centres at Pashtoonabad, Marriabad, Hudda and Kili Shaikhan, have been established. Most of the RCs are now meeting the targets in terms of house-to-house campaigns, area meetings, obtaining applications and installation of latrines and follow-up visits. This progress, however is acutely threatened by continuing disputes between LCS B-WASA and QSSP financed staff over materials procurement matters, which negatively affect the LCS image and impact in the communities concerned.

Training modules for civil technicians, RC store keepers, sanitation promoters, health educators, and mistries have been designed. Training and promotional materials have been developed, but require improvement.

Though building of community awareness is an expressed intent of the project activities, available communication media have been insufficiently exploited.

Technical support to the RCs from the head office is poor and ineffective. Relevant experience on low cost sanitation is not available at the head office. Consequently, the RCs cannot effectively respond to local situations encountered during implementation.

B-WASA and QSSP staff in the LCS unit are at odds with one another, undermining the chain of command and smooth functioning of the unit. This is reflected in the above poor technical support to RCs and problems relating to procurement of materials.

Cost recovery is poor. The LCS unit has not (yet) exploited any peer or group pressure to pay the instalment in time. For the majority of the people in the target areas, it is more a matter of indifference (why should we pay, if we are not pushed?) than an affordability problem.

Though the Project design emphasises the involvement of the private sector in low cost sanitation programme, there is no Project activity (yet) geared towards encouraging the private sector to respond to the demand for latrines.

LCS of QSSP promotes only one sanitation option viz. Twin Pit Pour Flush Latrine, despite commendable success with a range of options in many countries in the Asian region. If a spin-off effect, with the private sector taking on the production and delivery of the latrines, is aimed at, a range of options at a varying prices, is generally more attractive to the private sector than only one product.

There is scope of reducing the cost of the PFL promoted through design optimization, use of different materials and introduction of options in its different components.

1.7 Financial viability: ability to pay and willingness to pay

Quetta residents in the QSSP area, both the sewer area and the LCS area, are relatively well off. Payment towards sewerage and sanitation should not be a problem. However, the value/priority attached to sanitary facilities is low. This results in indifference to payment obligations and cost recovery problems, both on account of sewerage and for LCS.

The currently proposed sewerage surcharges on the water rates are at best just adequate to recover O&M costs, but not to recoup any of the capital cost of the system. GOBAL subsidy to sewerage and sanitation will therefore be unavoidable in the near future.

1.8 QSSP Management

Over the last year efforts to introduce joint QSSP management between the BKH consultants and B-WASA staff have been initiated. This is expressed in joint responsibility for i.a. contractual/tendering matters and financial claims by the B-WASA Project Director and the BKH Project Manager.

1.9 BWASA institutional development

The BKH and NMC consultants/advisors have provided building blocks to operationalise the provisions of the B-WASA Act through the preparation of:

- organisational recommendations;
- accounting systems recommendations;
- an accounting manual;
- tariff and billing systems recommendations;
- staffing and training recommendations.

However, none of these recommendations have so far been adopted and implemented.

Numerous proposals have been made on water charges, but none have been implemented fully.

Hence, most of the prerequisites for B-WASA to function as an autonomous, self-sustaining authority according to the provisions of the Act are not yet in place, even though many of the above essential prerequisites have been discussed and approved by the B-WASA Board. Such B-WASA Board approval has not led to or has not been preceded by GOBAL approval as required under Articles 13 (1) (rules), 16 (a) (tariffs), 26 (borrowing) and 27 (accounts) of the Act. Therefore, a number of essential B-WASA Board approved recommendations could not be implemented legally or practically.

Staff rules along the lines of QDA staff rules have been adopted, whereas for procurement the provincial government rules apply; for O&M no rules exist yet. Revenue collection is still administered and handled manually, accounting and budget preparation still follow government departmental practices (single entry accounts and preparation of expenditure budgets only).

As a result of the non-implementation of the Act, B-WASA today functions not as an Authority, but as a government department, with its establishment temporarily funded out of QWSP and (to a lesser extent) QSSP.

Hence, in the Mission's view, the Project has been largely unsuccessful in making a serious institutional impact.

The Mission feels that the root cause of this lack of progress is insufficient concern or commitment on the part of GOBAL for the viability of B-WASA. B-WASA has clearly not been perceived by GOBAL policy makers as an important implementation arm of Government policy in the area of urban water supply and sanitation.

1.10 Transfer of QMC assets and liabilities on account of water supply and sewerage operation to B-WASA

De facto responsibility for water supply to Quetta is divided between QMC and B-WASA. QMC is responsible for the supply to the city centre and B-WASA to the surrounding areas. QWSP, implemented by B-WASA, is partially providing water to areas where QMC is responsible for operation and maintenance (O&M), as well as to areas where B-WASA has this responsibility.

B-WASA and QMC are at odds over the distribution of the additional water which will be generated by QWSP. B-WASA currently provides water to consumers in Satellite

Town, where QMC is (still) responsible for O&M of sewerage. QSSP will exclusively provide sewerage to areas currently provided with water by QMC. Assigning the technical responsibility for O&M of the entire Quetta water supply and sewerage system to a single agency is obviously desirable, but has not yet taken place.

The transfer of responsibilities is provided for in Article 12 (f) of the B-WASA Act; proposals for it have been prepared from time to time and the issue has been regularly discussed in the B-WASA Board meetings. However, todate only a limited portion of QMC's water operations and none of its sewerage operations have been taken over by B-WASA as noted above.

II Recommendations to B-WASA and GOBAL

2.1 Sewerage

2.1.1 Progress in sewer construction depending on water supply availability

The construction of sewers and subsequent connections should only start in areas with a proven sufficient water supply. In the Mission's assessment the areas with high potential and low risk in this regard appear to be Tel Godam/Quaidabad/Nichari and Sirki.

Since the pipes required to sewer Tel Godam/Quaidabad and Nichari plus Sirki are largely in stock, these sewers could be laid with priority over the planned implementation schedule of QSSP. Starting with Tel Godam has the tentative additional advantage (from the flushing potential point of view), that the Cantonment Board has an active interest in a possible discharge connection into the QSSP network at Tel Godam. Minor upgrading of the sewer line may be required.

Subject to confirmation of adequate water availability in these areas to flush the system, construction of the main lines to Tel Godam and Sirki should therefore be started upon the satisfactory completion of the present 1A and 1B contracts **(Action: QSSP/B-WASA)**.

For subsequent sewerage contracts, similar conditionality should apply. Depending on resulting feasible subsequent progress of the sewerage works, Gul Pipe will have to be informed about the (potentially significant) change in the pipe requirements for 1993. It needs to be explored if the shortfall can be compensated by supply to other consumers, e.g. the Cantonment Board and BDA. Gul Pipe, the lessee of the pipe factory, should obtain all its input requirements through normal commercial channels **(Action: QSSP/B-WASA/BDA/Gul Pipe)**.

2.1.2 House connections

Before connecting houses to the sewers, the procedures and regulations (bye-laws) for connection should be established and made known to the clients. Particularly the residents of Tel Godam are middle and upper class, and do not have financial constraints to meet any connection or other charges if properly explained **(Action: QSSP/B-WASA)**.

Before starting to connect houses to the sewers an education campaign on the actual use of the sewer should be carried out. This campaign should explain that solids should be separated from the waste water prior to discharging waste water, and that all waste water should be discharged into the sewer **(Action: QSSP/B-WASA)**.

It is recommended that the outstanding issues concerning house connections are resolved immediately. Upon completion of the procedures and the assurance of sufficient water in areas 1A and 1B house connections should be started without delay **(Action: QSSP/B-WASA)**.

House connections in Tel Godam/Quaidabad/Nichari and Sirki should be made during construction of the main lines **(Action: QSSP/B-WASA)**.

2.1.3 1993 sewerage outputs

By the end of 1993 QSSP should have completed the sewer mains and a number of houseconnections in 1A, 1B, Sirki and Tel Godam zones. The sewage will be discharged through the temporary outlet into the Habib Nullah.

As this cannot be more than a temporary solution, preparation for the construction of the transport main and the treatment plant (land acquisition and detailed design/preparation of bills of quantity/tendering) should start during 1993, so that construction could start once the sewerage in the above mentioned areas is operating properly **(Acion: B-WASA/QSSP)**.

2.2 Low Cost Sanitation

For successful implementation of the LCS component of QSSP as designed, continued and additional support has to be provided to advance the Project in fulfilment of its objectives. Support actions necessary are summarized below and will all need to find their way in the 1993 QSSP implementation plan **(Action: QSSP)**:

2.2.1 Materials Procurement Policy

In view of the recurring problems on procurement of materials for the RCs, perhaps the involvement of the beneficiaries in the procurement of the materials may solve the problem and give the RCs a level of flexibility desired by them. Considering that the creditability of the LCS programme ultimately depends on its ability to deliver to the community, this matter needs to be resolved urgently **(Action: QSSP/B-WASA)**.

2.2.2 Training Support

The LCS unit need further training support. Training modules should be developed for community leaders, councillors, imams and people whose opinion matters in society. Special training to improve the capability of private sector and encourage their participation should be initiated.

Perhaps the best way of improving sanitation coverage is through reinforcing common experience in the community. About 35% of the people have acceptable latrines and a high percentage have traditional latrines. The initiative to install a facility exists in the community. It is for the programme to take advantage of this vital force through training interested people in the community in both the 'soft' and 'hard' issues of sanitation programme.

Training in both technology and the soft issues of community development, social mobilisation, sanitation promotion should be strengthened to include details on criteria

of design, use of materials, technology options, improvisation and flexibility along with cost implications **(Action : QSSP)**.

2.2.3 Development of Training and Promotional Materials

Without detracting from the dedication and the efforts the Project has made in developing the training and promotional materials, improvements have to be made if the activities are to have their intended impact **(Action: QSSP)**.

2.2.4 Monitoring and Evaluation

Qualitative indicators of success of training, promotional and hygiene education, activities should be expanded **(Action: QSSP)**.

2.2.5 Media of Communication

Success of low cost sanitation is dependent on a positive response from the community, not only in the areas served, but also the wider Quetta community. A programme involved in improving sanitation conditions in the community should use all available means of communication. The radio, television, newspaper, billboards, traditional channels, transport such as buses should all be used to generate general support and acceptance. Demonstration latrines along with basic information, should be put up in schools, madrashas, market places and in front of RCs **(Action: QSSP)**.

2.2.6 Technical Support

A LCS programme cannot depend solely on a design for ideal conditions. Reality is different. Improvisation and change in design necessary to adapt to changing site conditions, such as high water table, and space constraints have to be introduced.

A low cost sanitation programme based on one technology option with very little flexibility, cannot be expected to be cost effective in the long run. A community with diverse culture, habits, attitudes, income groups and scarcity of spaces, needs a range of technology options with improving traditional latrines at one end of the scale to twin pit pour flush latrine at the other. Single pit latrines, VIPs (single pit and twin pits), upgrading traditional latrines and small bore sewers should all be tested as to appropriateness under specific constrained conditions, user acceptability and response **(Action: QSSP)**.

Even within the selected technical option, there may be scope for improvement, both in terms of design optimisation, and reduction of cost. The parameters of design of pits should be carefully evaluated. There is scope of reducing pit sizes. Introduction of concrete rings for pit linings, pre-cast Y-junctions, concrete pans, masonry footrests may all be considered to assess their contribution to cost reduction, flexibility, choice, and greater potential for private sector involvement in production and delivery of latrines **(Action: QSSP)**.

2.2.7 Study Tours, Seminars and Workshops

Key LCS and B-WASA staff should be exposed to successful low cost sanitation projects in the region. Successful projects should be identified and relevant staff sent to study technology options, community development and evaluation procedures, service delivery mechanisms and cost recovery practices **(Action : QSSP)**.

Key staff from the LCS unit should be sent to seminars, workshops and training courses on relevant topics. The LCS unit should also organise seminars/workshops to share experiences and lessons learnt **(Action: QSSP)**.

2.2.8 Cost Recovery

Cost recovery should relate to a realistic assessment of present value of money. The present value of the time series repayment over a period of five years will be much lower than the current price of a latrine. The prevailing repayment schedule provides discounts for full payment upfront and for different rates of down payments. Logically the rebate allowed should be equal to the current full price minus the present value of the time series payment of instalments. The prevailing rate of interest should be used as the rate of discount to calculate the present value. This will give the beneficiaries an incentive to pay upfront. Ultimately, the entire credit system may be abandoned, as affordabilty does not appear to be a serious constraint, and the incentive function of the credit scheme will diminish in importance over time as compared to the inherent difficulties in implementing the credit scheme **(Action: QSSP)**.

Important to effective cost recovery is peer or group pressure, which is known to have worked in many places in Asia. Apart from follow-up visits by sanitation promoters and hygiene educators, CBOs and motivated community leaders may prove to be useful. Notwithstanding that users group formation is difficult in the prevailing socio-cultural environment in Quetta, efforts at group formation should be pursued. If latrines can be given to individuals in groups, a group guarantee can work to mutual advantage **(Action: QSSP)**.

2.2.9 WID Activities

The LCS unit has been successful in involving women in its programme. It is recommended that the programme consolidates its position vis-a-vis WID in sanitation before venturing into solid waste management and drainage. Widening the scope for women's involvement to include education, health and family planning will depend on the future institutional status of the LCS unit **(Action: QSSP)**.

2.2.10 Future Institutional Sustainability

The long term institutional sustainability of the LCS unit beyond the Project period has been a source of concern. It is now time to seriously consider the options available (either for LCS to stay in one way or the other under B-WASAs auspices or for it to

develop into an NGO), weigh the financial implications, and decide on the future. For a smooth transition a plan of action should be drawn up and operationalised by the end of 1993 **(Action: QSSP/B-WASA/GOBAL)**.

2.3 Gradual expansion of joint management of QSSP

During 1993 the function of supervising engineer (verifying the quality and quantity of work) should be gradually transferred to B-WASA. For the transfer B-WASA should, with the assistance of BKH consultants, prepare itself for taking on this responsibility **(Action: QSSP/B-WASA)**.

To satisfy GON need for an accountability of its financial support, the Project Manager for QSSP should keep a small inspection team for random quality of works checks and bill inspection **(Action: QSSP)**.

QSSP bookkeeping should also be gradually transferred. To prepare for this transfer, B-WASA should appoint a suitably qualified accountant/bookkeeper to QSSP (possibly the current QSSP incumbent) to be trained as required on QSSP accounting practices under the supervision of the BKH Project Manager **(Action: B-WASA/QSSP)**.

2.4 B-WASA institutional development

B-WASA's institutional sustainability can only be secured if GOBAL adopts the agency as an operational entity in accordance with the Act. In the Mission's view GOBAL's commitment to the implementation of the Act can be demonstrated by a number of concrete, monitorable action steps, which can be taken during the next 6 months i.a. including the following:

- amendment of the BWASA Act to provide more stability in the Board membership and its chairmanship, to delete the clause regulating the tenure of the managing director, and to reduce direct GOBAL interference with the operation of the Authority;
- an early GOBAL approval of the proposed B-WASA double entry accounting system, which would enable it to establish the WASA Fund as provided for in Article 23 of the Act; implementation of the same by BWASA and carrying out an inventory of the Authority's assets and liabilities to establish its balance totals;
- an early GOBAL approval of the water charges and sewerage surcharge, approved by the B-WASA Board in its meeting of 19 October 1992;
- the framing by B-WASA of comprehensive B-WASA rules of business (or bye-laws) as required for the smooth operation of the Authority, an their approval by the Board and GOBAL;
- the framing of an operational plan for a commercial (computerised) billing system (including provisions for sanctions for non-payment) by B-WASA and its approval by the Board and GOBAL;
- to prepare and submit to BWASA Board and GOBAL a realistic budget for FY 1993/94, considering realistic revenue targets for that year;
- rationalisation of B-WASA's organisation, through adoption of clear task descriptions for its various departments, with particular emphasis on strengthening the revenue

collection operations, accounting and budgeting and operation and maintenance, both on the water and sewerage sides;
- adoption of unambiguous job descriptions and qualification requirements for all staff, starting from the top management, which will henceforth be adhered to when vacancies arise; urgently filling the positions currently lying vacant, most particularly the position of Director Administration/Secretary of the B-WASA Board;
- improving the dismal office space situation of B-WASA, bringing QSSP and the revenue section under one roof with the other central B-WASA functions;

The Mission has reviewed a draft Action Plan prepared by B-WASA to achieve the above by the middle of next year. In the Mission's view this Action Plan is broadly achievable, if there is sufficient political and administrative will to carry it out. However, it requires further detailing of the action steps for it to be useful as a management tool for implementation.

The Mission recommends that GOBAL reviews, details and adopts this Action Plan with the objective to achieve the above targets by 1 July 1993, so that the required institutional and financial systems can be in implementation by the beginning of FY 1993/94. The Mission further recommends that this Action Plan is submitted formally by B-WASA/GOBAL to RNE not later than 31 December 1992, so that it can also be used as a monitoring tool by RNE **(Action: B-WASA/GOBAL/RNE)**.

For the finalisation and the implementation of the Action Plan it will be necessary to establish a small working group in B-WASA, charged with the task of initiating and following up on each of the individual steps of the Action Plan. In view of B-WASA staff constraints, the Mission recommends that this working group is chaired by the MD B-WASA and further consists of the Director Finance, the (Deputy) Director Administration and a management advisor **(Action: B-WASA)**.

2.5 Transfer of responsibilities for water and sewerage from QMC to B-WASA

The Mission considers that resolution of this issue is very urgent, as neither QWSP nor QSSP can become fully operational in its absence, and it hence impinges about the institutional sustainabilty of both. As has been done elsewhere in Pakistan, under the present circumstances in Balochistan this can be decided by GOBAL and operationally implemented relatively quickly, with resulting inventory of and agreement on the financial magnitude of assets and liabilities transferred to be resolved post-facto.

The Mission recommends that an action plan for transfer along these lines is prepared urgently by GOBAL, to be agreed upon by all parties by 31 January 1993. The mission further recommends that this action plan is submitted to RNE by that date to also be used as a monitoring tool by RNE. For the preparation and implementation of this action plan it is necessary to establish a small working group consisting of representatives from QMC and B-WASA, supported by technical and financial advisory capability **(Action: GOBAL/RNE)**.

2.6 1993: a year of 'Testing and Transition'

If the above recommendations are adopted, 1993 will be a year of testing and transition for QSSP and B-WASA.

The testing applies particularly to the technical aspects of QSSP components e.g. sewerage and LCS. The general direction for the implementation of these components has been described above. Implementation of these components is within the capability and competence of QSSP and B-WASA.

General directions for the more fundamental transfer of responsibilities from QMC to BWASA and required institutional actions related to B-WASA have also been described above. The implementation of these proposals will go beyond the competence of B-WASA, and will require interagency agreement (B-WASA and QMC) and GOBAL approvals.

The working groups recommended in sections 2.4. and 2.5. have been proposed to facilitate the achievement of these agreements and obtaining those approvals.

III Recommendations on continued GON support to QSSP

3.1 General direction

Considering the considerable uncertainties regarding the technical viability of the sewerage part of the Project and regarding GOBAL readiness to seriously adopt B-WASA as its main implementing agency, **the Mission recommends that GON extends continued support to the Project during 1993, with further support thereafter conditional to the satisfactory undertaking of the various actions described in section II above.**

The Mission further recommends that an independent and joint GOBAL/GON review of progress is carried out by the middle of 1993 to assess this, and to recommend the scope and direction of further GON support, if any **(Action: GOBAL/GON)**.

Considering project implementation delays, substantial overspending on TA along with capital cost increases, it is not likely that GON will, within the original commitment limitations, be able to support financing of the entire QSSP works on a 70/30% basis as provided for in the original PC-I. By the end of 1992 only an amount of Dfl.16.1 million will still be available for QSSP implementation. As detailed below, the Mission proposes some marginal adjustment in the GON support items for 1993, but considering the larger GON and GOBAL resource constraints, it may be advisable for GOBAL to actively pursue financial support from other donors for selected sewerage capital investment items in the overall QSSP capital investment programme. Considering its earlier involvement in supporting QWSP and its expressed interest to provide further support, an obvious alternative source of finance will be the Kuwait Arab Development Fund. GON may facilitate this through liaison with appropriate donor agencies **(Action: GOBAL/GON)**.

3.2 Specific support elements

In the Mission's view GON support during 1993 should comprise the following:

a. financial support for continued sewerage work along the lines described in paras 2.1.1. - 2.1.3. above;
b. financial support for continued LCS work as described in paras 2.2.1 - 2.2.10 above;
c. technical support by BKH/NESPAK to facilitate the implementation thereof, consisting of:
   - about 25 mm of expatriate consultants support;
   - 40 mm of local consultants support;
   - 36 mm of local support staff.

   Some suggestions for specific job descriptions are provided in Annex 5a to the Mission's report. These need to be developed fully in the consultants' proposal as part of the 1993 QSSP implementation plan **(Action: QSSP/BKH/NESPAK)**.

d. advisory support to B-WASA to facilitate the implementation of the institutional action plan and the transfer of responsibilities from QMC to B-WASA, consisting of:
   - an expatriate management and organisations specialist with experience in public utility management (10.5);
   - a local utility systems engineer (12 months).

   Until this management advisory team is in place, the services of the present management adviser require to be continued. An overlap with the advisory team would be desirable, and if the workload requires, it may be considered to retain the present management adviser (who has an accounting background) as an additional member of the advisory team for part of 1993. A brief Terms of Reference for the envisaged management advisory team is in Annex 5b to the Mission's report to facilitate early recruitment **(Action: DGIS/RNE)**.
e. intermittent support from the Pakistan Country Team of the UNDP/WB Water and Sanitation Programme on computerised billing and revenue generation, LCS technology, training, community development and development of training and promotional materials. This support would also serve the wider objective of donor coordination in the water and sanitation sector, and in that way shorten learning curves for executing agencies and donors alike **(Action: RNE)**.

It is tentatively estimated by the Mission, that the above GON support during 1993 would require the following approximate budget:

- sewerage (at 70% of cost of works, including share of maintenance equipment, but excluding cost of pipes, which need to be 100% financed by GOBAL until the pre-financing debt incurred has been repaid in full):	Dfl. 1.6 million
- LCS (at 70% of cost of works, including share of operational cost):	Dfl. 0.3 million
- transport provisions and other QSSP operational overheads (at 70% of cost):	Dfl. 0.1 million
- continued BKH/NESPAK technical support (at 100% of cost):	Dfl. 1.1 million
- B-WASA advisory support (at 100% of costs):	Dfl. 0.4 million
Total required:	Dfl. 3.5 million

3.3 Additional considerations

Upon GOBAL/GON agreement on the above, QSSP should be requested to prepare a revised and detailed annual implementation plan for 1993, including a budget. This plan should follow the recommendations above. This plan should also include a tentative time schedule plus estimate for the completion of QSSP **(Action: QSSP)**.

As continued GON financing is not ensured beyond 1993, depending on the outcome of the above review mission to be fielded by mid-1993, production of pipes for QSSP during the first half of 1993 by the pipe factory should not be more than required for 1993 works **(Action: B-WASA)**.

I Introduction

1.1 QSSP context

1.1.1 Background

The Quetta Sewerage and Sanitation Project (QSSP) has been designed to improve sewerage and sanitation conditions in Quetta, the capital city of Balochistan. Balochistan at 350,000 km^2 comprises 44% of the land of Pakistan, but with an estimated 6.3 million population (1991) only about 5.5% of Pakistan's population. Population growth in Pakistan has been high by international standards, at about 3.1% per annum. Population growth in Balochistan has been estimated at an astounding 7% p.a during the 1972-81 intercensal period. Balochistan is considered to be one of the poorer provinces of Pakistan, and as such is a major recipient of Netherlands development assistance.

Balochistan has an arid climate, and a shortage of water resources, which limit its agricultural potential. It has some non-agricultural natural resources, such as gas and precious metals. Industrial activity is limited to Hub Chowki (just across the border with Sindh province and really an adjunct of Karachi, with its development caused largely by favourable federal tax exemptions applicable in Balochistan during the 1960s through to the 1980s), Gadani on the coast (shipbreaking/scrap industry) and Quetta valley.

A substantial share of the province's income is derived from trade, with Quetta being a major transshipment point on the road between Karachi and Afghanistan (Kandahar-Kabul).

The province's population consists of a number of distinctly different ethnic/tribal/ linguistic groups, comprising of the Baloch, the Pathans and the Brahui as the three major groups. During the 1980s the province's population has been augmented by an estimated 1 million refugees from Afghanistan. While the impression exists that some of these have returned since the political settlements in that country early in 1992, the renewed waves of civil war have brought such returns to a standstill and have brought in new refugees.

1.1.2 Intergovernmental relations

Pakistan has been a federally governed country since the break-up of the "one-unit" of then West-Pakistan in 1971 in the wake of the separation of Bangladesh. The Constitution specifies which subjects are Federal and provincial functions.

However, until recently, provincial autonomy with regard to its prescribed functions could not be exercised properly for lack of funds within the control of provincial governments. The Federal government recognised the disadvantageous position of Balochistan by providing a special additional development allocation on top of the regular Annual Development Programme (ADP) allocation, which is determined on the basis of population criteria. This Special Development Programme (SDP) i.a. forms

the source of counterpart funding for QSSP. Even with this and similar provisions in other provinces, the provinces increasingly had to resort to utilising ADP funding to finance recurrent costs, as their own sources of revenue and shared revenue from the federal government under the existing arrangements were insufficient for this purpose. This situation could not be sustained. The 1991 Award by the National Finance Commission has changed the revenue sharing formulas significantly in favour of the provinces, and the SDPs have been phased out.

In terms of staffing, the Provincial Government Departments depend for their top management positions on CSP officers, who also play a major role in local government management through the District Management Group. More junior positions are held by provincial civil service cadres. Balochistan is not generally considered to be a pleasant duty station, and as a result it has traditionally proven to be difficult to attract qualified personnel to the province, both in the private sector as well as in government service.

1.1.3 Quetta

Quetta, the province's capital had about 286,000 population in 1981, the last year in which a population census has been conducted. During the 1972-81 intercensus interval Quetta's population had grown at 6.8% per annum, a rate substantially above the national urban population growth average of about 4.7% p.a., but slightly below the aggregate provincial population growth rate. Since then the QMC boundaries have been substantially extended. Current (1992) population is variously estimated at ranging between 480,000 and 1 million. As the 1991 population census was aborted no reliable data are available. Quetta has always had a high proportion of nomadic population living in tents. This transient population has, of course increased substantially with the influx of Afghan refugees. Quetta's population varies markedly between summer and winter, when many of its transient inhabitants move towards the coast to avoid the severity of the winter weather.

Quetta is a typical transport and trading centre, and is otherwise characterised by being the seat of the provincial government and the main western airbase and army garrison.

In terms of municipal services the city has substantial deficiencies in water supply (caused in part by endemic water resource deficiencies in the Quetta valley), in solid waste disposal, drainage and sanitation. Household waste water finds its ways into side drains along roads and streets in the city, which often do not properly function and stagnate as they are being choked by uncollected solid waste. Drinking water supply shortages were envisaged to be addressed by the Kuwait Arab Development Fund supported Quetta Water Supply Project (QWSP), which after substantial implementation delays is now scheduled for physical completion by mid-1993. The Quetta Sewerage and Sanitation Project (QSSP - the Project) was first conceived in 1982 as an essential response to evacuate the envisaged large waste water flows generated by the additional water supply from QWSP.

1.2 The Project: objectives and scope

The Project's broad objective is to improve the living and sanitary conditions of the population of Quetta.

As per PC-I, this objective was to be furthered by the implementation of the following project components:

- the provision of about 130 km of sewerage system in the city centre;
- the provision of 12.5 km sewage transport main;
- the development of a waste water treatment plant with a capacity of 25,000 cubic m. per day;
- the development of a 270 ha. irrigation scheme to be irrigated with treated waste water from the treatment plant;
- the installation of about 14,500 sewerage house connections;
- the provision of at least 13,850 low cost latrines in areas which can not (yet) be sewered;
- assistance in the development of the Balochistan Water and Sanitation Authority (B-WASA), which would be the agency responsible for O&M of the assets created under the Project and for further development schemes.

Envisaged prerequisites for project implementation are land acquisition for the treatment plant and for the transport main, as well as the development of a pipe factory, which would manufacture sewerage pipes to be used in laying the sewerage network and the transport main.

After initial Project preparation and appraisal in 1982-3, it was deemed that further Project feasibility was necessary before commitments to its funding could be made.

This feasibility study was carried out during a 3 months Project Reformulation Mission in 1984. This feasibility study was reviewed by a Government of the Netherlands (GON) Appraisal Mission in 1985 and also formed the basis for the 1985 Planning Commission Format I (PC-I) for the Project, which, with slight modifications, was approved by the Executive Committee of the National Economic Council (ECNEC) in 1986.

To achieve the Project aims GON financial assistance of Dfl. 22 million and technical assistance of Dfl. 4.5 million was envisaged.

Technical assistance for the Project to be carried out by the Netherlands-Pakistan consultants team of messrs. BKH/NESPAK was mobilised in early 1987 on the basis of an agreed Plan of Operations (PlanOp).

1.3 Mission objectives, scope, composition and itinerary

The QSSP Evaluation Mission has been carried out during 25 October - 12 November 1992. The Terms of reference for the Mission (attached as Annex 1a) prepared by the Netherlands Embassy Islamabad (RNE) provided a broad mandate to the Mission to evaluate the Project along the following criteria:

1. Policy. Has the Project been designed and implemented in consonance with GOBAL/GOP/GON (sector) policies? How does Project design and implementation compare with international sector policy trends and programme approaches?

2. Realisation of objectives. To what extent have Project objectives been realised?

3. Effectiveness of Project design, inputs, activities and outputs in achieving Project objectives.

4. Project impacts, particularly impacts on the environment, health, poverty and on the position of women.

5. Project sustainability, along the following dimensions:
   - technical/operational sustainability;
   - environmental sustainability;
   - social sustainability;
   - institutional sustainability;
   - financial sustainability.

The Mission TOR also indicates some of the perceived problem areas, and explicitly requires the Mission to make recommendations for further Project development.

The Mission was envisaged to be a joint GOBAL/GON evaluation mission. The following mission members were nominated by GON/RNE: mr. Jens Bjerre, RWSG-SA, Delhi; dr. Zia Al Jalaly; mr. Haroon-ur-Rashid, RWSG-SA; Dhaka, ir. Henk van Schaik (HvS), RIVM, Bilthoven and dr. Emiel Wegelin, NEI, Rotterdam (mission leader). The Government of Balochistan (GOBAL) nominated mr. Hidayatullah Khan, Chief Coordination Officer, Planning, Monitoring and Coordination Unit, Planning and Development Department,GOBAL as counterpart mission member.

After initial briefing at RNE in Islamabad, the Mission spent its remaining time in Quetta and had discussions with all concerned GOBAL officials, B-WASA management and staff, QSSP consultants and staff and other involved individuals. An issues paper was presented by the Mission to the Additional Chief Secretary (Development), GOBAL and discussed on 5 November 1992. The Mission presented its draft summary findings and recommendations in a wrap-up meeting chaired by the ACS (Dev.), also attended by GON/RNE representatives on 10 November 1992 (agreed minutes of the meeting are in Annex 1b). Subsequent to the wrap-up meeting, further discussion of highlights of the Mission's findings and recommendations took place with the Chief Minister, GOBAL and the Minister for Urban Development and Planning, GOBAL.

In preparing this report, messrs Bjerre and Van Schaik have been responsible for the technical evaluation of the sewerage and water supply issues, mr. Rashid and dr. Al-Jalaly for the evaluation of the low-cost sanitation component, and dr. Wegelin for the institutional and financial evaluation of B-WASA. Editing of the report has been carried out by messrs. Wegelin and Van Schaik. This final report has benefitted from comments on the earlier draft (circulated on 18 November 1992) received from B-WASA, BKH and GON.

II QSSP Achievements: Benchmarks and their Realisation

2.1 Pipe factory

The Reformulation Mission Report for the Quetta Sewerage and Sanitation project (1984) recommended the construction of a concrete sewer pipe factory in Quetta.

The PC-I for QSSP stated that "a number of Pakistani pipe manufacturers and private investors have already shown keen interest in this undertaking", that "GON/FMO expressed interest to provide a development credit to a joint venture to be set up between a Pakistani and a Dutch pipe manufacturer" and that "the investment costs are not included in the project budget".

The PlanOp for QSSP estimates the required time for the establishment of the pipe factory at 13 months, and envisaged that the starting date for the delivery of sewer pipes to QSSP would be 1 December 1987.

On 15 May 1990, 2.5 years after the projected date in the PlanOp, the first pipe was produced in the pipe factory.

Instead of a private party, BDA (Balochistan Development Authority) became the owner of the factory. GON had agreed to pre-finance the imported equipment for the factory, which was subsequently leased to the present operator, Gul Pipe.

Full scale production for QSSP started on 1 July 1991.

QSSP prepared a 5 year delivery schedule to the pipe factory for production purposes.

At the time of the Mission, October-November, 1992, the pipe factory was in full production, had delivered the pipes for year 1 of the delivery schedule and had cast a substantial number of pipes for year 2 of the delivery schedule.

2.2 Sewerage disposal network

The Reformulation Report (1984) states that QSSP will provide a sewer network for the city centre of Quetta. The PlanOp (1986) stipulates that a total of 130 km sewer lines will be constructed in contract parcels between 1988 and 1993.

Presently a total of 18 km of concrete sewer line has been constructed.

The PlanOp envisaged a total of 14,500 house connections to the sewerage system, to be provided during the course of the Project period. No houses have been connected as yet.

2.3 Sewage transport main, waste water treatment plant and irrigation scheme

Transport main

The waste water will be transported to a sewage treatment plant through a gravity transport main. The treatment plant will be situated approximately 12.5 km north of Quetta. The preliminary design indicates that the transport main will be a single 900 mm diameter pipe. By 2004 this main line will need duplication to accommodate the volume of waste water. The proposed route runs largely parallel to the railway easement (see Annex 2b).

A topographical survey of the originally proposed route had been carried out in 1987; after revising the route, a resurvey has been carried out in 1990. Acquisition of land required for the current route was initiated in February 1991, but has not yet been completed (see section 2.6).

The PlanOp assumed that detailed design of the transport main would be carried out in January - February 1988 and envisaged completion of construction by November 1990. The detailed design has not yet been prepared.

A temporary discharge point into the Habib Nullah has been established in the city. Untreated waste water will be discharged at this point into the riverbed (nullah) until the transport main and the treatment plant will have been constructed.

The Mission considers that the following issues require consideration:

- recalculation of the transport main on the basis of the present and the expected future water supply situation in Quetta **(action: QSSP)**;
- land acquisition should be completed as soon as possible **(action B-WASA)**;
- detailed design and bill of quantities for the construction of the transport main should be prepared immediately and construction should start as soon as possible **(action QSSP)**;
- the environmental impact of the temporary discharge point in town should be assessed **(action: QSSP)**.

Treatment plant

The Reformulation Mission Report of 1984 discussed several appropriate options for waste water treatment. The report recommended a treatment system with anaerobic pre-treatment followed by facultative ponds and maturation ponds. The recommended system is simple and requires minimum operation and maintenance. The report recommended to utilize the treated waste water for irrigation purposes.

The preliminary design suggested the treatment ponds to be designed to facilitate the irrigation requirements for 270 ha during the cropping period. The hydraulic design capacity based on the original population and water consumption capacities was estimated at 25,000 cu.m/day for phases I and II.

The report discussed the pros and cons of this method. It did not discuss the environmental impact of the reduced or stopped biological process during the winter months. During this period the waste water will be discharged to the nearest nullah, because there is no requirement for irrigation.

Due to land acquisition problems the proposed site for the treatment plant has been changed to a site at the railway line to Chaman at Sundar Chore to a site of the Airport and north of Tirkha Lora (see map at Annex 2b). Acquisition of a 200 acre site is in progress (see section 2.6 below). The Mission visited the proposed site. The area is relatively flat; its elevation is roughly 300 m lower than Quetta city. No soil tests have yet been carried out.

The B-WASA laboratory is fully equipped and staffed. However, the necessary chemicals to performs water quality tests have been lost when the laboratory changed location, and these have not yet been replenished. This is urgently required, as a detailed knowledge of the composition of the waste water, to be acquired through water quality monitoring, is a **prerequisite input** for the detailed design of the treatment plant.

The PlanOp envisaged the detailed design to be prepared in August - September 1987, followed by start of construction in March 1989 and completion in November 1990. Preliminary design work was carried out in August 1987, but due to the above no further design work could be undertaken.

The Mission suggests that the following issues are carefully considered:

- a review of the hydraulic load on the treatment plant based on the revised estimate of the expected waste water flow **(action: QSSP)**.
- provision of the required chemicals to the B-WASA laboratory, water quality monitoring and for the purpose of verification of the composition of the waste water at the outlet into the Habib Nullah **(action: B-WASA)**.
- environmental impact of the discharge to the nullah during periods with no irrigation demand and with low biological activity in the ponds **(action: QSSP/B-WASA)**.
- impact on the use of treated waste water for irrigation purposes, both for the crops grown and for the labourers working on the farms **(action: B-WASA)**.
- commencement of the detailed design of the treatment plant and further preparation for its construction to be taken up immediately **(action: QSSP)**.

Irrigation scheme

The Reformulation Mission Report proposed a re-use of treated waste water for an irrigation scheme at the treatment plant. The report describes theoretical modular irrigation farms of 10 ha each with a system of lined main channels, service roads and management through a Project Management Unit (PMU). On-farm development is, according to the report, the responsibility of the farm.

The report proposed sale of waste water to the farms through PMU; a method for measuring of the water for each farm is not described. Resale of the treated waste

water was a major was envisaged to contribute significantly to the financial and economic viability of the Project. The area adjacent to the (revised) site for the treatment plant is waste land. An irrigation scheme, fed from a tubewell and a dam is situated approximately 2 km north of the site for the treatment plant.

The PlanOp assumed that the irrigation schemes would be designed during September - October 1987; and that construction of the schemes would commence by mid-1990.

A design for irrigation schemes had been prepared in relation to the originally intended treatment plant site, but no further follow-up has been carried out since. In the Mission's view, it is highly questionable if surrounding land owners are at all willing and interested in developing irrigation fed farms and in buying treated waste water to irrigate their crops. This needs to be established as a matter of urgency, and if positive interest is established, a concrete arrangement for selling this waste water needs to be designed **(action: B-WASA)**.

2.4 Low cost sanitation (LCS)

The low cost sanitation is a process oriented component of QSSP with quantitative targets in the number of latrines to be installed. As the LCS component aims at improving health and environmental sanitation in low income areas through change in people's attitudes and hygiene habits, it is important that the component be seen as a 'process' of change rather than only activities geared to meeting physical targets.

In such a context project indicators of achievement should not only be numbers of latrines produced and sold, training sessions held or health messages imparted, but must be intrinsically linked to the quality of each project element and the integration of all project elements as a whole. Achievement can only be measured by the changes brought about in perception, attitudes and hygiene habits of the beneficiary. But such indicators are not readily available. In the absence of better indicators the latrines installed and training and promotional activities conducted are used as surrogates.

Targets Met

The LCS component was expected to be operational in 1987 and by 1993, 13,850 Pour Flush Latrines (PFL) were to be installed in six low income areas of Quetta. The target was too ambitious for an LCS unit without any prior experience in low cost sanitation.

In 1987-1988 (the demonstration phase) 100 latrines were constructed through contractors, all free of cost. The demonstration phase provided the basis for the subsequent development of the LCS. The user acceptability of the PFL was tested in selected areas and important lessons on the design, delivery system and beneficiary attitudes were learnt. However, providing free latrines, and using contractors for latrine installation, were shown not to be feasible in the long run.

As a result in Phase II (1988- Dec. 1990), cost recovery was introduced and contractors were passed over in favour of Community Based Organisations (CBOs). With the

active support of the only Reference Centre (RC) in Pashtoonabad, the CBOs installed a total of 328 latrines. The pace of construction was slow. The management capacity of CBOs was poor, the LCS unit lacked experience in community based development and coordination at the management level was virtually absent. In the 1987 - April 1990 period only 428 latrines were installed.

The third phase of LCS (Nov. 1990 - March 1992) was marked by a shift in responsibility of implementation from the CBOs to the Reference Centres. Six RCs were planned and by March 1992, five RCs had been established at Pashtoonabad (two RCs in Pashtoonabad were combined into one), Hudda, Marriabad and Kili Saikhan. No additional RC is planned, as areas earmarked for coverage have already been brought under the project with concomitant adjustments in the targets for the RCs. However, if new low income areas are identified, another centre may be established.

In Phase IV (April - Oct. 1992) the LCS programme started picking up and some of the RCs surpassed their monthly targets set at 100 latrines for Pashtoonabad, and 50 latrines each for Hudda, Marriabad, and Kili Saikhan.

By October 1992 2,034 latrines had been constructed against a revised target of 2,583. Operation of the RCs has improved, and despite outstanding procedural problems in materials procurement, and technical backstopping, the RCs are meeting their assigned targets.

Methodology

The number of latrines installed, is only one (albeit a major one) of the indicators of performance. Other project activities related to building awareness, sanitation promotion, and hygiene education, are perhaps less tangible, but no less important. These activities are in essence the foundation on which a low cost sanitation scheme is based.

In recognition of the importance of the 'soft' issues, the LCS unit has evolved a methodology for implementation of the LCS programme. Prior to the construction of the latrines, active promotional activities are undertaken at the community level to build awareness and create a demand for latrines in communities. Hygiene education and post construction follow-up with regard to proper use and maintenance are also undertaken by the RCs.

The LCS unit has developed training/promotional and educational materials in the form of slides, posters, charts, pamphlets and diagrams. These have been tested in the field and are a part of the promotional and educational activities of the RCs.

A monitoring system complete with reporting formats and forms has been developed and is being used. The system assesses staff performance and determines the bottlenecks in implementation of the programme. Monitoring is practised at both the RC and Head Office levels. After two months of installation of the latrines a user satisfaction survey is undertaken to assess the proper use and maintenance of latrines. Weekly and monthly review meetings to evaluate progress, identify problems and suggest solutions are regularly held at the head office. A Baseline Survey has recently been conducted.

Cost

The cost of the latrine depends on the cost of local materials and its dimensions, which depends on the estimated number of users in the households. On average, the construction cost of a latrine, excluding overheads, is between Rs. 2,000 to Rs. 2,400. Training, sanitation promotion and hygiene education are indispensable components of the programme. Based on standard RC performance, the overhead on account of these social components is Rs. 968 per latrine with another Rs. 977 for interest subsidy, technical and administrative support. The total overhead, therefore is Rs. 1,945 per latrine, assuming that the RCs meet the total monthly target of 200 latrines. The overheads of temporary consultant support have been excluded in this calculation. Total standard capital cost per latrine, therefore, works out at Rs.4,000 to Rs.4,400.

This compares favourably to the capital costs of the sewerage system which is estimated at about Rs. 17,000 per house connection (costs of sewerage network only - if cost of treatment plant and transport main are added, capital costs per connection work out at Rs. 27,000), excluding additional costs to be incurred by households for connecting to the system (see sections 3.2 and 7.5).

Cost Recovery

The cost recovery schedule involves a down payment with the remaining (construction costs only; no interest is charged on the loan) payable in monthly instalments. The schedule is not uniform across the board. There are a number of options for the beneficiaries to choose from. The options are as follows:

Full Payment at the time	Discount of Rs. 350
Down Payment of Rs. 1400	Discount of Rs. 280
Down Payment of Rs. 1050	Discount of Rs. 150
Down Payment of Rs. 700	Discount of Rs. 70
Down Payment of Rs. 200	No discount

The option commonly used is a down payment of Rs. 200 with the remaining payable in monthly instalments of Rs. 35 over a five year period. The down payment is received at the RCs during application for the latrines, while the instalments are payable through banks. A Challan Book for the purpose of deposits with the banks is provided by the RCs to all beneficiaries on satisfactory completion of the latrines. The banks are expected to send monthly statements to the QSSP head office.

Cost recovery is the weak side of the LCS programme with low monthly repayments in the order of 10% of what is due. Defaulters report lack of cooperation from the banks in receiving payments and long hours of wait to make the payments, as being the primary reasons for non-payment. Recent follow-up visits to forty defaulting households have resulted in an improvement, reinforcing the wisdom of exerting social pressure on defaulters. At least four of these 40 families visited, upon being reminded of the outstanding debt, paid the total outstanding loan amount in one payment at once. A beneficiary who defaults in payment for three consecutive months is supposed to be issued a notice by the head office, but despite low rate of cost recovery, notices are not issued.

Target Groups

The LCS programme focuses on low income/katchi abadi areas. Compared to other areas of the city, access to public utilities and services in these katchi abadis is poor. With high population densities, the areas exhibit poor social and economic attributes. Inhabitants in these areas are conservative and have diverse cultural traits. Restrictive control, and the pervasive concept of seclusion of women, inhibit community development and women's involvement in the sanitation improvement. Katchi abadis in Quetta are not the easiest areas to work in. That an entry has been made into these traditional areas is by itself a major achievement. Todate all areas earmarked for LCS have been included in ongoing Project activities.

2.5 BWASA institutional development

No quantitative benchmarks were set in project design for the development of B-WASA or assistance thereto. In fact, in the original PC-I, this was not seen as a project objective, but as an **additional** requirement, necessary for implementation and operation of project facilities.

In the Plan of Operations the assistance in the development of B-WASA on technical, organisational, financial and administrative matters was seen as one of the 5 short-term aims of the Project, with the understanding that upon Project completion by early 1994 there would be an Authority capable of managing the assets created under the Project, as well as planning and implementing future investments.

Major milestones in the process of institutional development referred to in the Plan of Operations are:

- the enactment of the B-WASA act, the drafting of which had been agreed at Project initiation;
- the establishment of a system of user charges to cover the cost of capital and of operation and maintenance;
- the establishment of an organisational structure and manpower;
- the establishment of rules and regulations governing design and construction standards, operational and maintenance aspects, budget preparation and accountancy control and revenue collection systems.

Todate the following has been achieved:

- the B-WASA act, which had been drafted in 1988, had been first promulgated as an ordinance in 1988 and was enacted as an act in 1989;
- numerous proposals have been made on user charges, but none have yet been implemented: the B-WASA Board, in its meeting of October 1992 adopted a surcharge on the water rate for sewerage of Rs. 50 per connection per month, but this is yet to be approved by GOBAL and to be operationalised; as indicated in section 7.5 below this proposed tariff may at best be adequate to cover O&M cost;
- B-WASA organisation has been established (present organogramme is in Annex 3), and according to B-WASA, has a current nominal staff strength of 431 persons (according to BKH consultants, this reflects the mid-1991 position: it is suspected

that actual staffing levels are significantly higher), of which 370 are paid out of development outlays on account of QWSP and 61 on account of QSSP;
- numerous proposals have been made by the BKH and NMC consultants to establish rules and regulations governing the above; none of these have been adopted and operationalised todate; staff rules along the lines of QDA staff rules have been adopted, whereas for procurement the provincial government rules apply; for O&M no rules exist yet. (Water) revenue collection is still administered and handled manually, accounting and budget preparation still follow government departmental practices (single entry accounts and preparation of expenditure budgets only).

Additional benchmark indications of (lack of) institutional progress consist of the following:

- since B-WASA's establishment, the B-WASA Board has only met 8 times from September 1988, instead of monthly as mandated by the B-WASA Act;
- there have been several extra-legal changes in the composition and particularly the chairmanship of the Board; these have not been legalised post-facto;
- from January 1986 till the present there have been 6 managing directors, i.e an average incumbency of a little more than one year.

2.6 Inputs: land, manpower and expenditure

Land acquisition

According to the September 1986 Plan of Operations, the required land, both for the sewage treatment plant as well as for easements with regard to the sewage transport main was to be acquired during a 6 months period ending in late December 1987.

At present, none of this has yet been fully realised.

With regard to the treatment plant land, when the land value of the originally designated site was assessed in accordance with the compulsory land acquisition procedure in early 1989 (!), it turned out to be Rs. 60 million, or twelve times the envisaged land costs of Rs. 4.6 million as per approved PC-I.

In view of this, GOBAL decided in July 1989 that B-WASA should identify an alternative site. An alternative 203 acre site was identified, and its land value assessed in May 1990 at an amount of Rs. 4.1 million, with a 15% compulsory acquisition cost surcharge leading to land costs of Rs.4.7 million. Following representations by the landowners, land compensation payable was fixed by the competent authorities at Rs. 4.5 million plus 15% surcharge in November 1990.

Upon deposit of this amount, the landownership was transferred in the name of B-WASA in December 1990, giving B-WASA formal possession of the site. However, the original owners appealed from this decision to the Sessions Court, which awarded a much higher compensation. Following this, B-WASA appealed to the High Court, which upheld the decision of the lower court in which the total amount to be paid by B-WASA was fixed at Rs. 26.3 million. B-WASA again appealed to the Supreme Court, which was expected to rule on the case on 8 November 1992, but the ruling has been

further delayed. It is generally expected that the Supreme Court will uphold the High Court decision, leading to additional land costs of Rs. 21.1 million, payable by GOBAL, as provided for in the B-WASA act, if B-WASA cannot meet its obligations. As indicated in para 7.5 below, B-WASA is clearly not in a position to pay this amount **(action: GOBAL)**.

Pending the court proceedings, B-WASA has not yet physically taken possession of the land (even though it is legally entitled to do so), reportedly for fear of physical violence.

With respect to the land acquisition requirement for the transport main easements, this concerns relatively small parcels of private land, as most of the transport main trajectory is land owned by Pakistan Railways, which has given B-WASA permission to lay the main. Acquisition of private land has been complicated by a slight change in the alignment of the proposed trajectory: as a result acquisition of the required one acre of land was re-initiated in January 1992. This land acquisition process is further complicated by the fact that the land is in multiple (sub-) tribal ownership. B-WASA expects that the list of owners will be complete in about three months from now, after which land value assessment can be carried out. The financial implications of this are likely to be too small to form a serious obstacle.

Manpower

a. BKH/NESPAK

BKH expatriate manpower input has been utilised at much higher levels than envisaged in the Plan of Operations for the project: by July 1992 the originally envisaged 146.5 manmonths for the entire 7 years project period (up to January 1994 inclusive) had been exceeded (147.6 manmonths had been used by then).

There has also been a significantly different pattern of manpower uptake as compared with the originally planned utilisation: the project manager spent substantially more time (52.5 manmonths as compared to 36 originally planned). The envisaged provision for home office support has been very substantially exceeded (31 manmonths as compared to 10 manmonths planned). This has been largely offset by less time spent by the senior civil engineer and the resident engineer (combined actuals of 41 manmonths as compared to planned inputs of 73 manmonths). The envisaged inputs on organisation and O&M have also been much lower than envisaged (a combined input of 3.5 manmonths as compared to 10 manmonths planned).

By mid 1992 also a total number of 59.5 additional manmonths (for a low-cost sanitation coordinator, a water supply coordinator, a community development advisor and a sociologist) had been used, for which GON committed additional funds in 1988 through to 1990.

Local (NESPAK) inputs were envisaged at a total of 166.5 professional manmonths. By October 1992 a total of 176 manmonths (comprising 114 professional manmonths and 62 manmonths of draughtsmen, computer operator and inspectors) have been utilised.

b. Martens Beton

Martens Beton provided machinery and equipment for the pipe factory and rendered substantial technical assistance for the establishment and operationalisation of the factory. Subsequently, Martens Beton provided about 12 manmonths of technical assistance for pipe factory operation, in an initial six month input and nine short missions. None of this support had been envisaged in the original project design.

c. National Management Consultants (NMC)

Two separate, unanticipated inputs have been provided by NMC for a two-months review study of the administrative development of B-WASA in 1991, and through the provision of 8 manmonths of the services of a management advisor in 1992.

d. Monitoring and evaluation missions

In accordance with the Plan of Operations, monitoring missions in support of the project were envisaged at least twice-yearly during the Project period. In reality monitoring missions have visited the Project somewhat less frequently, generally once-yearly, except in 1989 and 1991 when 2 missions were fielded.

The plan of Operations envisaged independent evaluations at the end of the second and at the end of the fifth year of the Project. The first envisaged evaluation mission did not take place. The evaluation mission of which this report describes the outcome was carried out five and-a-half years after the Project started.

e. GOBAL/B-WASA counterpart staff

In the PC-I 17 manmonths of professional staff were foreseen during the detailed design stage for the sewerage scheme. Additionally, the following annual establishment was foreseen during implementation and operation:

- implementation of sewerage scheme, transport main, treatment plant and irrigation scheme: 10 professional staff and 82 sub-professional and support staff;
- low cost sanitation implementation: 7 professional staff and 36 sub-professional and support staff;
- operation and maintenance: 6 professional staff and 77 sub-professional and support staff.

The PC-I is not clear on whether these annual staffing levels were envisaged throughout during the Project, which is unlikely: as implementation proceeds, the staff required for implementation may gradually phase out, while the maintenance requirement will grow concurrently.

Recent actual staffing levels have been lower: while the QSSP B-WASA establishment for FY 1991-92 listed 22 professional and 78 sub-professional and support staff, 5 and 26 of these positions were listed as vacant. In the current FY 1992-93 establishment list

there are 20 professional positions (of which 1 is vacant) and 41 occupied sub-professional and support staff positions. In view of the above unclarity in the original Project design in this regard, it is difficult to attach significance to these differences.

g. QSSP contract staff

During 1992 some local staff under contract with QSSP have been funded out of the capital funding part of the Project, i.e. on top of the provisions for technical assistance, which was not foreseen. This comprises largely staff involved in the LCS project component, at present 2 professionals and 57 semi-professional and support staff.

Office facilities, equipment and vehicles

Furnished office facilities, supplies and vehicle O&M were to be provided by B-WASA as per PC-I and Plan of Operations, while equipment and 24 vehicles were to be procured under the project. Additional office requirements not foreseen in the Plan of Operations, i.e. for the LCS reference centres have been met by BWASA in as far as rentals are concerned, while the project budget met the costs of outfitting. Todate 28 vehicles have been procured, of which 5 were for replacement. Additionally, 22 motorcycles have been provided as well as office equipment.

Financial resource inputs

The revised PC-I approved by ECNEC in April 1986 envisaged a total capital outlay of Rs. 240 million for the project, covering detailed design, capital works and project establishment charges. It is not clear if the PC-I approval also envisaged technical assistance beyond the detailed design: although GON committed Dfl. 22 million as a loan and Dfl. 4.5 million as a grant (meant for technical assistance), this is described in the PC-I as if the entire Dfl. 26.5 million is meant for part capital financing. GON financing was envisaged to cover 66% of total project cost.

Due to a delayed start and changes in the exchange rate, the total project costs and financing shares had become as follows in the Plan of Operations:

Total project costs:	Rs. 283 million
GON share:	Rs. 203 million
GOBAL share:	Rs. 80 million

With the exception of technical assistance and vehicles (Rs. 50.5 million), which were 100% to be financed by GON, capital expenditure was to be financed for 70% by GON and for 30% by GOBAL.

The Netherlands contribution as per approved Plan of Operations consisted of a Dfl. 22.0 million loan for capital investment (in 1988 this was subsequently converted into a grant in the same amount) and a Dfl. 5.4 million grant for technical assistance and training (additionally, a further Dfl. 0.4 million committed to the Project was kept outside the Plan of Operations for monitoring and other support missions and for

contingencies). During the course of project development, GON committed a further total of Dfl.1.2 million for related technical assistance (water supply and low-cost sanitation coordinators).

GON original technical assistance funds have been substantially overspent: by November 1992 Dfl. 6.4 million has been expended. The additional commitment of Dfl.1.2 million for related technical assistance had not been entirely exhausted, but these funds have now lapsed.

Of the Dfl. 22 million for capital investment, it is estimated that as of end 1992 about Dfl. 5.3 million will have been spent as follows:

- pipe factory machinery (pre-financing):	Dfl.	1.5 million
- QSSP investments (including a share in QSSP staff and establishment)	Dfl.	2.1 million
- various technical assistance activities	Dfl.	1.7 million

In view of the above the Mission understands that GON has decided to rectify the overspending on account of technical assistance by debiting an amount of Dfl.0.6 from the capital investment fund, leaving a balance of Dfl.16.1 million for further investment as per January 1993.

GOBAL todate expended a total of Rs.11.2 million on its 30% share in QSSP capital investment (including QSSP staffing and establishment costs and repayment on account of pipe factory advances), and approximately Rs.5-6 million per annum on B-WASA staff and establishment costs. A further Rp. 11.8 million on account of capital financing advanced by QSSP is due by end 1992.

III Effectiveness of QSSP design, inputs and activities in achieving its objectives

3.1 Pipe Factory

a. Feasibility

The Reformulation Mission Report for the Quetta Sewerage and Sanitation project (1984) recommended the construction of a concrete sewer pipe factory in Quetta based on technical and economic arguments.

Technical argument

The reformulation report argued that pipes produced by the vibrating technique (VM) are flexible in the joints (rubber rings) and simple for house connections, because of direct connections into the sewerpipes of 250 mm, and as such superior to pipes conventionally produced by the spinning method (CCM).

Cost comparisons

Cost comparisons were made as follows:

a. between procurement of CCM pipes from elsewhere in Pakistan and production in Quetta: Costs were calculated per meter of sewer pipe when produced in Quetta, including the cost to establish a pipe factory. To calculate the meter price for Quetta production, investment costs were spread over a total production volume of pipes equivalent to the pipe requirements to sewer the entire Quetta area,and including the evacuation of Cantonment and Satellite Town sewage. With respect to the cost of procurement from elsewhere, costs of procurement from Karachi plus transportation costs to Quetta were calculated. Transportation costs and pipe breakages due to transportation added some 70% to ex-factory costs of the pipes. The predictable outcome of this cost comparison was that setting up pipe production in Quetta is cost effective. Cost effectiveness calculations for lower production volumes were not made. Neither was a risk analysis carried out concerning implementation.

b. per meter costs for VM pipes compared to per meter costs for CCM pipes. The Reformulation Mission Report assessed the price of CCM pipes at Rp 192 per meter and of the VM pipes at Rp 222 per meter. The Reformulation Mission Report further assumed savings because of lower house connection (HC) costs (savings on PVC) and reduced manhole requirements for VM as compared to CCM. The resulting VM meter cost turns out lower than the CCM cost per meter. The argument that utilising VM pipes will save on HCs is highly questionable, because it does not take into account the cost of extra connection boxes (1 for each HC) and the extra costs and inconvenience to break the road cross sectionally for each house connection across the road from the sewer line.

The feasibility studies did not consider the costs and requirements to upgrade one of the existing Quetta concrete pipe factories.

In the Mission's view, the cost effectiveness of a VM pipe factory to be built in Quetta was not adequately demonstrated in the Reformulation Mission Report. The report's recommendation to proceed with the construction of a VM pipe factory in Quetta was highly questionable and fraught with risks.

b. Effectiveness of ownership pipe factory

The PC-I for QSSP states on page 12 that "a number of Pakistani pipe manufacturers and private investors have already shown keen interest in this undertaking". GON/FMO also expressed interest to provide a development credit to a joint venture to be set up between a Pakistani and Dutch pipe manufacturer, as i.a. recorded in the QSSP PlanOp. The PC-I continues that for this reason, "the investment costs are not included in the project budget".

Soon after, BDA obtained GOBAL approval to assume ownership of the factory, despite its ambivalent record as a developer of manufacturing establishments (out of more than 10 enterprises apparently only two - one being the pipe factory - are producing). Apparently, in 1987 GOBAL felt the time was not ripe yet for this to be handled by a private enterprise.

Subsequently, GON was requested to assist BDA, first through technical advice, and later in the financing of the machinery for the factory. In a memorandum of understanding dated 20 August, 1987 GON agreed to pre-finance the machinery and to provide a grant for technical assistance.

Although the factory is still owned by BDA, it has been leased to a private company, Gul Pipe, for production of the QSSP piping during a period of 5 years. This management arrangement presently works well. The lease agreement, however, is flawed, as it does not mention Gul Pipe as the lessee of the factory, and as it does not correctly specify the QSSP pipe delivery requirements (see para 3.8 below). Amendment of these flaws is recommended.

Upon completion of pipe production for QSSP the factory should continue -as per plan - with the production of sewer pipes for the rest of Quetta. However, todate no financing for these activities has been found.

The present tri-partite arrangement between BDA (owner/lessor of the factory), Gul Pipe (the lessee) and B-WASA (the consumer), works satisfactorily, even though the lease document is flawed. This requires correction **(Action: B-WASA, BDA and Gul Pipe)**.

If financing for the follow up phases to QSSP is found, the present tri-partite arrangement between BDA, B-WASA and Gul Pipe should be continued. If no financing will be found, GOBAL/BDA should consider selling off the pipe factory, using the revenue for pipe procurement to extend the sewerage system beyond QSSP. The follow-up agreement may include a multi-customers arrangement, considering i.a. Cantonment Board and BDA's own requirements.

c. Costs and financing

Initially BDA was to finance the factory investment with a loan. In 1987 it was agreed that GON would prefinance the equipment costs. GOBAL would repay by financing a larger than originally agreed share (30% GOBAL and 70% GON) in the pipe costs (see section 3.8). This arrangement is adhered to.

The Reformulation Mission Report of 1984 estimated the costs for infrastructure and equipment for the VM pipe factory at a total of Rp 15.6 million with a foreign exchange component of Rp 3.9 million.

Cost re-calculations done under BKH auspices (by IME-Consult) in 1987 with and without grant element, not counting technical assistance, come to a total investment cost of Rp 24 million and Rp 25 million respectively. These costs are substantially higher than the 1984 outcome. Yet, despite this substantially higher investment cost, a reassessment of the financial feasibility and cost-effectiveness of the Quetta pipe factory compared to procurement from elsewhere was not carried out. In addition, an amount of Dfl 683,200 was estimated to be required for technical assistance.

Actual total investment cost for the factory has been reported at Rp 24.7 million, while technical assistance costs by Martens Beton amounted to Dfl 675,500. Investment costs for infrastructure and equipment of the factory and for technical assistance for design and construction thus were within the revised cost estimates of 1987.

d. Design and construction

The PlanOp (1986) does not mention the design and construction of the pipe factory under "Major Project Segments" (because it was - as per PC-I - technically not part of the Project and therefore not a subject of BKH concern). Under "Additional Issues" (Chapter 6) the PlanOp states as one of the conditions for Project implementation "agreement with the establishment programme detailed in Figure 6.1.". This figure sets out the staffing and time schedule for the establishment of the pipe factory, estimating the required time to start production at 13 months (i.e. completion by December 1, 1987).

In the GON project monitoring missions the design and construction of the factory have consistently been a subject of serious concern. In its August 1987 mission report and the minutes of the debriefing meeting, the monitoring mission reports that the construction is delayed considerably, but yet also states that "it expects the factory to be ready by July, 1988". A similar statement was made in the monitoring mission report of November 1989.

On 15 May 1990, 2.5 years after the projected date in the PlanOp, the first pipe was produced.

The implementation plan in the PlanOp, the subsequently revised schedule for completion of construction and outfitting of the factory, and the reports of the monitoring mission on this have been consistently over-optimistic.

e. Operation

Between May 1990 and June 1991 the pipe factory was staffed by BDA, but did not produce satisfactorily.

The minutes of the debriefing meeting on 16 May 1990 of the GON monitoring mission state that "it was agreed that BDA would lease the factory to a suitable third party". Subsequently it took to 2 March, 1991, after tendering, before Gul Pipe leased the pipe factory for a period of 5 years. Full production under Gul Pipe management started on 1 July, 1991.

Martens Beton provided and installed the pipe manufacturing machinery and equipment. Upon commissioning of the factory Martens Beton was further contracted to provide operational support to Gul Pipe. For the period April 1990 - March 1992 a support contract was agreed between Martens Beton and DGIS (Dfl 495,000) for the delivery of these advisory services, estimated to require about one man year to be provided in one 6 monthly input plus some 11 to 12 two week follow-up missions.

Since Gul Pipe took over the management of the factory (1.6.1991) the Martens Beton adviser has provided expert advice and training to Gul Pipe staff on production, management, routine operation and maintenance, when required, advice on repairs and advice on pricing.
Without these additional technical assistance inputs Gul Pipe could not have operated the factory satisfactorily.

f. Output

After completion of the detailed design for the sewerage system QSSP prepared a 5 year delivery schedule for the pipes to be produced. A substantial number of 250 mm diameter pipes will be provided with a socket to be directly connected to the connector box for each HC.

Since sewerage implementation started, generally modest changes in design have been made, which also altered the pipe orders slightly. One change is that 500 mm pipes have been ordered outfitted with a socket. The pipe factory makes these sockets by cutting an opening in the concrete pipe wall immediately after casting, cementing the socket into position after production of the pipe. No major problems are expected to result from this alteration, but unfortunately the pipes and masonry work around the socket are not presently tested for water tightness.

Presently the factory is producing 80 pipes of 250 mm diameter per day. Total production is ahead of schedule. Pipes to be laid under contracts 1A and 1B (total 8,180 m. of 250 mm diameter; 730 m. of 400 mm; 604 m. of 500 mm and 360 m. of 700 mm) have been produced. A considerable stock of pipes (over 4,000 m. of 250 mm; over 600 m. of 500 mm, 130 m. of 700 mm and 250 m. of 900 mm) has been produced and has been stockpiled. Within some weeks the factory will be closed down for the winter period, to resume production by April 1993. Presently, pipe production will not be a bottleneck for QSSP progress, even if pipe laying contracts were to be brought forward.

Pipe prices have been slightly adjusted (calculations by adviser) because of input price increases and are presently as follows:

dia mm	1991 price Rp/m	1992 price Rs/m	cost increase Rs/m	%
250	225	240	15	7
250+ inlet	266	282	15	6
300	272	293	21	8
400	317	347	31	10
500	392	433	41	10
700	623	692	69	11
900	845	961	117	14

QSSP requested only minor changes in the 5 year production schedule. These changes have been accommodated. The production of the pipe factory currently meets QSSP requirements. Limited price increases have been agreed upon between Gul Pipe and QSSP.

g. Sustainability, vulnerability and bottlenecks

The pipe factory's sustained operation is conditioned by the following factors:

- electricity supply from the power grid is erratic. The factory generator is inadequate to make up for this. The generator provided by BDA is not included in the inventory plant of the pipe factory **(Action: BDA)**;
- present Gul Pipe management staff and labourers have the required skills to maintain required production levels. However, changes in staff would negatively effect output, and should therefore be prevented;
- the present payment arrangements by QSSP to Gul Pipe (with 75% payment upon production, prior to stock piling and the balance upon delivery on site) will have to continue as agreed. Delays in payments or less favourable arrangements with other customers will adversely affect liquidity, cash flows and procurement of required stocks;
- limited continuing external technical assistance is required to be provided during the coming years, particularly to assist in closing and re-starting production after the winter season, for major maintenance and upkeep and for emergency repairs. Yet, Gul Pipe should gradually take on full responsibility for management of factory operations. Steps to reduce the inputs and role of the external advisor should be agreed upon. An important step on this path would be for Gul Pipe to procure the services of the external adviser, rather than DGIS and to phase out GON support for technical advice to Gul Pipe over the next two years (an additional 5-6 manweeks in an equal number of trips is still foreseen: **Action: Gul Pipe/GON**);
- some spare parts are required (inner and outer moulds) as well as some additional spare plant, e.g. a vibrator for the 250 mm pipes. The required spare parts (at an

equivalent of Dfl 60,000) could and should be procured by Gul Pipe **(Action: Gul Pipe)**. The spare vibrator, which is considered as essential plant investment (such as a spare wheel is for a car) for the factory (at an estimate of Dfl 30,000) should be procured by BDA, the owner **(Action: BDA)**;
- a 6 m^3 overhead water reservoir (estimated cost Rp 120,000) is still to be provide by BDA for water tightness testing of pipes **(Action: BDA)**;
- Contractually, Gul Pipe owes the pipe factory a second fork lift truck. Presently only one truck is in service at the factory. This is insufficient to do all the work **(Action: Gul Pipe)**.

Due to lack of various contingency provisions, the pipe factory is vulnerable to possible emergencies. This should be sorted out primarily by Gul Pipe **(Action: Gul Pipe)**. QSSP support should only be brought to bear as a last resort.

3.2 Sewage disposal network

Sewerage design features

The preliminary design of the sewerage disposal network was prepared for the entire Quetta district. The network is divided into five phases and a 25 year implementation period. GON has committed funding and technical assistance for the design and implementation of phase I, which is covering the city centre of Quetta.

The design is based on maximum discharge during peak hour of the maximum water consumption in year 2010. The maximum daily consumption is estimated to be 1.4 times the average consumption. Maximum discharge is calculated as 0.75 times the maximum consumption. Phase I is further designed to accommodate transit of waste water from other areas to the transport main.

Main design criteria (as per Reformulation Mission):

- population distribution per ward as indicated in Annex I, pp. 48-50 of Ref. Mission Report;
- average water consumption until year 2010 fixed at 100 lcd;
- 75% of the consumed water will be discharged to the sewer system;
- Quetta summer population will be 20% higher than its permanent resident population;
- the connection rate to the sewer system will be 85% for the municipal area, 90% for the railway area and 90% for the Cantonment.

The detailed design of phase I of the sewerage disposal network was completed in 1987 in accordance with the PlanOp. The network comprises 105 km of concrete pipe and 45 km of PVC connection pipes between house connection chambers and the main sewage line. The network construction is divided into 10 pipe laying contract parcels each consisting of between 7 and 14 km of concrete pipe and 3 to 6 km of PVC pipe.

The area to be covered under phase I is the city centre with its commercial and residential areas (see map in Annex 2a).

The network is designed with main pipe lines through all streets and lanes with established connection points for all houses. These yard connections are made directly in the street sewer through factory cast inlets. Each yard connection has a connecting chamber (called a "junction box") on the boundary between public and private premises. This system has the advantage that the length of the yard sewer is minimized, but it causes considerable nuisance to the public during construction because the street is cut open at each connection.

The PlanOp stipulates that a total of 14,450 house connections will be served by phase I. The detailed design shows that 10,500 house connection boxes will be provided by phase I; it is estimated that approximately 10% of these connection boxes will serve more than one household, bringing the total number of connections served to approximately 11,600.

Sewerage design effectiveness

The design has a relatively large safety factor on the hydraulic load. This is because of the gradient of most of the lines. Problems with sediment of solids may occur in the upper end of the street sewer and in some sections of the main sewers during the upstart of the system. This becomes critical in areas with shortage of water and when the anticipated number of connections is not reached.

The design of the sewage disposal system is anticipating that water supply is fully augmented and rehabilitated in the sewered areas. The augmentation and rehabilitation work of the water projects (QWSP) is delayed (see section 4.3 below) and no work is presently being carried out. The rapid population growth in Quetta in combination with the diversion of water to surrounding areas have resulted in acute water shortage within the municipal area.

As a result water supply in the sewered areas and the areas for next year's sewerage contracts is insufficient to operate the system. This has several implications for the sewage disposal network and the implementation programme must therefore be reconsidered.

A temporary outlet has been constructed into Habib Nullah in the northern part of the city. This measure has been taken to facilitate use of the sewage collection system before the transport main and the treatment plant is constructed. The environmental impact of this is discussed in section 6.1.

The Mission suggests that the following issues are carefully considered:

- The entire network should be calculated for the minimum flow necessary to avoid sedimentation and to establish the critical path(s) through the system. The critical paths through the system and the present water supply situation will determine the future implementation schedule **(Action: QSSP)**.

- The water supply situation in the various ares needs to be established possibly through household surveys on water consumption and use, assessment of the availability of water in the area and assessment of the complications and likelihood for connection to the sewerage system with the intention of establishing a 'reliable' connection scenario **(Action: B-WASA and QSSP)**.
- The implementation schedule and the operationalisation of the completed part of the system should be reconsidered. Implementation should only start in areas with sufficient water supply to operate the system; and sewers should only be made operational when sufficient water supply has been ensured.

Sewerage implementation

According to the PlanOp, implementation of pipelaying was to start in March 1988 and be completed by January 1994. The tendering procedure for the first contracts was initiated in August 1990, but the first contract was signed only in October 1991. The main cause of the delay was the delay in operationalisation of the pipe factory.

The implementation of the first contract started in November 1991. The first two contracts 1A and 1B will be completed by December 15, 1992.

Description	Contract 1A	Contract 1B
Total length of Pipe-laying (variation order)	7,467 m 500 m	10,559 m 500 m
Value of contract (variation order)	Rs. 10,13 million	Rs. 14.05 million Rs. 1,6 million

The 18,526 meter of pipe laid is equivalent to 17.5% of the total length of the sewer disposal network excluding house-connections.

The volume of all proposed implementation contracts is shown in table 2.1. The implementation pattern proposed is to let two 'parcels' per year, leading to a phase I implementation period of 5 years. The main reason for this sequencing is the requirement to limit traffic congestion in the city centre during construction (sewage lines are being installed in the main city traffic routes).

Implementation of the first two contracts (1A and 1B) has virtually been completed on time, and it is therefore considered by the QSSP consultant to bring forward a portion of the third year's implementation programme to provide similar size follow up contracts and to lay 28 km of pipes during the second year of implementation.

The contractor selected to implement contract 1A is Taimur Construction Company. Contract 1B is implemented by National Pipe Industries; both companies are Quetta based. The working spirit between the consultant and the contractors is one of 'problem solving' which is very important for a complicated high profile project causing substantial nuisance during implementation.

Table 2.1

QUETTA SEWERAGE AND SANITATION PROJECT (QSSP)

BALOCHISTAN WATER AND SANITATION AUTHORITY (BWASA)

SEWERAGE COMPONENT (SEWERAGE PARCELS)

5 Parcels of two (2) Contracts each year

PARCELS	1991 - 92 1st Year		1992 - 93 2nd Year		1993 - 94 3rd Year		1994 - 95 4th Year		1995 - 96 5th Year		TOTAL	
	Pipe		Pipe		Pipe		Pipe		Pipe		Pipe	
	Concrete	uPVC	Concrete	uPVC	Concrete	uPVC	Concrete	uPVC	Concrete	uPVC	Concrete	uPVC
	km	km	km	km	km	km	km	km	km	km	km	km
Contract - A	7 0	4.44	13.7	6 21	10 3	4 46	13 6	6 33	9.63	4 82	54 23	26 26
Contract - B	10 4	3 63	7 9	3 83	11 1	3 69	9 9	3 49	12 46	2 87	51 76	17.51
Total	17 4	8 07	21 6	10 04	21 4	8 15	23 5	9 82	22 09	7 69	105 99	43 77
GRAND TOTAL											**149.76 km**	

The 'problem solving' attitude is particularly useful during the excavation stage where several unforeseen pipes, cables and kareez are uncovered and an on-site solution must be found immediately. The contractors are taking this in good spirit and have been reasonable in their demands for additional payments. It is however, the impression of the Mission that this mutual problem solving attitude has, at times, also led to reduced quality of workmanship.

The Mission was not impressed with the workmanship on the sewer lines inspected. Laying of pipes is done satisfactory, but the construction of manholes and junction boxes could be improved. The inlet and outlet pipes are chopped to fit the manhole slab; the benching finish is rough. The manholes are all in-situ concrete and brick-work; they are not constructed at the time of pipe laying; the manhole cover is not provided when the manhole is constructed. The pipes are sealed to prevent soil and waste to enter the pipe. It is important to clean the pipes and manholes before the cover is sealed. This is especially important in the present situation with acute water shortage where efficient flushing of the system for eventual sediment might be difficult.

Several of the pipelines visited were complete except for the manholes and/or manhole covers. This requires timely attention, as it is a nuisance and dangerous to have these large 'holes' lying open for a longer period.

The pipes are being laid and junction boxes constructed, but house connections are not yet made. The technical reason for this has been that a temporary outlet to the Habib Nullah needed to be constructed. This has now been completed and the main line has been laid except in two places: one is at the crossing of a Kareez and the other at the crossing of two high pressure water mains constructed at the same level as the intended sewerage pipes. This work is expected to be complete by mid December 1992.

The Mission was informed that some junction boxes have been placed on top of other service installations and not at the prescribed depth. The Mission considers this a matter of concern, as the junction box will be damaged when the service installation below is inspected or repaired, and, moreover, the gradient on the sewerage connection from the house will be less than designed and the possibility of blockage will increase. The Mission suggests to relocate the box instead of placing it on top of another installation, as reported in some cases; this could be done by recalculating the gradient of the yard sewer and when possible pass below the other service installation.

The possibility of constructing manholes as prefab unit(s) should be explored. These units could, for handling and construction purposes, be segments of the complete unit in the form of rings or pre-cast sides. Even if there would be no price advantage, the shorter construction period in town would minimise inconvenience to the public.

Campaigns for house connections can start as soon as the main line is complete and sufficient water supply to operate the system has been secured (see chapter IV on water supply). A mobile reference center will be put into action for this purpose. This mobile unit has already been procured, and is presently "docked" at QSSP premises.

Bye-laws for connections needs to be developed before the campaigning for house connections can start; B-WASA does not presently have such bye-laws, spelling out procedures concerning the connection to the sewage system in financial and technical terms. The bye-laws must contain a technical section describing aspects like: the quality of the required 'on the premises' installation, specific requirements for the installation (establishing of a 'grate' etc.) and the authority to connect to the sewage disposal system.

In the Mission's view the following issues need to be addressed:

- the minimum flow for self cleaning for the entire sewerage network needs to be calculated **(Action: QSSP)**;
- design criteria need to be reviewed, assessing the possible pattern of house connections **(Action:QSSP)**;
- implementation speed and number of contracts per year may be revised; this will also provide an opportunity to revise the implementation schedule to establish a continuous contract implementation flow with a new contract started up as soon as the previous contract is complete, as earlier agreed in principle between B-WASA and RNE **(Action: QSSP/B-WASA)**;
- quality of workmanship and the position of junction boxes require serious consideration **(Action: QSSP)**;
- a campaign for house connections needs to be started **(Action: B-WASA and QSSP)** after the development and adoption of bye-laws for BWASA **(Action: B-WASA/QSSP and GOBAL)**;
- possibility of constructing the manholes as prefab units or segments either as rings or as pre-cast sides that are mounted on site may be investigated **(Action: QSSP)**.

House connections

a. Practises in discharging of waste and wastewater

The Mission observed that households in Quetta discharge their wastewater through toilets into septic tanks, directly into tiled or untiled municipal surface drains, by sprinkling it onto the yard or onto the roads. Commonly households discharge toilet wastewater and bathroom waste water into a "sediment tank" which discharges the outflow into a soakpit or into the municipal drain. Kitchen wastewater is directly discharged into the municipal drains through a direct connection. Houses often have more than one discharge point into the municipal drains. This indicates that in-house plumbing is very limited.

Recent information on the **amounts** and **quality** (contents of solids) of wastewater discharged from households is not available in QSSP. A household level survey was conducted during the Reformulation Mission phase. This survey inquired about existing facilities for water supply, bathroom and toilet facilities, waste disposal facilities and practises as well as the interest and willingness at household level to be connected up to a sewerage system. A recent small household survey inquired into the availability of house connections for water supply and the arrangements for discharge of water and sewage, but did not collect information on the quantity of (waste) water flows.

QSSP does not have household level information about the actual amounts and quality of waste water discharged. A household level survey needs to be conducted to obtain this information prior to connecting houses to the system **(Action: QSSP)**.

b. QSSP arrangements for house connections to sewerage

QSSP proposes to connect up all the discharge outlets of households into the household connection box to ensure maximum collection of waste water. Whether this arrangement to collect all waste water discharges into the sewer connecting box will be adequate to meet the design discharge volume of roughly 100 l/c/d is questionable. If the discharge remains much below the designed discharge of the sewerage system, regular flushing of the system will be required.

In order to prevent solid waste from entering the sewer pipes, which will lead to clogging and overflowing of the connecting box, QSSP proposes to "grate" each house connection. This grate will have to be built prior to the collection box and has the function to have the solids separated from the waste water prior to entering the QSSP part of the sewerage system. Households themselves should have the responsibility to clean the grate.

QSSP estimates the costs for these additional works at household level between Rp 2000 and Rp 5000 per household. (at the same order of magnitude of the cost of a low cost latrine, see section 2.4 above) Whether households will be prepared to pay these costs is not yet known.

The Mission considers the implementation of these works essential, and proposes that detailed plans for the arrangements (including bye laws) will be worked out soon for consideration by the B-WASA board, prior to the start of making house connections. The financial implications should also be considered. In the Mission's view, the costs should be borne by the households, but with QSSP carrying out quality control prior to connection.

Discharge practices do not guarantee that all domestic waste water will be discharged into the sewer. This may mean that sewers silt up. To have the sewers operate properly households should not discharge kitchen solids into the sewer. The costs of physical work for house connections can be borne by the house owners. This needs to be provided for in the bye laws for house connections to be prepared by B-WASA and to be adopted by GOBAL.

QSSP has to carry out a public education campaign and develop household level instructions for the households to be connected to the sewerage prior to starting up house connections. Technically, the house connections should provide for minimal clogging up risks of the main sewers. Although the costs of house connections should be borne by the users, the likely low willingness to pay will present a serious problem. The required bye laws for house connections will provide the legal and technical means to resolve this. Formulation and adoption of such bye laws is therefore urgent **(Action: B-WASA/QSSP and GOBAL)**.

Technical assistance

Technical assistance is provided through BKH Consulting Engineers and their associates Haskoning and Nespak Ltd. The staffing profile for the design and implementation of the sewerage network according to the PlanOp as compared to actual inputs is shown below as estimated by the Mission.

Quetta Sewerage and Sanitation Project					
Manpower used for sewerage component					
	man-month				
	PlanOp			Used	
	Design	Construc.	Total	Total	%
Expatriate	25.0	11.5	36.5	88.0	241
Local	22.5	15.0	37.5	120.5	321

[Assumptions: Time spent by the Community Development Adviser and Training Sociologist is fully devoted to LCS. Project Manager's time is assumed to be distributed as follows: 40% on LCS, 30% on B-WASA and 30% on Sewage distribution network. Design and construction of transport main, treatment plant and irrigation schemes is estimated at 20% of the total manpower input. Construction supervision of the distribution network is assumed to be equal each year - 20% of total input per year during the implementation period.]

Design

Detailed design of the entire network was carried out in 1987 by Nespak and Haskoning. It was not possible for the Mission to obtain information of the actual manpower used for the design.

Implementation

The present structure of the supervision team is:

1 Project Director, B-WASA advised by Project Manager, BKH and the Deputy Project Manager, NESPAK.
1 Executive Engineer, B-WASA advised by Resident Engineer, BKH and Senior Civil Engineer, Nespak.
1 Assistant Engineer, B-WASA

2 Sub-Engineers, B-WASA and 2 Site Inspectors Nespak
4 Mortar Mates, B-WASA

This organizational structure is very 'top heavy' and manpower consuming, bearing in mind that only two contractors are working on the project and that the average pipe-laying is 80 meters per day.

The Mission recommends that the function of the Resident Engineer (RE) is phased out during the first half of 1993, and that the role of the Project Manager(PM) in the sewerage component is geared more towards an Operation and Maintenance Adviser (OM). The present duties of the RE could be absorbed by the Senior Civil Engineer and the Executive Engineer. The PM should retain a capacity to guide this through spot checks. The above need to be incorporated in a revised 1993 implementation plan **(Action: QSSP/BKH)**.

3.3 Sewage transport main/waste water treatment plant/irrigation scheme

Transport main

The proposed easement for the transport main runs mainly through public property. Small portions runs through private property. land acquisition or dispensation from the owners is required. It is essential that this matter is resolved within the shortest possible time to facilitate immediately design and construction of the transport main **(Action: B-WASA)**.

The transport main dimensions should be recalculated according to the conclusions and recommendations of chapter IV on the present and the expected water supply situation in Quetta **(Action: QSSP)**.

Treatment plant

Work on establishing the design criteria for the treatment plant could start immediately. The Reformulation Report, 1984 indicated a set of possible criteria for the outlet effluent to be used for irrigation. This set of criteria should be re-assessed considering present thinking concerning the quality of treated waste water for irrigation purposes. The set of criteria should consider the concentration of enteric pathogens in waste water and their survival on soil and on crops as well as the direct health impact of the farm workers. Issues related to handling of sullage is not discussed in the Reformulation Report 1984. This must be considered during the design phase.

The following design recommendations apply:

- the hydraulic load on treatment plant should be based on the revised estimate of the waste water flow;
- laboratory tests establishing the composition of the waste water should be carried out. Samples could be taken from the outlet into the Nabib Nullah and from the sewage system in Satellite Town;

- design and discharge criteria for the treatment plant should be established by B-WASA and presented to GOBAL for approval.

Detailed design of the treatment plant should be prepared as soon as possible, as B-WASA already has possession of the site even though the Supreme Court judgement on the land acquisition case is still awaited **(Action: QSSP)**.

Irrigation scheme

As noted in section 2.3 above, the concept of establishing an irrigation scheme using the treated waste water needs to be developed further, and, if found viable and feasible, detailed into a proposal for implementation.

Investigation into the suitability of land for irrigated agricultural purpose near the treatment plant should be carried out. Initial discussions with the landowners concerning interest in the development of irrigations farms could be initiated **(Action: B-WASA)**.

3.4 Low Cost Sanitation

Technology Option and Design

The LCS in QSSP is based on the premise that the twin pit pour flush latrine (PFL) is the technology of choice, without providing other low cost options such as the single pit, VIPs or conversion of traditional pits. Furthermore the design of the twin pit latrine as presented, does not exploit its flexibility to adapt to scarcity of space or high water table areas. Space to install latrines will get increasingly scarce in urban areas (more than 50% of the plot sizes in the LCS areas are less than 100 m^2) and contrary to expectation, some areas in Quetta do have a high water table (Kili Ismail and Saldora in Hudda). Experience in dealing with such situations do elsewhere in Pakistan and on the Sub-continent may be considered to broaden the range of options offered **(Action: QSSP)**.

Though the twin pit pour flush option has gained general acceptance, it leaves room for improvement as to design optimization, use of materials, and providing a range of sanitation options. Even within the current option, there is significant scope for cost reduction as discussed below. It has been reported that the time taken to fill one pit is 7 to 8 years. Most latrines in use since their installation in 1987 (pilot phase), are yet to switch to the second pit. The period is well beyond the 2 years needed for excreta to decompose into pathogen free humus. A re-evaluation of the parameters of pit design could reduce cost. Further cost reduction can be effected through the introduction of concrete rings, precast Y-junctions, masonry footrests, a range of pan options and conversion of traditional pit latrines to single pit options where families cannot afford or are not willing to acquire a twin pit options **(Action: QSSP/B-WASA)**.

Material Procurement Procedure

Government material procurement policy is through competitive bidding. Spot quotations are acceptable for materials valued at less that Rs. 10,000. Procurement and delivery of cement, steel, PVC pipes and bends from the head office to the RCs as per agreed, predetermined schedule has been in accordance with official procedures, but has led to delays in supply and in prices higher than market prices in the LCS areas. Additionally, disputes have arisen over the procurement of coarse aggregate, sand and bricks by the RCs. The B-WASA procurement officer at QSSP office and the RC managers are at loggerheads over these issues. Strict adherence to official procedures has led to costs above market prices in the LCS areas, which has created problems of credibility for the RCs, resulting in poor performance. Purchase based on spot quotations by the RCs have not always been carried out fully in keeping with required procedures. Due to these disputes, the entire delivery system is threatened to grind to a halt. A system must be evolved such that the RCs can operate with some measure of flexibility within the governments operational procedure. Alternatively, the entire procurement may be left to the private sector (the mistries) altogether, with the RCs in a supporting/monitoring role. **The options need to be carefully reviewed and a course of action proposed to B-WASA and RNE as soon as possible to overcome the current impasse (Action: QSSP).**

Training and Training Materials

The LCS component of QSSP has made commendable efforts at training, and developing a logical sequence of sanitation promotion, implementation, hygiene education. Training is imparted to civil technologists, sanitation promoters, sanitation hygiene promoters and mistries. Training is not given to private sector, CBOs, community/social/religious leaders, councillors or those whose opinions matter in society. The PlanOp emphasises the involvement of private sector, but there are currently no LCS activities to encourage private sector participation in improvement of sanitation. Despite the lack of support, there are instances of twin pit latrines being built without direct involvement of the RCs. This is a spin off spread effect that merit active support.

Training and promotional materials comprise of drawings, and photographs on health related behaviour, and technology as presented in slides, flip charts, posters, transparencies, cartoons as well as short printed texts. The materials on technology are insufficiently detailed and do not adequately encompass operation and maintenance, including desludging and re-use of pits. The materials do not include possible improvisations to match site conditions, or the advantage of the options over conventional or commonly used septic tanks. In spite of having been field-tested, the illustrations in training/promotional materials are difficult to comprehend without the written text. In a community with a low level of literacy, this seems inappropriate. The materials therefore require to be adapted further to ensure that illustrations adequately convey the messages intended. This will require specialised skills. It is recommended that use is made of sanitation promotion materials developed elsewhere in the Sub-continent.

Identical sets of materials are used for staff training and sanitation promotion and health education. Sanitation/hygiene promotion and training are activities of different orders for very different target groups. Using the same materials for both the functions is not expected to have the same level of impact. It is important to bear in mind that the linkage between sanitation and health, while being obvious to the health workers, may not be the key promotional issue for sale of latrine. Thus the marketing thrust will do well to keep sales of latrines apart from health promotion campaigns. Integration of the two should take place at a higher level and form the basis for the general promotional strategy.

Most low income families will probably not buy a latrine for its health function, but for reasons of convenience. In the Baseline Survey a majority of the beneficiaries interviewed consider convenience to be the prime benefit of the latrines. Furthermore, the beneficiary will have only a minimal interest in the technical functioning of the facility, but will expect it to function, to be neat in appearance, to be durable and easy to clean.

Price is an important determinant and should be commensurate to the perceived utility of the product. However, when the price range is seen as manageable by the beneficiary, he/she will be conditioned by perception of a non-technical or only limited technical nature to choose an option that suits his/her requirements.

As for the promotion of health related behaviour, the issues involved should be easy to practice if not always to 'understand'. Specifically, health behaviour, as promoted, should be possible and practicable in the sense that health messages such as 'always use soap'[1] have little relevance to some inhabitants in katchi abadi and thus may make the entire promotional effort irrelevant in the mind of the receiver.

Building awareness is an important aspect of sanitation promotion. All existing communication media should be used in informing the public about the programme and virtue of the improved sanitation. While LCS has carried out substantial promotional campaign efforts, not enough use has been made of newspapers, radio, television or billboards. A social profile shows that 53% and 44% of the households in the target group own radio and television respectively.

It will be useful for the LCs programme to re-assess the effectiveness of its promotional efforts and to adopt changes as appropriate as part of the 1993 implementation programme **(Action: QSSP).**

Monitoring and Evaluation

The RCs have developed a simple quantitative monitoring system for their activities in terms of number of visits to households, area meetings held, and the applications brought in by the RC staff. A process-oriented project as low cost sanitation is, should also have a system of qualitative monitoring. This may also be considered in the context of the 1993 implementation programme **(Action: QSSP).**

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[1] Perhaps 'always wash your hands with soap or ash after defecation', would have a better effect.

Technical Support

Despite the presence of a technical section, at the QSSP head office, technical support to RCs has not been forthcoming. Good experience in low cost sanitation technology options, is not available with the technical section. Consequently the section is unable to deal with unforseen physical conditions encountered during implementation of the programme. In consequence, RCs have not been able to adequately respond to issues like the high water table in parts of Hudda, and scarcity of space to install pits in some parts of the target areas. It is reported that applications for latrines from households having insufficient space for twin pits, have not been entertained. Unless the capability of the LCS unit to deal with these situations, is improved, latrine installation in Marriabad and parts of Hudda will remain at risk, and new katchi abadi areas will have to be included in the programme if physical targets are nevertheless to be achieved.

A consultant (from the Engineering University, Lahore) was commissioned to suggest appropriate solutions for problem areas. The options recommended in the consultant's initial report (June 1992) are highly tentative, based on conjectures, and do not demonstrate adequate understanding of the concept of low cost sanitation. Furthermore the report does not consider regional experiences at dealing with similar problems. The initial report is of little value to the LCS programme. Further technical support, therefore, continues to be required; a proposal for this should be included in the 1993 implementation plan **(Action: QSSP)**.

Cost Recovery

The cost recovery schedule as designed, is clearly not working as expected. Latrine programme involving instalments to be paid by the beneficiaries function well only where small, resident NGOs/CBOs are involved or peer pressure exists. Examples of commendable cost recovery exist in NWFP, Karachi, Bangladesh, Thailand and Guatemala. The main reason for non-payment is the well established fact, that government or larger organisations are reluctant to enforce payment, while the buyers feel no special relationship to such organisations. Assuming latrine cost between 2% to 5% of the annual income, as being affordable, 59% of the households in the target group can afford the latrines. It is more a lack of willingness to pay and absence of peer or group pressure necessary to improve cost recovery. There is no policy on the use of the funds accruing from cost recovery, which for the time being are kept in QSSP accounts.

Clearly substantial cost recovery can be achieved, if the RCs devote adequate attention to this. A policy on the utilisation of the proceeds need to be formulated and agreed with B-WASA and RNE. If it is confirmed that the Mission's impression that affordability is not a problem is correct, the current credit scheme may be abolished altogether once sufficient programme momentum has been built up, reducing the need for the credit scheme as an incentive. The LCS approach to cost recovery need to be spelled out in the course of the 1993 implementation plan **(Action: QSSP)**.

Human Resource Input

Internal personal conflicts between BWASA and project staff in the LCS unit has to some extent compounded the above problems. Despite these internal conflicts, staff commitment and dedication to the programme exist. The LCS unit has made commendable efforts at training its field staff in technology, social mobilization and hygiene education. The LCS unit has endeavoured to best of its ability to advance the objectives of the programme. However, traces of lack of experience are evident in some of the activities and outputs of the project. The guidance of the Community Development Advisor has been useful, but more needs to be done in upgrading skills in training, technology, technical backstopping and development of training and promotional materials.

Additionally, it is important that LCS staff will all be employed on the same terms and conditions. If LCS will continue to remain a B-WASA responsibility, it should be prepared to induct non B-WASA staff currently employed in LCS at reasonable terms. This issue is therefore directly related to the institutional future of LCS (see section 3.6 below).

3.5 B-WASA Institutional Development

Development of B-WASA itself

QSSP technical assistance has i.a. been provided to assist in the development of B-WASA towards an autonomous, self-sustainable authority. As noted in section 2.5 above, QSSP support for this by the BKH team and by NMC consisted mainly of the preparation of various studies with recommendations on organisational structure, staffing, accounting systems and billing systems.

Additionally, a substantial portion of the BKH QSSP project manager's time was spent on facilitating the adoption of the B-WASA Act, the Board meetings, and on explaining/discussing the above proposals.

Yet, comparatively, only a small proportion of BKH technical assistance resources have been devoted towards the Project's institutional objective; in fact, even less than was anticipated in the Project's PlanOp (see section 2.6. above).

Additionally, in an institutionally underdeveloped environment, such as B-WASA, it is not realistic to assume that good recommendations would be followed up, modified, adopted and implemented, based on their merits alone. A continuous, sustained institution building effort is required to pursue this. The inputs required to adequately perform this task have been substantially underestimated by all parties involved, including GOBAL, GON, the periodic monitoring missions and the consultants. Obviously, this task was way beyond the resources and the policy leverage of the BKH/NESPAK team. The consultants' terms of reference and team composition did not adequately address this institution building task, and as a result the team had neither the time nor the inclination to do this to the extent required.

Considering this, there is not much else the BKH consultants' staff could have done about this directly, except through invoking external support to pursue these issues, such as through the periodic monitoring missions, through the RNE and through having an evaluation mission (as noted above - section 2.6 - the evaluation mission envisaged in the Plan of Operations after the second year of project implementation never took place). The Mission is of the view that such external support has been inadequate during the project period todate, but is also not entirely convinced that the necessity thereof had been sufficiently perceived by the BKH project management.

This also points to a flaw in Project design: it is almost impossible to charge a team of consultants with on the one hand delivering tangible outputs (product orientation) and on the other hand supporting a process of institutional change (process orientation). Terms of reference for these orientations are not compatible: when consultants would have to do them both, they invariably gravitate towards the outputs for which they can be held responsible. The BKH team was no exception to this pattern, and, moreover, in its composition not very well suited to pursue the institutional objectives of the Project.

Considering the lack of institutional progress by 1991, RNE assigned NMC the task to do a reassessment of the institutional proposals made at that time, and, in 1992 to follow through with the provision of an in-house management adviser to B-WASA, i.a. charged with the task of assisting in implementing the B-WASA development action plan. In the Mission's view this was a good, but belated step towards institutional action support.

The management adviser has pursued the implementation of some of the earlier recommendations and resolution of outstanding issues. This has met with some degree of success, particularly in:

- preparing B-WASA Board and steering committee meetings;
- preparing issue papers for the B-WASA Board meeting;
- assisting in the preparation of the FY 1992/93 budget;
- assisting in the identification of major institutional bulk water supply consumers, and, based on a reconstruction of the records, billing these consumers for the first time in the history of B-WASA, potentially raising about Rs. 71 million in back revenue by end-October 1992, primarily from QMC - about Rs. 67 million).

However, the adviser has been handicapped initially by logistical problems, and later, at the time when the position of Director Administrator/Secretary of the B-WASA Board was vacant, by a steady flow of relatively routine administrative work, which he found difficult to refuse.

Clearly the task of bringing about institutional change in an unresponsive environment is a very hard one. In the Mission's view, the Project's means and the way these resources have been used were not very effective instruments in these circumstances. A much more substantial and prolonged effort of advisory support would have been required to achieve the Project's objective in this regard.

The LCS programme

The LCS is a component of the Quetta Sewerage and Sanitation Project (QSSP). Administratively there is a head-office with four sections, namely:

- Finance Administration
- Establishment and Monitoring
- Training and Promotion
- Technical Section.

The operation of these sections are coordinated by the Sanitation Coordinator. At the field level there are four Reference Centres (RC's) which are staffed with a manager, a civil technologist, female social organisers, a store office, sanitation promoters and sanitation educators. The RC staff are all on contract to BWASA while the Sanitation Coordinator, Senior Community Development Advisor, Officer Training and Promotion are BKH Consulting Engineers staff. The third category of staff are the staff in the four sections at the head-office who are permanent staff of BWASA.

There is a lack of coordination and cooperation among these different categories of people especially the technical/finance administrative sections and the social oriented staff of the RCs. There are also problems of rivalry between the BKH staff and the permanent BWASA staff who are responsible to the BKH staff.

Lack of coordination takes on added dimensions since the LCS programme is dependent on the BWASA for a number of activities. The most important ones are the following:

- technical design
- procurement of cement, pans and PVC pipes
- development of cost recovery mechanism
- development of training courses for the RC staff and also promotion and hygiene education materials
- administrative and audit procedures
- O&M of vehicles, equipment, etc.
- support staff like drivers, peons and typists.

With this interdependence between the LCS and BWASA, lack of coordination/ cooperation leads to major obstacles which work against the smooth implementation of the programme. In the context of institutional development the staff do not act as a single body to attain the same objectives and there is no mechanism to smoothen out and sustain the activities.

The supply constraints that have emerged as result of the procurement issues (see section 3.4. above) are a major area of concern. The technical section is responsible for providing quotations/prices for the materials purchased by the RCs. Due to lack of communication there is no agreement between the procurement officer at the head-office and some RC managers. The latter then purchase from the Imprest Account at the going market rates. However, these purchases are again questioned by the procurement officer and the auditor. Latrine installation by the RCs thus comes to a stand-still. The Project Manager (BKH) has in several instances taken personal respon-

sibility to ensure the smooth flow of funds to the RCs. While this initiative is commendable, it amounts to an emergency ad hoc arrangement. A permanent institutional solution is needed to overcome the procurement problems as they have a negative impact at the community level, where material supply constraints prevent latrines from being constructed after the community has been motivated to apply for latrines.

The above issues are all directly or indirectly related to the institutional future of the LCS programme: will LCS remain under the wings of B-WASA, and if so, what will B-WASA's role be vis-a-vis the communities and the mistries? If LCS will no longer be carried out under B-WASA auspices, will it be viable as an NGO? If so, what organisational and financial arrangements will be required to ensure its viability? The Mission finds itself unable to recommend categorically in one way or the other, as all options have advantages and drawbacks. It is recommended that the LCS institutional options are reviewed during the first half of 1993 with the objective of reaching consensus on the most desirable institutional model to implement LCS; the second half of 1993 could then be used to make the necessary operational changes, so that the revised model would be fully operational by the end of the year. This needs to be reflected in the 1993 annual implementation plan **(Action: QSSP/B-WASA).**

3.6 Monitoring missions support

From the start of QSSP implementation in 1987, Project progress has been monitored by a monitoring team contracted ad hoc for each monitoring mission by GON. A total of 7 such missions have been carried out todate, carried out by the same two technical experts throughout, with occasional additional support as the situation demanded.

The team leader of the monitoring team had also advised the GON on QSSP during the preparatory phase of the Project, particularly as a member of the GON appraisal mission, 1985 and as external evaluator of the two consultants proposals which were submitted in response to the 1986 DGIS bidding request to provide consultants' services for QSSP.

For each monitoring mission GON provided the monitoring team with a terms of reference. These terms of reference requested the monitoring team to i.a. check progress as compared to the PlanOp for the Project, identify bottlenecks, advise the GOBAL and GON about recommended actions to be taken, and provide technical backstopping to the consultants.

The monitoring missions reported about their findings in a monitoring mission report which was submitted to both governments. Each monitoring mission was concluded with a debriefing meeting, generally chaired by the ACS(dev). The conclusions of these meetings were written up in minutes, which were subsequently agreed upon and signed by the ACS on behalf of the GOBAL and the teamleader of the monitoring mission on behalf of the GON.

The reports by the monitoring missions describe the progress of QSSP and the bottlenecks i.a. concerning the pipe factory, acquisition of land and the LCS programme in relation to the status of the component at the time of the previous monitoring mission.

The reports by the monitoring missions reflect the "problem solving" attitude of the monitoring team. The monitoring missions have contributed positively to successively solving one bottleneck after the other one. The monitoring mission operated in support to QSSP. Apparently this approach was supported and shared by the RNE and DGIS-DAL/WZ.

The monitoring mission did not routinely report on the actual progress of the project vis-a-vis the PlanOp. Probably the monitoring missions regarded the PlanOp as outdated and unrealistic under the circumstances. However, the monitoring mission did not advise at any time to reconsider the PlanOp, adjust the - far too optimistic targets - and set a realistic set of targets and time horizons.

In this context a significant event occurred in April 1991, when the project manager of QSSP, in anticipation of the May 1991 monitoring mission, prepared a paper entitled "Sustainability of Project Aims", in which he cautioned that several fundamental conditions to achieve the project objectives were not (yet) fulfilled, seriously calling into question the overall sustainability of the entire Project.

Specifically, the (perennial) issue of the inadequacy of water supply to enable operation of the sewerage system was highlighted (see chapter IV below for a full discussion of this issue itself). This was very timely: QSSP was about to let the first sewerage pipelaying contracts 1A and 1B, and in the event of serious doubt on the adequacy of water availability, letting these contracts could still be deferred to prevent infructuous investment of a significant magnitude.

The May 1991 monitoring mission report, while referring to this problem in passing, noted that the matter was being studied (!) by a specially appointed consultant, but no deferral of implementation of contracts 1A and 1B was recommended pending the outcome of this study. The report's message was basically: business as usual, some problems in implementation, but nothing extraordinary. The Mission considers that the monitoring mission in this case completely failed to flag very serious Project issues at a strategic juncture in project development and further failed to recommend appropriate (and potentially drastic) action, even though these issues and the need for specific action were clearly indicated by the project manager in the above paper.

For future monitoring purposes the Mission suggests that a revised and realistic PlanOp to be developed for QSSP, with realistic and more detailed Annual Implementation Plans to be approved between GOBAL and GON for disbursement purposes on an annual basis. It may also be advisable to ensure a more permanent and more multi-disciplinary monitoring arrangement to ensure not only continuity, but also that all Project elements are considered appropriately. **(Action QSSP/RNE)**

3.7 GON capital financing

QSSP accounts have been kept by BKH consultants and accounts management, including billing to GON and GOBAL has been carried out by the BKH project manager (from November 1991 under a shared responsibility arrangement with the B-WASA project director). The accounts have been operated on a replenishment basis, with a starting advance provided by RNE.

Additionally, some project support elements have been financed directly through RNE and DGIS/GON.

The Mission does not have the impression that the modalities of GON capital funding have hampered project implementation. On the contrary, the flexibility in funding arrangements have made it possible to facilitate resolution of critical bottlenecks as they arose: the unforeseen pre-financing of the equipment for the pipe factory is an example of this - without GON pre-financing (which may be questionable from an audit point of view) it would have taken even more time to operationalise the pipe factory than it did.

It is understandable that financial management was carried out by the consultants initially, when there was not yet a GOBAL institution to manage Project funds, but attempts could have been made earlier towards joint responsibility and ultimate transfer of responsibility to B-WASA (fully accepting that this might have adversely affected the efficiency of flow of funds in the short run) in the interest of gradually enhancing B-WASA's financial management capability. The Mission has noted that notwithstanding the shared responsibility between the QSSP BKH project manager and the QSSP B-WASA project director, there appears an unnecessary lack of communication between QSSP and B-WASA's Director of Finance about project expenditure financed by GON.

3.8 GOBAL counterpart contribution

In the Mission's view QSSP billing arrangements to secure the GOBAL counterpart contribution has worked relatively well todate. It should be noted, however, that until recently only relatively small amounts have been involved (primarily payments towards GOBAL's share in project establishment and LCS). With the start of the pipe laying contracts this changed very significantly in 1992, but with the assistance of the management adviser two major payments of Rs.4 million each were processed and have been disbursed.

However, the Mission notes with some concern that there is still a substantial outstanding balance due from GOBAL (Rs. 11.8 million - see section 2.6 above). Considering work in progress and anticipated in 1993 (for which pipes are being stockpiled now, with 75% of the price payable upon production), this outstanding balance will grow very rapidly over the next few months.

The Mission is considerably less pleased with the way the GOBAL debt to QSSP on account of the pre-financing of the pipe factory equipment is handled, i.e. through an adjustment in the cost-sharing arrangements for the costs of the pipes, with GON paying 31.1% of the pipe costs instead of 70%) and GOBAL 68.9% (instead of 30%), so that the pre-financed amount of Rs. 17.6 million is repaid gradually during the anticipated life of the project, i.e. fully repaid by end 1996 (section 5.1. of the Monitoring Mission report of November 1991 refers).

The Mission understands that this arrangement was embarked on as an expedient. However, it is not clear why no separate loan agreement was concluded on account of this matter: even if it would have been more difficult to enforce in practice, this

would have been preferable from the point of view of accountability and financial transparency.

In any event, the formula requires recalculation, as the total length of pipes required by the project from Gul Pipe Industries is only about 117 km instead of 149.26 km as was assumed in the lease agreement (no allowance was made for the fact that about 45 km pipelength required would be PVC pipes not produced by Gul Pipe Industries, while on the other hand pipe requirements for the transmission main have not been included in the supply contract).

In the Mission's view this outstanding debt needs to be cleared as soon as possible in the interest of reestablishing accountability and financial transparency. For this reason the Mission considers it desirable to either:

- retroactively raise the GOBAL financing share to 100%, to be applicable until such time as the debt has been cleared, after which the original 70/30% split may be resumed, or
- request GOBAL debt repayment at once or through a separate loan arrangement.

(Action: QSSP/RNE)

IV Water supply constraints in the sewerage area

4.1 Introduction

The (in)adequacy of water supply to the sewerage area has been and continues to be a major concern for QSSP. This concern relates both to the limited supply to Quetta from the old tubewells managed by QMC, which is insufficient for the sewers to operate, and to the explosive development of peripheral katchi abadis (neighbourhoods of Quetta) which lay a further claim on the drinking water supply volume to Quetta.

QSSP prepared a detailed and factual set of reports on these issues in February 1991, entitled "Water Supply Coordination Evaluation Reports". These reports have been carefully studied and taken as a point of departure to consider the water supply production and service levels in Quetta. In addition the Mission collected its own data and observed the present water production and supply situation to Quetta. The results of the study, data collected by the Mission and its observations are presented in the following sections.

4.2 Water supply production volumes

The 1991 Evaluation reports estimate total production capacity of the 51 tubewells of QMC and Railway society at 2685 m^3/h. This estimate is based on NESPAK pump tests carried out in 1988. Meantime 4 years have passed, during which 9 additional tubewells have been taken in production by QMC, but without any regeneration of wells. Presently the aggregate production of the tubewells may therefore be significantly lower - there are no recent comprehensive test data on this available.

QMC receives 300,000 gpd (1350 m^3/d or 70 m^3/h) from the Cantonment Board (this has recently been reduced from 1.2 million gpd received earlier).

The 3 well fields developed under QWSP are expected to produce respectively:

North well field (NWF)	555 m^3/h
West well field (WWF)	190 m^3/h
South well field (SWF)	380 m^3/h

Hence, the total **nominal** water production volume for Quetta adds up to a maximum of 3880 m^3/h (equal to 17 million gallons per day) at 20 hours of operation of the well fields. B-WASA reported that the SWF has been or will be shortly extended with additional tube wells (total 4 with a nominal capacity of 2.8 cus, approximately 285 m^3/h, not yet included in the above 17 MGD)

However, it is unlikely that this nominal volume will be produced or maintained under present circumstances. Constraints are manifold: funds to operate the pumps and systems are inadequate and are not mobilised timely, the installations are showing technical weaknesses, operators are poorly trained, one water pump at the pumping

station in NWF has been burnt out, and an expansion vessel exploded at the Ayub stadium pumphouse. The lack of stand-by facilities/spare parts compound these problems. Repairs take time even under the best of circumstances, and all of this therefore adversely affect nominal water production.

If water production levels are to be kept at close to nominal production capacity levels, urgent action is required to establish and carry out procedures for O/M, training of personnel, supervision and inspection routines, creation of incentives, whether in QMC or in B-WASA, is required. A special programme for this purpose should be developed and implemented as a matter of utmost urgency **(Action: B-WASA/QMC)**.

4.3 Water supply distribution to Quetta

i) General

The water supply distribution system mains in Quetta are old and made of cast iron. The mains have a number of leaks. Apart from lack of finance to run the well fields, also the old, leaky distribution system prevents B-WASA to supply QMC with water for the city.

QWSP will rehabilitate the old mains in Quetta. Pipes for this rehabilitation have been ordered. It is envisaged by B-WASA that the rehabilitation may be completed within one year from now.

Until completion of the rehabilitation Quetta will be supplied with a nominal water volume of 2755 m^3/h from QMC (including delivery from the Cantonment Board) topped up with 380 m^3/h from the SWF and very limited supplies from the NWF and WWF (pending rehabilitation of the network, availability of adequate O&M funds and resolution of various outstanding issues between QMC and B-WASA - see below), adding up to a present estimated total of about 3200 m^3/h (14 MGD).

ii) Water distribution to katchi abadis

The February, 1991 report states that for katchi abadis GOBAL has adopted a target per capita water consumption of 120 lcd. For residences with a house connection in the urban built-up area, consumption levels between 120 and 330 lcd have been assumed, with a weighted average for the sewerage area of 195 lcd.

The report provides an overview of the water supply situation in the katchi abadis. At a total katchi abadi population of 237,409 (1990), which in the absence of more accurate (census) data, is based on a very rough estimate of the area of the katchi abadis, multiplied by an equally approximate estimate of population density, a total of 17,806 m^3/d water would be required at an estimated consumption level of 75 lcd (substantially lower than the above "entitlement" consumption levels of 120 lcd).

At 50% distribution efficiency a production of 35,612 m^3/d would be required to supply the katchi abadis.

The Mission was informed that the SWF presently provides more than 50% of its capacity of 380 m^3/hr to an estimated population of 110,327 residents in the katchi abadis along Sariab road (Board Working Paper discussed in the B-WASA Board meeting of 19 October 1992). The Board Working Paper notes that "acute shortage of water is experienced in areas like Satellite Town, Pushtoonabad and Kachra Road for which this Southern Well Field was actually designed". The actual off-take is estimated at approximately twice the SWF supply requirements for these areas as calculated in the February, 1991 report. This substantially higher than designed off- takes to katchi abadis is due to rapid population growth, a general feature in Quetta. Various sources confirmed that the population in the katchi abadis is substantially higher than 250,000 people (figures as high as 800,000 have been quoted - no accurate figures are available and it is unclear to what extent refugees have been included in these "guesstimates"). B-WASA reported that additional wells have been drilled to augment the production of the SWF. Presently, water supply to the southern parts of Quetta (particularly to Satellite Town) is reported as good.

Because of the need to provide these large volumes of water to the kacthi abadis, the remaining volumes for the QSSP areas to be sewered will be lower than anticipated, unless nominal production volumes of water are significantly increased.

If the residents of katchi abadis would be supplied at GOBAL target water supply levels (120 lcd) and if the total katchi abadi population is as high as rumours indicate (over 600,000), the QSSP areas to be sewered will have insufficient water supply to flush the sewers.

In the Mission's view the provision of water to the katchi abadis should not be taken from the water supply to the QSSP areas to be sewered. Additional water supply to katchi abadis should be provided exclusively from new water sources. This, however, should be embarked upon as part of a conscientious programme of water supply augmentation, in balance with the need to protect the scarce Quetta valley water resources **(Action: B-WASA)**.

iii) Supply to QSSP sewered area

Introduction
Considering the (nominal)production volume of water and the off-takes to non sewered katchi abadis, the remaining volume of water will be available for the QSSP area to be sewered. Accurate information on how much water will be supplied to the area to be sewered is not available. This is a serious handicap to the development of a sewer system. Metering does not make sense, because the ring water distribution network is directly fed from various sources.

The Mission's best estimate of the service levels to the sewered area in total and to the different zones in the sewered area is provided below.

Total supply
Total supply will maximally equate nominal production minus the volumes made available to the katchi abadis.

Based on the above calculations, it is estimated that the total water volume produced for the QSSP area to be sewered will be 46,600 m^3/d at maximum. The calculation includes the water supply from the four additional wells in SWF recently put into/prepared for production. At 50% distribution efficiency this means **an effective supply of 23,300 m^3/d.**

The 1991 report calculated the total and zonal water demand for Quetta. The calculations are based on a design population of 135,664 people (projected for 1991 from the 1981 census). The accuracy of this figure is not known, and it is likely to be on the low side. The total **effective water demand** based on this would be **20,205 m^3/d.**

Provided the above calculations are anywhere near accurate, it may be concluded that:

i) with the NWF, WWF and SWF (plus additional wells) in full operation, the effective total water supply to the QSSP sewer area will meet the calculated volumes on which the design for the sewerage has been based;
ii) for sustainability purposes, either a functional set up for operation and maintenance of the water supply to QSSP area will be required to ensure sufficient water for the sewerage, or additional water production capacity will be required.

However, these conclusions are subject to very considerable uncertainty, considering the many assumptions and risk factors involved. If any of these proves to be too optimistic, the effective supply into the QSSP sewered area may be very significantly short. For example: if the total population of Quetta is 1,000,000 (as some say), if the effective supply (including the well fields) is taken at 50% of the nominal production capacity and if the water is equally distributed over those 1 million inhabitants, only 8 gallons per person are available per day. This would substantiate the often heard complaints of serious shortages of water in the city, including the area to be sewered.

Fine tuning
The February, 1991 report calculates the water demands and supplies per zone. The resulting data indicate that without boosting from the NWF and WWF the following areas are experiencing a **shortage of water** as follows:

Zone	Demarcation	Shortage m^3/d
Upper I, North	Tel Godam, Toghi Road	212
Upper 1 South	Kasi Road, Quarry Road, Katchra Road	1,718
Lower I, North	North of Prince Road, Provincial Secretariat, Governors Residence	1,481
Lower I, South	up to Sirki	2,051
Satellite town		2,397

Only Upper I Centre (Mali Bagh, Quaidabad, Kazi Nichari) has a surplus of 255 m^3/day.

Boosting by the SWF (plus the installation of additional wells to make up for delivery to katchi abadis) takes place into the Satellite town and Lower I, South area. This boosting has reportedly resolved the water shortages in these areas.

For the northern parts of the city boosting is awaiting the rehabilitation of the pipe network and the availability of O/M funds, and the resolution of the QMC/B-WASA conflicts over supply priorities and payment by QMC of the B-WASA bill for bulk water supplied to QMC (see section 7.5 below)

In the northern part apparently only Tel Godam, Quaidabad and Nichari have sufficient, respectively reasonable water supply from QMC.

To ensure that water supply levels into areas to be sewered are sufficient, the Mission recommends to carry out a survey on water supply and consumption levels in those areas where sewerage will be laid, prior to starting the sewerage programme.

The surveys to establish this should be started in Tel Godam, Quaidabad and Nichari and Sirki, all of which are considered by the Mission to be high potential, low risk areas, based on the limited information currently available. If the surveys indicate sufficient water supply provision and consumption levels, construction of the sewer system could be started in those areas.

It is further recommended that the construction of sewerage in those areas where water supply is insufficient should not start until the NWF and the WWF are fully operational, the fine tuning of the water distribution to the respective sewered areas has been carried out, and the required water supply levels to the sewered areas are ensured. It is estimated that these activities may be completed by end-1993.

A large number of pipes for the sewers are currently stockpiled at the pipe factory. An additional reason to give high priority to laying sewerage in Tel Godam is the interest expressed by the Cantonment Board to connect up their sewerage system under construction (20,000 inhabitants) into the QSSP sewerage network in this area. Minor redesigning of the system in Tel Godam to transport the Cantonment sewage may be required to ensure that the capacity for transport will be installed.

This rearrangement in timing of the implementation plan will require rearrangement of the contracts sequencing. This will involve marginal extra preparatory work for QSSP. There are no significant consequences for the pipe supply orders.

In conclusion, the Mission highlights the following essential findings and recommendations with respect to water availability:

i) sufficient water supply to flush the sewers is a prerequisite before putting in the QSSP sewers.
ii) sufficient water supply is presently not conclusively ensured in the QSSP areas to be sewered.
iii) Tel Godam/Quainabad/Nichari and Sirki are likely to have sufficient water supply for flushing.
iv) to advance the sewerage contracts for Tel Godam and adjacent areas and Sirki within the overall construction schedule is technically possible with very minor delays and extra work. The pipes for these contracts are largely available.

v) QSSP needs to ensure that Tel Godam/Quaidabad/Nichari and Sirki have sufficient water supply for the QSSP sewers to be flushed. Once this has been confirmed, the contracts for sewer construction in Tel Godam/Quaidabad/Nichari and Sirki should be brought forward **(Action: QSSP/B-WASA)**.

4.4 Operation and Maintenance

Presently operation and maintenance of the water production and supply facilities in Quetta is, from a technical point of view, done 'on a shoestring'.

O&M by QMC

The above noted QSSP February 1991 evaluation report includes a discussion of O&M of QMCs water supply systems. It describes a rudimentary staff set up. The Water Department of QMC is run by 1 engineer assisted by 4 trained water staff to manage the operation of 60 tube wells serving a population of about 200,000 people. The Mission was informed that subordinate staff are largely "self trained" (on the job). On several occasions work morale was reported to be low.

QMC water revenue in FY 1988/89 was Rp 5.1 million. Water supply O&M expenditures amounted to Rp 17.4 million in the same year. The QMC water department occupies 2 small rooms in the QMC building. The store is very poorly stocked. Plant and equipment is either defunct or in poor operating condition.

To make up for falling production from aging pumps, QMC drills new boreholes equipped with new pumps. Preventive maintenance on the pumps and/or the network and regeneration of existing wells (which often costs a fraction of the cost for a new installation) are not practised.

O&M by B- WASA

B-WASA has no established O&M department as yet. B-WASA's revenue is completely inadequate to cover O&M expenditure, and although a budget for O&M expenditures is made available annually (see section 7.5 below) this is not sufficient to cover operational requirements. The position of director O&M has been abolished. O&M staff are to run the wells and pumps, but these staff should be provided with work programmes and reporting systems as well as incentives and regular (refresher) training to keep up their performance. As part of QWSP B-WASA presently receives support from 3 NESPAK engineers on O&M. This support seems to be largely consisting of emergency advice on breakdowns and repairs.

B-WASA has a large store area with largely unassorted left over equipment of QWSP near the western bypass road, some 10 km out of the city. This store area also has space for workshops (not yet equipped) and a laboratory equipped with sophistic equipment, but the procurement of chemicals for water analysis is still being processed anew. The three laboratory staff, who have been trained to perform routine tests, are awaiting the arrival of these chemicals to start work.

If the water supply system for Quetta is to function properly, a major effort to establish routine procedures for operation and maintenance as well as for inspection and (refresher) training is required. In the Mission's view this should be developed as soon as possible. External technical assistance to work out the practical and technical aspects (O&M programmes on wells, pumps, metering of production, O&M of valves, reporting of deficiencies and the repair as well as replacements of equipment, piping, materials etc, setting up of stores system and procurement, design of staffing set up for O&M, recruitment, training and supervision of technical staff) will be required in parallel to administrative and financial support. These technical tasks are in the scope of work of the NESPAK consultants under the O&M contract of QWSP, but may require further support **(Action: B-WASA/NESPAK consultants).**

Two proposals for the establishment of B-WASA O&M capability have been developed, one by the above NESPAK consultants under QWSP, and one by NMC under QSSP auspices. NESPAK prepared a manpower and budget plan for the establishment of an O&M department for water supply within B-WASA (November 1992). The NESPAK plan proposes a staff establishment of a total of 307 persons, at an annual budget of Rp. 8 million. Allowance is also made for expenditure on power, oil, lubricants, chemicals, machinery, civil works, staff training and miscellaneous. The budget does not include a provision for transport. Total annual budget requirements add up to Rp. 45 million per annum. B-WASA has submitted a budget request of that order of magnitude for approval to GOBAL for FY 1992/93. To establish adequate O&M provisions for water supply in B-WASA, the NESPAK proposal includes a provision for consultancy services at a total annual cost of Rp 4 million.

In its October 1991 report NMC proposed a B-WASA establishment for all activities envisaged under the B-WASA Act i.e. for planning, revenue development, project implementation, O&M for water supply, sewerage and sanitation. The total number of staff required by this plan amounts to 688 persons (envisaged to be achieved by 1994/95, when full staff strength is assumed to be reached). Additionally, NMC proposed an extensive training programme for B-WASA staff. The NMC proposal was briefly discussed between the NMC consultants, the Mission, the Secretary for Urban Planning and Development, GOBAL and the Managing Director, B-WASA. The proposal was found to be unrealistically ambitious, as it focused only on the operational requirements, without considering the financial constraints facing B-WASA and GOBAL.

Training Institute

The Institute for Technical Training in Quetta was visited by the Mission to explore the possibilities for this institute to train vocational staff of QMC and B-WASA in basic skills.

The training institute, which is under the Ministry of Labour, is interested to develop and provide (tailor made) training courses in plumbing to B-WASA and/or QMC staff. It therefore provides an opportunity to initiate the required training and incentive activities, which will have to be started as soon as possible by both agencies.

4.5 Past QSSP assistance for water supply

QSSP was meant to complement QWSP. QWSP was to ensure adequate water supply in Quetta, and QSSP would provide a sewerage network to evacuate the domestic waste water from the city.

Right from the start of QSSP (February 1987) concerns about progress and effectiveness of QWSP have plagued QSSP. In March 1989 a GON funded expatriate water supply engineer started work on a 2 year contract as Water Supply Coordinator under QSSP. This coordinator was meant to coordinate the water related aspects of QSSP with QWSP, and to advise QWSP on bottlenecks and ways to overcome these.

During April 1989 - February 1990 the Water Supply Coordinator prepared reports on the designs and performance of the well fields, and the operation of the existing network. The Water Supply Coordinator suggested improvements on numerous fundamental issues, including a set of suggestions to eliminate the water hammer effects which could damage the tubewell pumps. Whether or not these important suggestions were followed up could not be assessed by the Mission (B-WASA and its NESPAK consultants claim the reports are inaccessible).

In February 1990 the Water Supply Coordinator was withdrawn. He was considered to have become too involved in the technical aspects of QWSP, which was considered to be the responsibility of QWSP, and not of the QSSP team. The Water Supply Coordinator was replaced in September 1990. The second Water Supply Coordinator produced a very useful set of 4 evaluation reports in February, 1991 (as noted in section 4.1. above), containing:

i) a detailed analysis of requirements for the water supply in both katchi abadis and sewerage areas;
ii) a plan for the integration of QMC water supply services into B-WASA;
iii) proposals for the establishment of a tariff system.

The detailed analysis of requirements for the water supply in katchi abadis and sewerage areas concluded that, with the NWF, WWF and SWF in full operation, the water supply into the sewerage areas would be sufficient. This outcome confirmed the positions of GOBAL and B-WASA, which took the view that QWSP implementation would be completed soon, and, in any case, before QSSP sewers would become operational.

In his report "Sustainability of Project Aims" of April 1991, the BKH project manager noted that "At this stage there is no immediate improvement to be expected in the water supply levels in the sewer areas. This raises the question if the project should commence with the implementation of the sewer systems when insufficient (evaluation report February on water supply to sewer areas) water is available for its proper functioning". Presently full water production and supply from the Northern and Western well fields is still awaiting the rehabilitation of distribution network in Quetta and release of adequate O&M budget to B-WASA. The above April 1991 report continues with the recommendation "to investigate the existing water supply levels so that a decision can be made whether to proceed with the sewerage component or to await the (QWSP) improvements in water supply before starting with construction". In the Mission's view, this recommendation should have been adhered to by QSSP.

As noted in section 3.6 above, the monitoring mission in their May 1991 visit apparently discussed the options and likely developments and decided that construction should go ahead. As far as the Mission could assess, the evaluation reports were shelved after this decision had been reached, and construction of the sewerage contracts 1A and 1B went ahead.

In parallel to the work of the QSSP team the Netherlands Embassy commissioned a study on the present and future water supply to Quetta to the Groundwater Consult office, a division of Designment, Islamabad. The outcome of this rather superficial study is a plea for more water sources to be developed into production.

From all the above it may be concluded that GON has all along been aware of the importance of the interrelationship between the water supply and sewerage systems, and that it attempted to ensure adequate coordination between the development of the two systems, i.a. through the services of a water supply coordinator. The output of the first and the second water supply coordinator provides a wealth of information on the water supply situation in Quetta, and underlines the importance of setting up O&M systems, and of carrying out surveys prior to installation of the sewers and houseconnections to ensure that sufficient water will be available.
These concerns are shared by B-WASA senior management. The Managing Director of B-WASA has confirmed the seriousness of the water shortages issue to the Mission. The overriding concern of the Managing Director B-WASA is that, if the present population of Quetta is 1 million population (as estimated by B-WASA), it requires more water than can presently be produced even with all well fields fully in operation.

This underscores the importance of a rapid completion of QWSP, now that remaining pipes for completion have been ordered, resolution of outstanding water disputes with QMC, economizing on the scarce water being produced, and for the areas to be sewered, to assess if there will likely be enough water to enable the sewerage system to function as designed. Clearly, B-WASA should, prior to construction of the sewers and the house connections ensure that sufficient water is available, and should give high priority to the establishment of an effective O&M system **(Action: B-WASA/QSSP)**.

V Linkages with related sectors

5.1 Roads and drains

The 1984 QSSP Reformulation Report included a plan for stormwater drainage. The objectives for QSSP did not include stormwater drainage any more, as these were considered of lower priority.

In August 1991, GOBAL contracted NESPAK to prepare designs and documentation for roads and drainage in Quetta in association with BKH as lead consultants. GON agreed to finance the supervisory inputs of BKH for the preparation of the designs under a separate technical assistance grant.

BKH staff reported that the drawings and bills of quantities are ready now. The total cost for implementation of the project is estimated at some Rp 170 million. Implementation contract parcelling to dovetail the sewerage pipelaying contracts has not yet been carried out.

Construction of major drainage for the Quetta area is a responsibility of QDA. It is presently constructing a city-wide drainage system, the designs for which had also been prepared by NESPAK. It may be assumed that since NESPAK has designed both packages, the design of the Quetta city stormwater and drainage project is compatible with the overall Quetta area drainage system design.

B-WASA, assisted by NESPAK/BKH has, because of substantial overlap and in order to minimize inconvenience to the Quetta population, been arguing in favour of combined implementation (by the contractors constructing the sewer lines) of the sewerage and stormwater/drainage projects.

On the face of it, this argument is technically appealing. However, the sewerage network will only cover part of the city, whereas the drainage and stormwater project will cover the whole city (i.e phases I through V of the 25 year sewerage plan). Implementation of the sewerage project is therefore unlikely to coincide with the implementation plan for the drainage project. In addition to this, funding for the drainage project has to be secured (GOBAL has made a tentative commitment for this in an amount of Rs. 40 million). Finally, implementation of the roads and drains project by B-WASA would lead it to assume responsibility for development of infrastructure for which it does not have a mandate, and which would lead it into direct competition with QDA. In view of this, and in spite of the obvious importance of coordination between two logically closely related sectors, the Mission finds it difficult to support the contention that implementation needs to be combined in the manner presently intended.

5.2 Solid Waste Management

Solid waste management in Quetta is the responsibility of QMC. QMC estimates that it collects 200 tons of solid waste per day. Solid waste is mostly dumped informally,

on unused plots which turn into a dump. Part of the solid waste finds its way into the open municipal drains, which are kept open by some 830 municipal sweepers.

This presents a clear risk to the sewerage system developed under the Project, as is exemplified by the only other existing sewerage system in Quetta, i.e. in Satellite Town. A fully complete sewerage system was constructed in Satellite Town during the implementation of the housing scheme. O&M of the sewerage system is the responsibility of QMC (B-WASA is responsible for O&M of the water supply system to Satellite Town). The sewerage system is only partly operational; main parts of the system are clogged with solid waste.

Admittedly, the theory is that the main sewers of QSSP were designed to prevent significant clogging. Nevertheless, even with proper O&M of the sewer system and an appropriate house connection policy which is implemented properly, blockages resulting from solid waste collection deficiencies may occur. It is therefore important that the QMC solid waste collection system, perhaps in conjunction with private sector entrepreneurs, is improved.

5.3 Urban Planning

Urban Planning and its implementation is the formal responsibility of the Quetta Development Authority (QDA) operating independently from B-WASA or QSSP. Though the Director-general of QDA is a member of the B-WASA Board, and both organisations are controlled by the same administrative GOBAL department and provincial minister, coordination of their activities is inadequate. More generally, there are few formal planning and implementation coordination mechanisms among different projects dealt with by agencies performing similar functions. B-WASA, QDA and QMC often see one another as competitors, rather than as partners in development.

Building permits within Quetta city are issued both by QMC and QDA and government projects do not take such approvals from either organisation.

The Quetta Master Plan prepared for GOBAL by NESPAK will be given force of law shortly through enactment by the Assembly of Balochistan. In the view of the Mission this is unfortunate, as the plan is technically imperfect, and moreover, heavily oriented to conventional land-use and zoning control, which are unimplementable. In its spatial organization, the plan does not consider the sewerage scheme of BWASA.

It is also questionable if QDA as the prime land development arm of GOBAL is the right agency to prepare and implement urban spatial planning decisions. In other cities in Pakistan, particularly in Karachi, this combination has been found not to be in the public interest, and a planning agency under the control of Karachi Metropolitan Corporation, or as a separate independent entity is currently being considered.

GON has provided training support for GOBAL officials in the Netherlands and suggestions have been made to extend further cooperation in this field through institutional support to GOBAL agencies responsible for this. Urban services provision coordination in Quetta is obviously essential and needs to be carried out within the

framework of an overall structure plan, which should exclusively have the function to guide public infrastructure investment decision-making.

In the Mission's view the present conditions noted above are not conducive to the emergence of this kind of urban planning. Hence, the Mission would find it difficult to recommend further GON support in this area at this time.

VI QSSP impacts

6.1 Environmental impact

Presently the waste water from households flows in open drains through the city and ends up in the Habib Nullah. The Project will improve the environment and the quality of life for the people living and working in the central part of Quetta city. This will be done through collection of waste water from the households and transporting it to the treatment plant.

During the laying of sewerage pipes the general public will unavoidably have to put up with traffic nuisance and dust. This needs to be minimized. Unfortunately, as described above the designed system of connector boxes will cause a large number of additional cross sectional road cuttings. Coordinated connection activity will be of help to reduce this impact. Additionally, care needs to be taken to ensure proper installation of manholes.

In the operational stage inadequate functioning of the connection boxes may lead to overflowing and public nuisance and health hazards on this count.

A temporary outlet has been constructed north of the city centre into the Habib Nullah. This outlet will function as discharge point until the transport main and the treatment plant is constructed. The water flowing in the nullah today is mainly raw waste water from the open drains. The Habib Nullah is biologically dead on its passage through the city. Biological life is visible again in the nullah at 12 to 15 km north of the city.

The raw waste water from the nullah is presently being used for irrigating fields with vegetables and other crops. Quetta has a good supply of fresh vegetables, mostly grown under irrigation with "raw" waste water, taken from the Habib Nullah and other waste water channels. Quetta also has a high extent of helminthic diseases. This could be a result of the uncontrolled use of untreated waste water for irrigation purposes.

The temporary outlet is expected to increase the flow in the nullah; in view of the above-noted present conditions, its environmental impact is expected to be minimal (as it effectively rechannels the "raw" waste water being used for irrigation) and limited to improvements in the city centre. Major environmental improvements can only be expected once the sewerage system is gradually established fully and as ultimately all sewage is transported out of town for treatment. With this, the flow in the nullah is expected to decrease and the quality of its water flow is also expected to improve.

The proposed treatment technology is anaerobic, facultative and maturation ponds is giving a good treatment with temperatures above 15 C. At lower temperatures the ponds will function as sedimentation basins. Several environmental concerns need to be looked into:

- the environmental impact on crops and humans when the treated waste water is used for irrigation;
- the impact of discharge into the nullah of large quantities of 'raw' waste water during winter. This is the period when there is little biological activity in the

treatment plant, no demand for irrigation and little regeneration capacity in the nullah.

The construction of low cost sanitation with on-site disposal will improve the environment in the areas where it is implemented. These areas have no sanitary facilities and excreta is often swept into the open drains as described above. The technology chosen for this project is the twin-pit-pour-flush latrine. The advantage with this technology is that human contact with raw excreta is avoided. Global experiences indicates that pollution of groundwater resources is minimal. The impact on open wells is negligible provided a certain minimum distance is kept.

Should it be necessary to provide additional wells for water supply (or for agriculture, which at present still accounts for 85% of water extraction in Quetta valley), this will undoubtedly have an impact on the precarious water resource situation in Quetta valley. It is strongly recommended that this matter is studied in detail and that a clear, consistent water resource management strategy and programme is adopted and enforced by GOBAL and all concerned agencies.

6.2 Poverty Impact

Balochistan is considered to be a relatively poor province, as primarily indicated by the incidence of rural poverty, which is about 34% higher than the national average.

The QSSP as envisaged in its design and methodology is not a poverty alleviation project. The sewerage and the pipe factory, the two major components of the project are both capital intensive. The coverage of the sewerage system is at best neutral in terms of the income level of the population/beneficiaries.

The LCS component of the Project, in terms of population coverage, is presently operating in the low-income katchi abadi areas of the city. With an estimated household poverty line income for Quetta of Rs. 900 per month, it is the Mission's impression, that the bulk of the low-income residents in katchi abadies have incomes higher than that. However, poverty is multi-faceted and is also reflected in social indicators such as health, educational and environmental status as part of the overall standard of living, which is still low. In this regard the LCS has an important (potential) impact.

Cost recovery is a common practice of the LCS component and nowhere is it envisaged that the beneficiaries will be too poor and hence unable to pay for the facility.

6.3 Impact on Health

In Quetta about 40 per cent of the population have access to piped water supply and about 35 per cent have pour-flush latrines and septic tanks. The bulk of the population in the city uses traditional systems, dry pit or bucket latrines. Some of the traditional systems discharge the refuse into the open drains outside the house. The traditional systems are also a hazard as they sometime collapse leading to accidents and even

deaths. An insignificant portion of the population is served with a sewerage system. As a result, the open drains carry the raw discharges from the houses and during rain-storms they flood large areas with contaminated water.

The untreated waste water is used for irrigation of vegetables leading to diseases. The sanitary situation in the city is a health hazard and has led to a high incidence of water-borne sanitation related diseases in Quetta.

QSSP is expected to have a positive impact on the health of the population in the long term. The sewerage system is expected to reduce the extent of sewage seeping into the water distribution network as a result of the intermittent pressure in the water supply distribution system. It is also expected to carry the sewage to a treatment plant where treated waste water will be supplied for irrigation. (These components of the project are not yet operational). The LCS has brought the pour-flush system to the door steps of the low-income households. Hygiene education is also provided to the beneficiaries. However, the content and methodology needs to be reviewed as the impact is not yet evident despite hygiene education efforts.

Presently, the health impact is not yet visible as the beneficiaries themselves do not grasp the importance of sanitation and its direct implication on health. The baseline survey has revealed that there are no significant differences between the health situation of families with and without latrines. Poor drainage and indiscriminate dumping of solid waste in and around the neighbourhood, undermine the expected health impact of the project. Children play in dirt heaps and insects/flies infest the area, spreading diseases.

6.4 Impact on Women

In the Project formulation stage Women in Development (WID) was not an avowed objective. However, the very nature of the strategy followed by the LCS has brought women in focus. The impact on women is obvious in a number of areas. Some are more directly visible while others are less evident.

The LCS programme has contributed towards easing the burden of women as well as helping in their daily lives. Women now find it easier to keep the house clean and smell-free due to the pour-flush latrine (PFL) constructed in the house. The PFL also has implications on their daily life, as the women can use the latrine whenever required and not have to wait till dusk (as some of them previously had to) to relieve themselves.

The programme has involved the community and the women directly in the selection of the site for placing the latrine. All PFLs are for home use and not for male guests only. Thus women have been involved in decision making within the prevailing social set-up. From the community's point of view, the spin offs have been the programme's entry into a traditional area, the increased women accessibility to women, and social acceptability of men (from the Project) entering the inner house to check latrines. In the long run this impact will be more obvious, when other projects for women are started in this area. Presently women are also seen to be visiting the RCs.

At the Project level more than 50 per cent of the LCS staff are females. The sanitation educators and promoters are all women from the community. The Project has thus led to employment and income-generation for women.

Women have been employed at the decision making levels, where 2 (out of four) of the RC managers are women. The positive impact has been the acceptance by society of women in decision making positions.

The impact of the sewerage system will be on the health of men, women and children through a cleaner and healthier environment. No direct impact of this component on women specifically is evident.

6.5 Institutional impact

The Project has been relatively unsuccessful in making a serious institutional impact. To provide an appropriate legal framework for the establishment of B-WASA, a B-WASA bill was submitted to GOBAL in 1988, resulting to its enactment as B-WASA Act in 1989 (Balochistan Act no IX of 1989). The Project assisted GOBAL in the preparatory steps for this enactment, and this was perhaps the most significant institutional impact of the Project.

Numerous activities designed to operationalise the provisions of the B-WASA Act have been undertaken by the BKH and NMC consultants/advisors, such as e.g. the preparation of:

- organisational recommendations;
- accounting systems recommendations;
- an accounting manual;
- tariff and billing systems recommendations;
- staffing and training recommendations.

However, none of these recommendations have so far been adopted and implemented.

Hence, most of the prerequisites for B-WASA to function as a semi-autonomous, self-sustaining authority according to the provisions of the Act are not yet in place, even though many of the above essential prerequisites have been discussed and approved by the B-WASA Board in its 8 meetings held from September 1988 till today.

In no case has such B-WASA Board approval led to or been preceded by GOBAL approval as required under Articles 13 (1) (rules), 16 (a) (tariffs), 26 (borrowing) and 27 (accounts) of the Act. Therefore, a number of essential B-WASA Board approved recommendations could not be implemented legally or practically.

The in-house management adviser to B-WASA has pursued some of these outstanding issues, and has met with a limited degree of success as noted in para 3.5. above.

As a result of the non-implementation of the Act, B-WASA today functions not as an Authority, but as a government department funded out of SNE provided out of the

ADP (as noted in section 7.5 below, it has virtually no revenue of its own - about Rs. 3.2 million cumulatively todate, as against an establishment budget of about Rs. 58 million for 1992/93) and no regulatory framework, and organisational and accounting basis to change this situation significantly).

In the Mission's view the root cause of this is a lack of concern or commitment on the part of GOBAL for the viability of B-WASA. B-WASA has not been seen as an important implementation arm of Government policy in the area of urban water supply and sanitation, but rather as a parking ground for senior government officials on deputation, who for one reason or other had to be temporarily moved from their parent department.

As a result of this, the three top management officials today, by their own admission, do not have directly relevant qualifications for the positions they are holding, and do not see their future bound up with the organisation. By the same token, at lower levels of staff BWASA is overstaffed as a result from political appointments, which have been made without consideration of operational requirements.

6.6 Public Image Impact

Pipe production from the factory was long overdue and after a long delay it went into production in 1990. The design of the sewer system which is a major component of the Project was completed in November 1987, but implementation was delayed due to the delay in the production of pipes. Despite being a high profile project, QSSP did not take adequate steps to inform the public regarding the inconvenience that would be faced during the laying of the sewer pipes. The roads were dug without any prior warning, and neither were traffic signs provided to inform the public that work was in progress. As Quetta is a crowded city with relatively narrow and not too brightly lit roads, the nuisance impact of these activities was severely felt. There have also been a couple of accidents due to these reasons.

Another complaint has been the height of the manhole covers. Although technically this should be slightly higher than the original road surface to prevent "papering over" when roads are recarpetted, occasional implementation mistakes and lack of awareness in the public brought complaints against the Project.

Moreover, insufficient information has been provided to the public on the sewerage system that will be provided to the citizens. In the present volatile socio-political situation, there have been numerous damaging speculations regarding the provision of facilities by the Project.

These have had an adverse impact on the image of the Project, with court cases pending against BWASA on the above grounds. There is an urgent need to rehabilitate the image of the Project.

VII Sustainability

7.1 Environmental sustainability

The temporary outlet into Habib Nullah is acceptable only as a short term solution. A long term sustainable solution requires that the collected waste water is transported out of town, that it is treated before it is discharged either for re-use in agricultural irrigation schemes or into the nullah.

The environmental sustainability of the treatment plant depends of the solution of the concerns raised in section 6.1 above (environmental impact). The decision on the discharge parameter for the treated waste water to be used for irrigation and the choice of crops to be grown is important in this regard. The proposed winter discharge of 'raw' 'sedimented' waste water into the nullah is a matter of concern. This is a period with a low biological activity in the nullah, a sensitive eco-system.

The construction of low cost sanitation with on-site disposal will improve the environment in the areas where it is implemented and it is also a simple technology to maintain. The technology chosen for this project is the twin-pit-pour-flush latrine. The advantage of this technology is that human contact with the raw excreta is avoided. The technology is very easy to maintain and operate for the owner. The only operational activity is the change-over between pits; this is done approximately after two to three years of use (when the latrine does not flush). The full pit is left to rest (compost) for two years before it is emptied.

7.2 Technical and operational sustainability

The system as designed and described in the Reformulation Report, 1984 is a traditional gravity flow sewage system. The topography of Quetta and surrounding areas made it possible to design the system without any pumping stations. The proposed treatment technology (anaerobic, facultative and maturation ponds) is relying completely on biological digestion and gravity flow between the ponds. The only mechanical part in the system is the inlet pumping station.

The technical and operational sustainability of the Project is largely depending on: (1) the availability of water, (2) an efficient separation of solid waste from the waste water, (3) establishing of an O&M system.

The availability of water is discussed at length in Chapter IV. Safeguarding this is a prerequisite for any discussion of technical sustainability for the project.

The establishment of an effective system to separate solid waste from the waste water, to collect the solid waste and to dispose it is vital for the operation of the sewerage network.

Establishment of an O&M system for the sewerage network as well as for the treatment plant is important. This must include setting up of routines for inspection

of street sewers and junction boxes. It might, in the initial stage, be necessary to establish routines for regular flushing of critical sections of the system. This will depend on the amount of waste water available and the number of house connections.

The system should be constructed with an overflow at a suitable place. This overflow should function (during power failure and) when the storage capacity in the system has been fully utilized. The purpose is to prevent overflow through manholes and house connections in low laying areas. The overflow should be constructed as close to town as considered 'environmentally safe'.

7.3 Institutional sustainability

QSSP/B-WASA

QSSP institutional sustainability is intimately bound up with B-WASA's institutional sustainability. This can only come about if GOBAL adopts the agency as an operational entity in accordance with the Act. In the Mission's view GOBAL's commitment to the implementation of the Act can be demonstrated by a number of concrete, monitorable institutional action steps, i.a. including the following:

- amendment of the BWASA Act to provide more stability in the Board membership and its chairmanship, to delete the clause regulating the tenure of the managing director, and to reduce direct GOBAL interference with the operation of the Authority;
- an early GOBAL approval of the proposed B-WASA (double entry) accounting system (which would enable it to establish the WASA Fund as provided for in Article 23 of the Act), approved by the B-WASA Board on 1 August 1989 and submitted to the Department of Finance for clearance in its final draft form (after comments from this department had been incorporated) by B-WASA in August 1989; implementation of the same by BWASA and carrying out an inventory of the Authority's assets and liabilities, to establish its balance totals;
- an early GOBAL approval of the proposed water charges, first approved by the B-WASA Board on 1 August 1989 and subsequently amended in its meetings of 2 June 1991 and 19 October 1992 (along with sewerage surcharge);
- the framing by B-WASA of comprehensive B-WASA rules of business (or bye-laws) as required for the smooth operation of the Authority, and their approval by the Board and GOBAL;
- the framing of an operational plan for a commercial (computerised) billing system (including provisions for sanctions for non-payment) by B-WASA and its approval by the Board and GOBAL;
- to prepare and submit to BWASA Board and GOBAL a realistic budget for FY 1993/94, considering realistic revenue targets for that year;
- rationalisation of B-WASA's organisation, through adoption of clear task descriptions for its various departments, with particular emphasis on strengthening the revenue collection operations, accounting and budgeting and operation and maintenance, both on the water and sewerage sides;
- adoption of unambiguous qualification requirements for all staff, starting from the top management, which will henceforth be adhered to when vacancies arise; urgently filling the positions currently lying vacant, most particularly the position of

Director Administration/Secretary of the B-WASA Board;
- improving the dismal office space situation of B-WASA, bringing QSSP and the revenue section under one roof with the other central B-WASA functions;

Transfer of QMC assets and liabilities on account of water supply and sewerage operation to B-WASA

De facto responsibility for water supply to Quetta is divided between QMC and B-WASA. QMC is responsible for the supply to the city centre and B-WASA to the surrounding areas. QWSP, implemented by B-WASA, is partially providing water to areas where QMC is responsible for operation and maintenance (O&M), as well as to areas where B-WASA has this responsibility.

B-WASA and QMC are at odds over the distribution of the additional water which will be generated by QWSP. B-WASA currently distributes water in Satellite Town, where QMC is still responsible for O&M of sewerage. QSSP will exclusively provide sewerage to areas currently provided with water by QMC. Assigning the technical responsibility for O&M of the entire Quetta water supply and sewerage system to a single agency is obviously desirable (and is mandated in the B-WASA Act - see below), but has not yet taken place.

The transfer of responsibilities is provided for in Article 12 (f) of the Act; proposals for it have been prepared from time to time and the issue has been regularly discussed in the B-WASA Board meetings. However, todate only a limited portion of QMC's water operations and none of its sewerage operations have been taken over by B-WASA as noted above.

The Mission considers that resolution of this issue is very urgent, as neither QWSP nor QSSP can become fully operational in its absence, and hence impinges about the institutional sustainabilty of both. As has been done elsewhere in Pakistan, this can be decided by GOBAL and operationally implemented relatively quickly, with resulting inventory of and agreement on the financial magnitude of assets and liabilities transferred to be resolved post-facto.

Institutional Sustainability of LCS

The LCS and the sewerage components of QSSP are activities of different order in terms of inputs necessary to keep them going. The sewerage component needs massive input of financial and human resources in its implementation phase with a substantial reduction in resource needs during operation and maintenance. On the other hand, LCS programme's resource need is fairly constant extending to project completion and beyond. It is more a 'process' than 'target' oriented programme where success or failure depends on administrative commitment, flexibility, community development, awareness building, sanitation promotion and involvement of the private sector. Though there has been a tacit acceptance of the LCS component by B-WASA, the administrative environment todate has been not conducive for an optimistic scenario for the LCS programme beyond the Project period. Overzealous administrative control with good intentions will stifle the programme and make it

ineffective. For continued sustainability within B-WASA it is necessary to develop an arrangement that makes it possible for the LCS programme to operate with a minimum of interference from head office.

7.4 Social Sustainability

The LCS program has been able to make a breakthrough in a very conservative community. It is slowly building an awareness on the importance of not only a good latrine, but also solid waste management and drainage. In a culture where sanitation is seldom mentioned even in private conversation, involvement of women in the programme has been a significant achievement.

As the LCS programme gains momentum, promotional activities are intensified, more latrines are installed and the community catches on with the health messages; reduced health care cost, less mandays lost in illness, and better community health will contribute to social sustainability. The programme is gaining acceptability, as is reflected in the spread effect it has already induced. In Pasthoonabad RC about 5% of the PFL latrines installed in recent months has been constructed by individuals under private arrangement with the mistries. With the progress of the programme, and increase in demand for latrines, there is a real possibility of private market responses coming forward to meet the demand. The success or failure of such initiatives is the test of social sustainability, as has been demonstrated elsewhere in Pakistan, the subcontinent and elsewhere in the world.

7.5 Financial sustainability

Pipe factory

The financial sustainability of the pipe factory for production of sewerage pipes for Quetta is questionable. No funding for follow up orders to QSSP have been secured. This makes the survival of the factory beyond QSSP unlikely.

At the completion of the deliveries to QSSP and expiry of the current lease agreement the factory may well be privatised by GOBAL. Selling off may be expected to reduce the investment losses of BDA.

QSSP Sewerage

Under reasonable assumptions made on operating costs, number of houses actually connected to the sewerage system and the number of households paying sewerage charges, the sewerage network on its own is not financially viable, as is shown in Annex 4.

As capital costs are provided by GON and GOBAL as equity contribution, and not as loans, provision of the system could be seen as a capital grant to B-WASA in kind, for which it should be able to meet its operational costs out of its operational revenue. However, sewerage charges will not be adequate to meet operation and maintenance

costs, unless currently proposed sewerage charges at Rs.50 per month per connection will be increased annually by at least the same percentage as the rate of inflation.

LCS

LCS cost recovery is low at about 10% of loans extended at this time. However, a pilot drive to enhance cost recovery suggests that dramatic improvements are possible, if a serious effort at follow up is made: apparently affordability is not a serious constraint. In the long run, the subsidized credit scheme currently used to provide incentives to katchi abadi residents to acquire a PFL, should be phased out. At that stage financial sustainability will depend entirely on market acceptability: will the community find it worthwhile to enter into a straightforward financial commitment to have a PFL?

B-WASA

B-WASA's operational and establishment costs have so far been financed out of the project establishment provisions of QWSP and QSSP. Figures for recent years are as under:

	QWSP	QSSP
FY 1990-91	Rs. 15.9 million	Rs. 2.5 million
FY 1991-92	Rs. 39.9 million	Rs. 2.7 million
FY 1992-93 (est.)	Rs. 55.8 million	Rs. 6.2 million

As QWSP implementation will be completed by June 1993, this pattern of financing is unsustainable in future. B-WASA will have to rely on its own revenue, and where there is a shortfall, on outright GOBAL grants (as provided for in the B-WASA Act).

On the revenue side, a total of Rs. 3.2 million has been manually collected on account of water charges during September 1991 (when collection started after the revenue section had been formed) through to end October 1992, when the manual system was discontinued. This dismally low figure should be seen in the light of the only recently transferred responsibility for O&M of part of Quetta's water distribution to B-WASA and the complete lack of preparedness by B-WASA to assume responsibility for this on the revenue side at the time.

Currently a unified domestic water tariff is in force @ Rs. 50 per connection per month, with B-WASA presently having responsibility for O&M of a distribution network serving 15,378 household connections (QMC serves another 23,008 registered connections, and it claims another 31,000 unregistered connections in its area of operation).

Recently B-WASA has for the first time billed bulk water consumers, and the revenue section is now following this up on a quarterly basis. Total outstanding amount on this account effective end-October 1992 was Rs. 72.0 million (based on bulk water charges of Rs. 37.67 per 1,000 gallons as per PC-I for QWSP. The bulk of this, Rs.67.0 million, is (predictably) owed by QMC, which disputes the validity of these charges, both on quantity consumed and on the appropriateness of the price charged.

The B-WASA Board in its meeting of 19 October 1992 approved a revised set of rates; the main features of this over the existing rates comprise:

a. differentiation by pipe diameter to enable higher charges for assumed higher consumption levels;
b. a schedule of (higher) rates for commercial consumers;
c. revised (higher) connection fees;
d. a sewerage surcharge of Rs.50 per connection per month.

These tariffs require to be approved by GOBAL and notified, and B-WASA must install and operationalize the intended computerised billing system. Based on present tariffs, with an aggregate collection efficiency of 75% for domestic consumers, a conservative estimate of gross water revenue per annum would be as follows:

- domestic consumers:	Rs. 6.9 million
- commercial connections:p.m. (to be surveyed)	
- bulk consumers:	Rs. 20.3 million
Total:	Rs. 27.2 million

With transfer of QMC's water operations to B-WASA, most of the bulk revenue would be replaced by domestic consumers' revenue, and at 50% collection efficiency (considering that only part of the unregistered connections would be regularised) a conservative revenue estimate would be about Rs.22.5 million per annum.

These figures, of course, are very tentative and critically dependent on the full implementation of the tariff and billing system (including the implementation of commercial consumers surveys, which have not yet been carried out). **What they suggest, however, is that, if properly managed, B-WASA would be able to cover a very substantial share of its operational expenditure out of its own revenue.**

Hence, it appears to the Mission, that for the time being further rate increases should only be carried out to compensate for inflation (to maintain the real value of B-WASA revenue), with the focus of action on the revenue side being on operational improvements to ensure the collection of the present revenue potential. If this will be satisfactorily implemented, B-WASA will make major strides towards its financial sustainability.

VIII Summary findings of the evaluation mission

8.1 Introduction

In the above chapters detailed findings and recommendations of the Mission have been provided for each concerned subject heading. In this chapter the major findings of the Mission are brought together. In the next chapter major recommendations to B-WASA and GOBAL are presented, while the concluding chapter contains the Mission's recommendations on continued GON support for QSSP.

8.2 Project Design

The Project was envisaged to comprise of a chain of activities which dovetailed one another: QSSP was designed as a "total" sewerage and sanitation project for Quetta. Not only was the population of Quetta to be provided with the facilities for sewerage and sanitation, but the collected sewerage was also to be treated and re-used for irrigation, and an institution was to be created and set up for subsequent O&M. According to the Reformulation Mission report which assessed Project feasibility, this "total" concept for sewerage and sanitation would be cost effective.

In the Mission's view this was at once the strength and the weakness of the Project design: while it resulted in acceptable financial and economic rates of return (mainly on account of the sale of the treated waste water for irrigation), not all the shackles in the Project "chain" could be secured prior to Project implementation or controlled by the Project, resulting in very significant Project implementation risks.

The main uncontrolled/unsafeguarded elements consisted of the following:

a. the sewerage part of the Project depended on pipe supply from a pipe factory yet to be built, but which was not part of the Project, and therefore outside the control of project management;
b. the Project required land acquisition for the sewage treatment plant and sections of the transmission main, which was not secured at the time of Project inception;
c. for the sewerage system to work, sufficient water supply had to be available for flushing: at the time of Project inception there was no guarantee that this would be the case;
d. the institution which had to be strengthened under the Project to manage and operate project facilities, to collect user charges and to manage new investments had yet to be formed out of hiving off the Water and Sewerage Directorate from QDA;
e. ambitious targets were set for LCS without any prior experience with this approach in Quetta;
f. no specific arrangements on selling the treated wastewater had been provided for, even though the financial and economic viability of the Project were critically dependent on this sale.

In the Mission's view, the unusually large extent of the above Project risks should have led to deferment of Project implementation until at least some of these had been resolved, or built in as Project conditionalities. Alternatively, a more step-wise project approach could have been selected. As it happened, however, GOBAL and GON proceeded on the basis of a large, but insufficiently prepared Project, with the result that predictable delays occurred during Project implementation.

8.3 Plan of Operations (PlanOp) benchmarks and achievements

Land acquisition
Land acquisition for the treatment plant and the transport main was envisaged to have been achieved by end 1987. This has not yet been fully completed todate.

Designs
Designs for the sewerage system have been completed in 1987. The proposed transport main has been rerouted to reach the revised proposed treatment plant site. Preparation of detailed designs for the transport main and treatment plant has not yet started.

Pipe factory
The pipe factory was completed in July, 1990, 30 months behind schedule. Pipe production for QSSP started in July 1991. Presently the factory is operating satisfactorily.

Implementation of sewerage contracts
The implementation of the sewer network contracts started in November, 1991, 32 months behind schedule. Contracts 1A and 1B, comprising about 18 km of concrete sewer length (or about 17% of Project total), have almost been completed at present.

Sewerage house connections
The PlanOp envisaged 14,450 house connections. Based on detailed design estimates a total of 10,500 connecting boxes for house connections will be provided. No houses have been connected so far.

Low cost sanitation
The PlanOp envisaged a total of 13,850 low cost latrines to be constructed in areas outside the sewered area. As of 31 October 1992 a total of 2,034 latrines have been constructed (17% of target).

Institutional strengthening
The PlanOp provides for assistance in the establishment and development of B-WASA. Progress towards this objective is as follows:

- the B-WASA act, which was drafted in 1988, has been enacted in 1989;
- B-WASA organisation has been established and has an estimated nominal staff strength of 431 persons.

Numerous proposals to operationalise the provisions of the B-WASA Act have been made by the BKH and NMC consultants/advisors, but this has not led to implementation. This matter is discussed in more detail in section 8.10 below.

8.4 Water supply to QSSP sewers

The overall anticipated water supply (from QMC wells and the B-WASA well fields) to the area to be sewered by QSSP is expected to broadly meet the requirements of the sewers to be flushed, provided that all wells will continue to operate at their nominal production capacity and that this production volume is provided to the sewered area as per design. However, if GOBAL decides that the scarce water in Quetta is to be distributed equally to all its citizens, not enough water will be available in the sewered areas.

A proper set up for O&M of the entire water supply to Quetta to ensure that these water supply levels will be sustained in future is an essential prerequisite for the QSSP sewerage system to operate.

Presently , with only partial boosting to Quetta from the Northern well field, the water supply service levels vary in the QSSP area. Some areas are most likely better off than others, notably Tel Godam, Quaidabad and Nichari in the Northern part of the city, and Sirki/Satellite town in the southern part of the city. However, actual water supply volumes can not be accurately measured with bulk water meters, because of the direct boosting of water from the wells into the entire system and the ring pipeline network.

8.5 Discharging of domestic waste water in Quetta

Customarily Quetta residents discharge toilet and bathroom water separate from kitchen water. Toilet and bathroom water often passes through a "settlement tank" before discharge into a soakpit or in the municipal surface drains. Kitchen water plus solids pass directly into the municipal surface drains. Municipal sweepers keep the drains running.

For the proper functioning of the sewer system all domestic waste water should be collected into the sewer, and solids should be separated from the waste water prior to entering the sewer.

A public campaign to inform Quetta residents about these "needs" of the sewerage system will be required prior to connecting houses to the system.

8.6 Pipe Factory

The decision to build a VM pipe factory in Quetta was highly questionable both on technical and economic grounds, and should not have been taken in view of the very high implementation risks. After very significant implementation delays, which could not have been overcome without the substantial, but unanticipated GON financial and technical assistance to its establishment, the factory is presently running well. A large stock of sewer pipes is available in the yard. However, the sustainability of the pipe factory is vulnerable as it depends on questionable demand beyond the Project, intermittent electricity supply, unsecured spare parts supply and limited technical O&M expertise.

8.7 Low Cost Sanitation (LCS)

From a slow start, the LCS component of QSSP has progressed to a stage where four Reference Centres at Pashtoonabad, Marriabad, Hudda and Kili Shaikhan, have been established. Most of the RCs are now meeting the targets in terms of house-to-house campaigns, area meetings, obtaining applications and installation of latrines and follow-up visits. This progress, however is acutely threatened by continuing disputes between LCS B-WASA and QSSP financed staff over materials procurement matters, which negatively affect the LCS image and impact in the communities concerned.

Training modules for civil technicians, RC store keepers, sanitation promoters, health educators, and mistries have been designed. Training and promotional materials have been developed.

Training and promotional materials produced by the LCS unit leave much to be desired. The materials pertaining to technology are poor in details and available options, while those on 'soft' issues lack clarity in terms of messages they convey.

Though building of community awareness is an expressed intent of the project activities, available communication media have been insufficiently exploited. The LCS does not utilise a specific, structured orientation programme aimed at obtaining popular support from politicians, civil servants, businessmen, community leaders, councillors and others who influence community views at large. Demonstration latrines have only been used in the RCs, but not in schools, health clinics or any other public place.

The RCs are competent and effective within the limits of their own design, but they are continually plagued by the above administrative problems relating to material procurement.

Technical support to the RCs from the head office is poor and ineffective. Relevant experience on low cost sanitation is not available at the head office. Consequently, the RCs cannot effectively respond to local situations encountered during implementation.

B-WASA and QSSP staff in the LCS unit are at odds with one another, undermining the chain of command and smooth functioning of the unit. This is reflected in the above poor technical support to RCs and problems relating to procurement of materials.

Cost recovery is poor. The LCS unit has not (yet) exploited any peer or group pressure to pay the instalment in time. For the majority of the people in the target areas, it is more a matter of indifference (why should we pay, if we are not pushed?) than an affordability problem.

Though the Project design emphasises the involvement of the private sector in low cost sanitation programme, there is no Project activity (yet) geared towards encouraging the private sector to respond to the demand for latrines.

LCS of QSSP promotes only one sanitation option viz. Twin Pit Pour Flush Latrine, despite commendable success with a range of options in many countries in the Asian region. If a spin-off effect, with the private sector taking on the production and delivery of the latrines, is aimed at, a range of options at a varying prices, is generally

more attractive to the private sector than only one product.

There is scope of reducing the cost of the PFL promoted through design optimization, use of different materials and introduction of options in its different components.

8.8 Financial viability: ability to pay and willingness to pay

Quetta residents in the QSSP area, both the sewer area and the LCS area, are relatively well off. Payment towards sewerage and sanitation should not be a problem. However, the value/priority attached to sanitary facilities is low. This results in indifference to payment obligations and cost recovery problems, both on account of sewerage and for LCS.

The currently proposed sewerage surcharges on the water rates are at best just adequate to recover O&M costs, but not to recoup any of the capital cost of the system. GOBAL subsidy to sewerage and sanitation will therefore be unavoidable in the near future.

8.9 QSSP Management

Over the last year efforts to introduce joint QSSP management between the BKH consultants and B-WASA staff have been initiated. This is expressed in joint responsibility for i.a. contractual/tendering matters and financial claims by the B-WASA Project Director and the BKH Project Manager.

8.10 BWASA institutional development

The BKH and NMC consultants/advisors have provided building blocks to operationalise the provisions of the B-WASA Act through the preparation of:

- organisational recommendations;
- accounting systems recommendations;
- an accounting manual;
- tariff and billing systems recommendations;
- staffing and training recommendations.

However, none of these recommendations have so far been adopted and implemented.

Numerous proposals have been made on water charges, but none have been implemented fully.

Hence, most of the prerequisites for B-WASA to function as an autonomous, self-sustaining authority according to the provisions of the Act are not yet in place, even though many of the above essential prerequisites have been discussed and approved by the B-WASA Board in its (only) 8 meetings held from September 1988 till today.

In no case has such B-WASA Board approval led to or been preceded by GOBAL approval as required under Articles 13 (1) (rules), 16 (a) (tariffs), 26 (borrowing) and

27 (accounts) of the Act. Therefore, a number of essential B-WASA Board approved recommendations could not be implemented legally or practically.

Staff rules along the lines of QDA staff rules have been adopted, whereas for procurement the provincial government rules apply; for O&M no rules exist yet. Revenue collection is still administered and handled manually, accounting and budget preparation still follow government departmental practices (single entry accounts and preparation of expenditure budgets only).

As a result of the non-implementation of the Act, B-WASA today functions not as an Authority, but as a government department funded out of SNE provided out of the ADP.

Additional indications of limited institutional progress consist of the following:

- there have been several extra-legal changes in the composition and particularly the chairmanship of the Board; these have not been legalised post-facto;
- from January 1986 till the present there have been 6 managing directors, i.e an average incumbency of a little more than one year.

Hence, in the Mission's view, the Project has been relatively unsuccessful in making a serious institutional impact.

The Mission feels that the root cause of this lack of progress is insufficient concern or commitment on the part of GOBAL for the viability of B-WASA. B-WASA has clearly not been seen as an important implementation arm of Government policy in the area of urban water supply and sanitation, as is vividly illustrated by the prevalence of senior government officials on deputation from unrelated departments in its senior management positions.

8.11 Transfer of QMC assets and liabilities on account of water supply and sewerage operation to B-WASA

De facto responsibility for water supply to Quetta is divided between QMC and B-WASA. QMC is responsible for the supply to the city centre and B-WASA to the surrounding areas. QWSP, implemented by B-WASA, is partially providing water to areas where QMC is responsible for operation and maintenance (O&M), as well as to areas where B-WASA has this responsibility.

B-WASA and QMC are at odds over the distribution of the additional water which will be generated by QWSP. B-WASA currently distributes water in areas where QMC is still responsible for O&M of sewerage, primarily in Satellite Town. QSSP will exclusively provide sewerage to areas currently provided with water by QMC. Assigning the technical responsibility for O&M of the entire Quetta water supply and sewerage system to a single agency is obviously desirable, but has not yet taken place.
The transfer of responsibilities is provided for in Article 12 (f) of the B-WASA Act; proposals for it have been prepared from time to time and the issue has been regularly discussed in the B-WASA Board meetings. However, todate only a limited portion of QMC's water operations and none of its sewerage operations have been taken over by B-WASA as noted above.

IX Recommendations to B-WASA and GOBAL

9.1 Sewerage

9.1.1 Progress in sewer construction depending on water supply availability

The construction of sewers and subsequent connections should only start in areas with a proven sufficient water supply. It seems that such areas are likely to be Tel Godam/Quaidabad/Nichari and Sirki.

Since the pipes required to sewer Tel Godam/Quaidabad and Nichari plus Sirki are largely in stock, these sewers could be laid with priority over the planned implementation schedule of QSSP. Starting with Tel Godam has the tentative additional advantage (from the flushing potential point of view), that the Cantonment Board has an active interest in a possible discharge connection into the QSSP network at Tel Godam. Minor upgrading of the sewer line may be required.

Subject to confirmation of adequate water availability in these areas to flush the system, construction of the main lines to Tel Godam and Sirki should therefore be started upon the satisfactory completion of the present 1A and 1B contracts **(Action: QSSP/B-WASA)**.

For subsequent sewerage contracts, similar conditionality should apply. Depending on resulting feasible subsequent progress of the sewerage works, Gul Pipe will have to be informed about the (potentially significant) change in the pipe requirements for 1993. It needs to be explored if the shortfall can be compensated by supply to other consumers, e.g. the Cantonment Board and BDA. Gul Pipe, the lessee of the pipe factory, should obtain all its input requirements through normal commercial channels **(Action: QSSP/B-WASA/BDA/Gul Pipe)**.

9.1.2 House connections

Before connecting houses to the sewers, the procedures and regulations (bye-laws) for connection should be established and made known to the clients. Particularly the residents of Tel Godam are middle and upper class, and do not have financial constraints to meet any connection or other charges if properly explained **(Action: QSSP/B-WASA)**.

Before starting to connect houses to the sewers an education campaign on the actual use of the sewer should be carried out. This campaign should explain that solids should be separated from the waste water prior to discharging waste water, and that all waste water should be discharged into the sewer **(Action: QSSP/B-WASA)**.

It is recommended that the outstanding issues concerning house connections are resolved immediately. Upon completion of the procedures and the assurance of sufficient water in areas 1A and 1B house connections should be started without delay **(Action: QSSP/B-WASA)**.

House connections in Tel Godam/Quaidabad/Nichari and Sirki should be made during construction of the main lines **(Action: QSSP/B-WASA)**.

9.1.3 1993 sewerage outputs

By the end of 1993 QSSP should have completed the sewer mains and a number of houseconnections in 1A, 1B, Sirki and Tel Godam zones. The sewage will be discharged through the temporary outlet into the Habib Nullah.

As this cannot be more than a temporary solution, preparation for the construction of the transport main and the treatment plant (land acquisition and detailed design/preparation of bills of quantity/tendering) should start during 1993, so that construction could start once the sewerage in the above mentioned areas is operating properly **(Acion: B-WASA/QSSP)**.

9.2 Low Cost Sanitation

For successful implementation of the LCS component of QSSP as designed, continued and additional support has to be provided to advance the Project in fulfilment of its objectives. Support actions necessary are described below and will all need to find their way in the 1993 QSSP implementation plan **(Action: QSSP)**:

9.2.1 Material Procurement Policy

In view of the recurring problems on procurement of materials for the RCs, perhaps the involvement of the beneficiaries in the procurement of the materials may solve the problem and give the RCs a level of flexibility desired by them. There are several options.

The first option requires all materials to be procured from pre-selected private suppliers in the market by beneficiaries themselves as part of the mistries construction contract, or through a system of coupons, with private suppliers to be reimbursed by B-WASA on producing the coupons, and a certification by the RC that materials have been supplied.

The second option retains the procurement and supply of the major materials such as cement, PVC pipes and bends, pans, steel, with the B-WASA procurement officer. The supply is made as per predetermined schedule to be agreed upon by the head office and the RCs. The additional materials will be procured by the householders through coupons as in option one.

The third option involves supply of all materials to the RCs by enlisted suppliers as per rates tendered every six months. To guarantee continuous supply, B-WASA will retain a security deposit from the suppliers.

Considering that the credibilty of the LCS programme ultimately depends on its ability to deliver to the community, this matter needs to be resolved urgently **(Action: QSSP/B-WASA)**.

9.2.2 Training Support

The LCS unit need further training support. Training modules should be developed for community leaders, councillors, imams and people whose opinion matters in society. Special training to improve the capability of private sector and encourage their participation should be initiated.

Perhaps the best way of improving sanitation coverage is through reinforcing common experience in the community. About 35% of the people have acceptable latrines and a high percentage have traditional latrines. The initiative to install a facility exists in the community. It is for the programme to take advantage of this vital force through training interested people in the community in both the 'soft' and 'hard' issues of sanitation programme.

Training in both technology and the soft issues of community development, social mobilisation, sanitation promotion should be strengthened to include details on criteria of design, use of materials, technology options, improvisation and flexibility along with cost implications **(Action : QSSP)**.

9.2.3 Development of Training and Promotional Materials

Without detracting from the dedication and the efforts the Project has made in developing the training and promotional materials, improvements have to be made if the activities are to have their intended impact **(Action: QSSP)**.

9.2.4 Monitoring and Evaluation

Qualitative indicators of success of training, promotional and hygiene education, activities should be expanded **(Action: QSSP)**.

9.2.5 Media of Communication

Success of low cost sanitation is dependent on a positive response from the community, not only in the areas served, but also the wider Quetta community. A programme involved in improving sanitation conditions in the community should use all available means of communication. The radio, television, newspaper, billboards, traditional channels, transport such as buses should all be used to generate general support and acceptance. Demonstration latrines along with basic information, should be put up in schools, madrashas, market places and in front of RCs **(Action: QSSP)**.

9.2.6 Technical Support

A LCS programme cannot depend solely on a design for ideal conditions. Reality is different. Improvisation and change in design necessary to adapt to changing site conditions, such as high water table, and space constraints have to be introduced.

A low cost sanitation programme based on one technology option with very little flexibility, cannot be expected to be cost effective in the long run. A community with diverse culture, habits, attitudes, income groups and scarcity of spaces, needs a range of technology options with improving traditional latrines at one end of the scale to twin pit pour flush latrine at the other. Single pit latrines, VIPs (single pit and twin pits), upgrading traditional latrines and small bore sewers should all be tested as to appropriateness under specific constrained conditions, user acceptability and response **(Action: QSSP)**.

Even within the selected technical option, there may be scope for improvement, both in terms of design optimisation, and reduction of cost. The parameters of design of pits should be carefully evaluated. There is scope of reducing pit sizes. Introduction of concrete rings for pit linings, pre-cast Y-junctions, concrete pans, masonry footrests may all be considered to assess their contribution to cost reduction, flexibility, choice, and greater potential for private sector involvement in production and delivery of latrines **(Action: QSSP)**.

9.2.7 Study Tours, Seminars and Workshops

Key LCS and B-WASA staff should be exposed to successful low cost sanitation projects in the region. Successful projects should be identified and relevant staff sent to study technology options, community development and evaluation procedures, service delivery mechanisms and cost recovery practices **(Action : QSSP)**.

Key staff from the LCS unit should be sent to seminars, workshops and training courses on relevant topics. The LCS unit should also organise seminars/workshops to share experiences and lessons learnt **(Action: QSSP)**.

9.2.8 Cost Recovery

Cost recovery should relate to a realistic assessment of present value of money. The present value of the time series repayment over a period of five years will be much lower than the current price of a latrine. The prevailing repayment schedule provides discounts for full payment upfront and for different rates of down payments. Logically the rebate allowed should be equal to the current full price minus the present value of the time series payment of instalments. The prevailing rate of interest should be used as the rate of discount to calculate the present value. This will give the beneficiaries an incentive to pay upfront. Ultimately, the entire credit system may be abandoned, as affordabilty does not appear to be a serious constraint, and the incentive function of the credit scheme will diminish in importance over time as compared to the inherent difficulties in implementing the credit scheme **(Action: QSSP)**.

Important to effective cost recovery is peer or group pressure, which is known to have worked in many places in Asia. Apart from follow-up visits by sanitation promoters and hygiene educators, CBOs and motivated community leaders may prove to be useful. Notwithstanding that users group formation is difficult in the prevailing socio-cultural environment in Quetta, efforts at group formation should be pursued. If latrines can be given to individuals in groups, a group guarantee can work to mutual advantage **(Action: QSSP)**.

9.2.9 WID Activities

The LCS unit has been successful in involving women in its programme. It is recommended that the programme consolidates its position vis-a-vis WID in sanitation before venturing into solid waste management and drainage. Widening the scope for women's involvement to include education, health and family planning will depend on the future institutional status of the LCS unit **(Action: QSSP)**.

9.2.10 Future Institutional Sustainability

The long term institutional sustainability of the LCS unit beyond the Project period has been a source of concern. It is now time to seriously consider the options available, weigh the financial implications, and decide on the future. For a smooth transition a plan of action should be drawn up and operationalised by the end of 1993 **(Action: QSSP/B-WASA/GOBAL)**.

There are basically two options:

i) LCS may remain within the B-WASA setup with a degree of freedom for it to operate without hindrances. By the end of 1993, increased promotional activities, and demonstrative effect of the latrines constructed, would have created a market demand for latrines. The spread effect of the programme and training specifically targeted at encouraging the private sector in production and marketing of latrines would have taken effect. Private sector initiative would gradually step in to meet demand. The LCS unit will then operate more as a 'facilitator' than a 'provider' of services, helping people help themselves. Promotional activities, community development, training and token construction of latrines would be the main activities of the LCS unit. The LCS would be free to move its operation from one area to another in Quetta and also to other cities where B-WASA may opt to operate. LCS unit staff and RC staff would all have to be B-WASA employees.

ii) the LCS unit graduates into an NGO with financial support from GOBAL and donor agencies. A model for such an NGO already exist in the Baluchistan Rural Support Programme (BRSP) which used to be a GTZ supported Pak-German Assistance Project. BRSP is funded jointly by the GOBAL and GTZ. There are currently 350 NGOs supported by the GOBAL, with 27 NGOs in Quetta alone. However, if this is the option of choice, groundwork has to be completed before the NGO can become a reality. As prerequisites to the formation of an NGO, a core group of prominent sponsors has to be identified, scope of activities

defined, and a memorandum drawn up. Technical, institutional and management capability to operate and sustain such an organization have to be developed. LCS unit and RG staff would, by implication, become employees of the NGO.

9.3 Gradual expansion of joint management of QSSP

During 1993 the function of supervising engineer (verifying the quality and quantity of work) should be gradually transferred to B-WASA. For the transfer B-WASA should, with the assistance of BKH consultants, prepare itself for taking on this responsibility **(Action: QSSP/B-WASA)**.

To satisfy GON need for an accountability of its financial support, the Project Manager for QSSP should keep a small inspection team for random quality of works checks and bill inspection **(Action: QSSP)**.

QSSP bookkeeping should also be gradually transferred. To prepare for this transfer, B-WASA should appoint a suitably qualified accountant/bookkeeper to QSSP (possibly the current QSSP incumbent) to be trained as required on QSSP accounting practices under the supervision of the BKH Project Manager **(Action: B-WASA/QSSP)**.

9.4 B-WASA institutional development

B-WASA's institutional sustainability can only be secured if GOBAL adopts the agency as an operational entity in accordance with the Act. In the Mission's view GOBAL's commitment to the implementation of the Act can be demonstrated by a number of concrete, monitorable action steps, which can be taken during the next 6 months i.a. including the following:

- amendment of the BWASA Act to provide more stability in the Board membership and its chairmanship, to delete the clause regulating the tenure of the managing director, and to reduce direct GOBAL interference with the operation of the Authority;
- an early GOBAL approval of the proposed B-WASA double entry accounting system, which would enable it to establish the WASA Fund as provided for in Article 23 of the Act; implementation of the same by BWASA and carrying out an inventory of the Authority's assets and liabilities to establish its balance totals;
- an early GOBAL approval of the water charges and sewerage surcharge, approved by the B-WASA Board in its meeting of 19 October 1992;
- the framing by B-WASA of comprehensive B-WASA rules of business (or bye-laws) as required for the smooth operation of the Authority, an their approval by the Board and GOBAL;
- the framing of an operational plan for a commercial (computerised) billing system (including provisions for sanctions for non-payment) by B-WASA and its approval by the Board and GOBAL;
- to prepare and submit to BWASA Board and GOBAL a realistic budget for FY 1993/94, considering realistic revenue targets for that year;

- rationalisation of B-WASA's organisation, through adoption of clear task descriptions for its various departments, with particular emphasis on strengthening the revenue collection operations, accounting and budgeting and operation and maintenance, both on the water and sewerage sides;
- adoption of unambiguous job descriptions and qualification requirements for all staff, starting from the top management, which will henceforth be adhered to when vacancies arise; urgently filling the positions currently lying vacant, most particularly the position of Director Administration/Secretary of the B-WASA Board;
- improving the dismal office space situation of B-WASA, bringing QSSP and the revenue section under one roof with the other central B-WASA functions;

The Mission has reviewed a draft Action Plan prepared by B-WASA to achieve the above by the middle of next year. In the Mission's view this Action Plan is broadly achievable, if there is sufficient political and administrative will to carry it out. However, it requires further detailing of the action steps for it to be useful as a management tool for implementation.

The Mission recommends that GOBAL reviews, details and adopts this Action Plan with the objective to achieve the above targets by 1 July 1993, so that the required institutional and financial systems can be in implementation by the beginning of FY 1993/94. The Mission further recommends that this Action Plan is submitted formally by B-WASA/GOBAL to RNE not later than 31 December 1992, so that it can also be used as a monitoring tool by RNE **(Action: B-WASA/GOBAL/RNE)**.

For the finalisation and the implementation of the Action Plan it will be necessary to establish a small working group in B-WASA, charged with the task of initiating and following up on each of the individual steps of the Action Plan. In view of B-WASA staff constraints, the Mission recommends that this working group is chaired by the MD B-WASA and further consists of the Director Finance, the (Deputy) Director Administration and a management advisor **(Action: B-WASA)**.

9.5 Transfer of responsibilities for water and sewerage from QMC to B-WASA

The Mission considers that resolution of this issue is very urgent, as neither QWSP nor QSSP can become fully operational in its absence, and it hence impinges about the institutional sustainabilty of both. As has been done elsewhere in Pakistan, under the present circumstances in Balochistan this can be decided by GOBAL and operationally implemented relatively quickly, with resulting inventory of and agreement on the financial magnitude of assets and liabilities transferred to be resolved post-facto.

The Mission recommends that an action plan for transfer along these lines is prepared urgently by GOBAL, to be agreed upon by all parties by 31 January 1993. The mission further recommends that this action plan is submitted to RNE by that date to also be used as a monitoring tool by RNE. For the preparation and implementation of this action plan it is necessary to establish a small working group consisting of representatives from QMC and B-WASA, supported by technical and financial advisory capability **(Action: GOBAL/RNE)**.

9.6 1993: a year of "Testing and Transition"

If the above recommendations are adopted, 1993 will be a year of testing and transition for QSSP and B-WASA.

The testing applies particularly to the technical aspects of QSSP components, e.g. sewerage and LCS. The general direction for the implementation of these components has been described above. Implementation of these components is within the capability and competence of QSSP and B-WASA.

General directions for the more fundamental transfer of responsibilities from QMC to BWASA and required institutional actions related to B-WASA have also been described above. The implementation of these proposals will go beyond the competence of B-WASA, and will require interagency agreement (B-WASA and QMC) and GOBAL approvals.

The working groups recommended in sections 9.4 and 9.5 above have been proposed to facilitate reaching of these agreements and obtaining those approvals.

X Recommendations on continued GON support to QSSP

10.1 General direction

Considering the considerable uncertainties regarding the technical viability of the sewerage part of the Project and regarding GOBAL readiness to seriously adopt B-WASA as its main implementing agency, **the Mission recommends that GON extends continued support to the Project during 1993, with further support thereafter conditional to the satisfactory undertaking of the various actions described in chapter IX above.**

The Mission further recommends that an independent and joint GOBAL/GON review of progress is carried out by the middle of 1993 to assess this, and to recommend the scope and direction of further GON support, if any **(Action: GOBAL/GON)**.

Considering project implementation delays, substantial overspending on TA along with capital cost increases, it is not likely that GON will, within the original commitment limitations, be able to support financing of the entire QSSP works on a 70/30% basis as provided for in the original PC-I. By the end of 1992 only an amount of Dfl.16.1 million will still be available for QSSP implementation. As detailed below, the Mission proposes some marginal adjustment in the GON support items for 1993, but considering the larger GON and GOBAL resource constraints, it may be advisable for GOBAL to actively pursue financial support from other donors for selected sewerage capital investment items in the overall QSSP capital investment programme. Considering its earlier involvement in supporting QWSP and its expressed interest to provide further support, an obvious alternative source of finance will be the Kuwait Arab Development Fund. GON may facilitate this through liaison with appropriate donor agencies **(Action: GOBAL/GON)**.

10.2 Specific support elements

In the Mission's view GON support during 1993 should comprise the following:

a. financial support for continued sewerage work along the lines described in paras 9.1.1.-9.1.3. above;

b. financial support for continued LCS work as described in paras 9.2.1 - 9.2.10 above;

c. technical support by BKH/NESPAK to facilitate the implementation thereof, consisting of about 25 mm of expatriate consultants, 40 mm of local consultants (plus support staff) comprising of :

   - an expatriate project manager (10.5 months);
   - an expatriate sociologist (10.5 months);
   - other short term inputs (3.5 months), i.a. including: i) a short-term input by the expatriate resident engineer to transfer his tasks to the local consultant engineer,

and ii) a short-term input by a senior LCS advisor, particularly to assist in the development of a future institutional scenario for LCS;
- a 0.5 month provision for project director work, including home office support in The Netherlands;
- a local deputy project manager/senior civil engineer (12 months);
- a local sewerage O&M engineer (12 months);
- a local sewerage design engineer (4 months);
- a local sociologist/training specialist for LCS (6 months);
- a local LCS technology expert (6 months);
- 36 manmonths of local support staff.

Some suggestions for specific job descriptions are provided in Annex 5a. These need to be developed fully in the consultants' proposal as part of the 1993 QSSP implementation plan **(Action: QSSP/BKH/NESPAK)**.

d. advisory support to B-WASA to facilitate the implementation of the institutional action plan and the transfer of responsibilities from QMC to B-WASA, consisting of:

- an expatriate management and organisations specialist with experience in public utility management (10.5);
- a local utility systems engineer (12 months).

Until this management advisory team is in place, the services of the present management adviser require to be continued. An overlap with the advisory team would be desirable, and if the workload requires, it may be considered to retain the present management adviser (who has an accounting background) as an additional member of the advisory team for part of 1993. A brief Terms of Reference for the envisaged management advisory team is in Annex 5b to facilitate early recruitment **(Action: DGIS/RNE)**.

e. intermittent support from the Pakistan Country Team of the UNDP/WB Water and Sanitation Programme on computerised billing and revenue generation, LCS technology, training, community development and development of training and promotional materials. This support would also serve the wider objective of donor coordination in the water and sanitation sector, and in that way shorten learning curves for executing agencies and donors alike **(Action: RNE)**.

It is tentatively estimated by the Mission, that the above GON support during 1993 would require the following approximate budget:

- sewerage (at 70% of cost of works, including share of maintenance equipment, but excluding pipe supplies, the cost of which would be borne by GOBAL until the pre-financing debt has been settled in full):	Dfl. 1.6 million
- LCS (at 70% of cost of works, including share of operational cost):	Dfl. 0.3 million
- transport provisions and other QSSP operational overheads(at 70% of cost):	Dfl. 0.1 million
- continued BKH/NESPAK technical support (at 100% of cost):	Dfl. 1.1 million
- B-WASA advisory support (at 100% of costs):	Dfl. 0.4 million
- Miscellaneous support (UNDP/WB, pipe factory advisor):	p.m.
Total required:	Dfl. 3.5 million

10.3 Additional considerations

Upon GOBAL/GON agreement on the above, QSSP should be requested to prepare a revised and detailed annual implementation plan for 1993, including a budget. This plan should follow the recommendations above. This plan should also include a tentative time schedule plus estimate for the completion of QSSP **(Action: QSSP)**.

As continued GON financing is not ensured beyond 1993, depending on the outcome of the above review mission to be fielded by mid-1993, production of pipes for QSSP during the first half of 1993 by the pipe factory should not be more than required for 1993 works **(Action: B-WASA)**.

Annex 1a

Terms of Reference for evaluation of the Quetta sewerage and sanitation project (QSSP)

Annex 1A Terms of Reference for Evaluation of the Quetta Sewerage and Sanitation Project (QSSP)

1 Background

The QSSP started in February 1987. The project aimed at contributing to an improved sewerage and sanitation system in Quetta to promote hygienic conditions and through that public health. Besides the construction of sewerage transport main and household connection, the project included a treatment plant and a low cost sanitation programme. It was also intended to facilitate the institutional development of the Balochistan Water and Sanitation Authority (BWASA), the counterpart organization responsible for the subject matter in Balochistan (Quetta). It was also envisaged that an irrigation scheme be set up using the treated waste water.

The objectives of the project were:

1. sewerage to serve a total of 14,450 house connections in the central (business) area of the city;
2. the construction of 13,850 low-cost latrines in the outer mohallags surrounding the CBD;
3. the construction of a sewage transport main;
4. the set-up of a waste water treatment plant;
5. the construction of an irrigation scheme using treated waste water;
6. the institutional development of BWASA.

The project is funded by the Netherlands and Pakistan Governments. The Dutch contribution amounted to about DFL. 28 million, earmarked for technical assistance, equipment, operational costs and contingencies. The Pakistan contribution amounted to Rs. ..... million covering cost of counterpart staff, equipment, office space and operational and recurrent cost.

The project faced a slow start, among other due to problems in setting up a pipe-factory and the overall performance of and institutional problems in connection with the counterpart organisation. After a period of five years the first results have materialized, but it is estimated that the current project will at least have to continue till 1996 before the originally intended results can be reached physically. The project has been reviewed (semi) annually be an external monitoring mission.

2 Evaluation: general characteristics

An evaluation of the QSSP is warranted in view of the need to apprise both governments on the results of the project up to present and to recommend any improvements, to review the implementation methods, to identify constraints and the necessity or otherwise of the continuation of the present phase of the project in terms of allocation of, among others, an additional technical assistance budget. The mission

should also review and recommend in detail on the institutional requirements for the future sustainable continuation of the project's benefits as well as look into specific issues of particular interest to women or otherwise arrive at a gender specific analysis of the project's benefits, methodology, etc.

According to the relevant instruction (no. 8) and guidelines evaluation of bilateral projects are carried out as a joint activity of the cooperating governments. Evaluation have specific management, policy and communication functions. The evaluation has to cover the prescribed elements of DGIS evaluations as detailed in the terms of reference, as well as concur with the Pakistan Government's procedures.

3 Terms of Reference

3.1 General description of project, facts and processes

a. perception and assessment of original problem, assumptions and background leading to the project;

b. description and assessment of objectives and design of project;

c. description and assessment of working plans and time schedules;

d. description and assessment of use of inputs and mode of financing by donor and receiving country (including staffing);

e. description of implementation as compared to plan of operation and annual workplans, including changes, modification and bottlenecks;

f. description of the process of technical assistance, especially regarding the absorption of, transfer to and internalization by counterpart.

Attention should be paid to the following activities and issues:

Outputs

* pipes laid
* house connections realized
* support to contractors
* set-up and support to pipe-factory
* contracts
* latrines constructed
* installation and operation of reference centres
* surveys
* preparatory activities for water treatment plant and irrigation scheme
* training
* technical assistance (expatriate and local)

Logistics

* adequacy of project's office and suboffices and equipment installed
* adequacy of automation equipment (hard and software) and installation procedures
* adequacy and use of transport facilities

Management

* monitoring and management information system
* external review
* backstopping
* support by and procedures of DGIS, Embassy and counterpart organisation
* project management
* personnel management
* networking and public relations
* operation and maintenance

Other relevant issues

* coordination of utilities with other relevant organization and institutions in Balochistan and Quetta
* gender specificity and position of women
* community based participatory approach
* the institutional requirements for sustainability of project's benefits and the necessary actions with respect to BWASA
* management advisor to BWASA
* technology
* legal framework
* relation with water supply
* relation with the Quetta road and drainage project and its implementation

3.2 Relevance

Indications as to whether the project's results are relevant in terms of:
- improvement of the sewerage and sanitation conditions in the project area and subsequent better hygienic and health circumstances;
- environmental improvements;
- structural poverty alleviation;
- gender specific analysis and improvement of the position of women and children.

3.3 Receiving country's policy

Does the project fit into the policies and priorities of the Government of Pakistan. Refer to the current and next Five Year Plan and promulgated policies on sanitation and environment.

3.4 Netherlands development cooperation policy

Does the project fit into the Netherlands policies and priorities in the field of development cooperation. Refer to the policy document 'A world of difference, a new framework for development cooperation in the 1990's', the Country Policy Documents for Pakistan 1988-92 and 1992-95 and other relevant policy documents.

3.5 Effectiveness

Are the intended results achieved (taking into consideration that the project is not yet completed)? What are the reasons for any shortfall? Are there any unanticipated, additional or side effects. Were the originally intended results realistic? If not so, why?

3.6 Efficiency

Was the project carried out in an efficient way? What are reasons for delays, if any. Was the mode of implementation adequate, flexible and realistic? Do the results up till now justify the efforts made and inputs used?

3.7 Sustainability

Are the project's results sustainable, i.e. can they be continued without an external donor's major support? Are sufficient measures taken to ascertain a (gradual) transfer of project activities to the counterpart and are the institutional requirements fulfilled in this respect?

3.8 Conclusions and recommendations

What are the major conclusions of the evaluation mission regarding:

a. the original perception and design of the project;
b. the implementation of the project, its major achievements and problems encountered;
c. its relevance in terms of developmental and receiving and donor country's policies and priorities
d. effectiveness, including strong and weak points;
e. efficiency;
f. institutional, procedural and manpower sustainability;

g. the impact on (the autonomy of) women and children;
h. any other relevant aspects.

What are the recommendations (formulated in clear-cut, operational terms):

a. regarding the activities and issues ad. 3.1 to improve the implementation of the project during the remaining period;
b. regarding the sustainability of the activity;
c. regarding the receiving country's and donor's policies and priorities, if and when relevant;
d. any other pertinent subject.

3.9 Follow-up

Is there a need, on the basis of the mission's findings or otherwise, for important changes and modifications during the remaining period of the project. What are recommendations regarding the continuation and composition of the technical assistance. Have any (further) activities to be undertaken with respect to the transfer and institutionalisation of the project. Is BWASA sufficiently equipped to sustainable continue and operate the project's activities and achievements without external support or are any additional programmes needed to ascertain this. If so, what steps have to be taken to identify, formulate and fund such activities.

4 Composition of joint evaluation mission

1. technical expert on sewerage construction, collection and treatment;
2. institutional and management expert with experience in the field of public amenities notably sewerage and sanitation;
3. expert on participatory, community based sanitation and extension;
4. expert on wide issues.

One of the members should be the team leader. One, preferably two experts should be from Pakistan.

5 Timing

The mission should be fielded in the month of September 1992 and visit all relevant major institutions and persons in the sector. The final report (in the English language) should be ready by 15th of October 1992. Besides the substantive sections, the report should contain an account of the evaluation methodology followed. In addition to the field visits time should be allocated for preparatory study and reporting. In particular, the mission should read all relevant material, reports, publications, etc. in relations to the project.

6 Briefing and debriefing

The mission should brief and debrief with the project's counterpart organisation, Netherlands Embassy and DGIS. Part of the mission, should also visit the members of the monitoring mission and BKH headquarters.

Annex 1b

Agreed minutes of wrap up meeting of

10 November 1992

AGREED MINUTES OF WRAP-UP MEETING BETWEEN THE NETHERLANDS GOVERNMENT EVALUATION MISSION AND THE GOVERNMENT OF BALOCHISTAN REGARDING QUETTA SEWERAGE & SANITATION PROJECT HELD ON 10TH NOVEMBER, 1992 UNDER THE CHAIRMANSHIP OF THE ADDITIONAL CHIEF SECRETARY (DEV.)

List of participants is enclosed as Annexure - A.

The ACS welcomed the participants and called the meeting to order.

Mr. Jan Schaik gave a brief overview of the findings and recommendations of the mission with regard to the sewerage component of the QSSP project.

The Pipe Factory went into production in 1991 and contracts 1A, 1B are almost complete and no house connections have yet been made. Critical to the sewerage is the availability of water, where there seems to be much confusion as systematic data are not available. Quetta is expected to have a total water supply capacity of 16 mgd for a population of 1.0 million. If distribution is uniform, the water in the sewered portion of the city will not be enough for the flushing to take place. Assuming an unequal distribution, some areas will have sufficient water. Before house connections are made BWASA should assess the availability of water in the areas and be sure that sufficient water is available. Another factor that may affect the functioning of the sewer is the habits of people in regards to disposal of spent water. Awareness campaign must be undertaken before house connections are made to ensure that all spent water go to the sewer and that solids from kitchen water is separated before disposal into the sewer.

The year 1993 will be a year of testing, with parts of the sewered system put into operation.

Dr Zia briefed the meeting on the LCS component of the QSSP. From a shaky start the LCS component has consolidated itself. Though there are a few problem the LCS unit is meeting its target. However there will have to be additional inputs into training, development of promotional materials, and technology options. Greater attention has to be given to cost recovery. The prime concern of the mission is on the long-term sustainability of the LCS unit beyond the period of the project. The unit could operate with relative flexibility within the WASA set-up, functioning more as a'facilitator' than as a 'provider' of services. Or it could become an NGO with support from the GOBAL and donor agencies. It is therefore recommended that:

- The LCS component continues with additional support in training, development of training and promotional materials,

activities to induce the private sector into the program and improve cost recovery.

- GOBAL decides on the future status of the LCS unit, draws up a monitorable plan of action by Dec. 1993 and puts it into action.

- The Pakistan Country Team of the UNDP/WB Water and Sanitation Program could provide support and assistance in making the LCS unit more effective.

Dr. Wegelin, the Team Leader of the Mission dealt at length with the institutional issues concerning the project. The project in itself was designed for over ambitious targets. But the BWASA, under which the project is based, is yet to be operationalised as an autonomous body despite the BWASA Act. BWASA has operated as a government department and GOBAL has not really taken its ownership. It is essential that the BWASA is strengthened through:

- Changes in Act or otherwise to make BWASA more stable

- Formulating Bye-Laws.

- Proper Budgeting and introduction of the double-entry system.

- Introduction of computerised Billing

All water production and supply should be vested in a BWASA and all assets and liabilities pertaining to water supply in QMC should be transferred to BWASA as soon as possible.

The Mission recommended that GOBAL draw up a monitorable Action Plan with dates and deadlines, approve it, and send it to the GON by the end of 1992.

The mission further recommends that:

- the project will go ahead with the fifth phase contracts of the sewerage contract advanced to the second phase.

- continued technical support to enable this implementation.

- Management advisory support in form of a team incorporating relevant disciplines, will be made available. The current management advisor will be retained and absorbed in the team.

- Intermittent support from the Pakistan Country Team of the UNDP/WB water and Sanitation Program will be available in computerised billing, and LCS activities.

- In mid 1993, a Joint Review Mission of the GON and CrOB will evaluate the progress of the Action Plan and if found satisfactory, will recommend continuation of the funding beyond December 1993.

- GOBAL is well advised to explore additional funding, as the funds available will not cover the total project, if a continuation of the project is recommended in mid 1993.

Ms Barbara Brouwer, appreciated the effort of the Evaluation Mission, and hoped that the GOBAL and GON can arrive at an agreement in the interest of the project's long term sustainability.

The ACS appreciated the proposals. After discussion on the different aspects of the findings, and recommendations, it was agreed that:

- A Short Term Action Plan for BWASA development with details and deadlines will be prepared, approved by the GOBAL of Balochistan, and submitted to the GON by December, 31, 1992.

- However, the transfer of the water supply assets and liability of QMC will take a bit more time. A monitorable Action Plan on the transfer will be prepared, approved by GOBAL and submitted to the GON by January 31, 1993.

- A decision on the long term sustainability of LCS unit will be taken and a monitorable Action Plan will be worked out and put into practice by December 1993.

- Actions will be initiated to ensure an early provision of the required technical and advisory teams.

The meeting ended with a vote of thanks.

(Mirza Qamar Beg)
Addition Chief Secretary,
Government of Balochistan

(Barbara Brouwer)
Royal Netherlands
Embassy

(Emiel Wegelin)
Evaluation Mission Leader

Annexure A

List of Participants

Government of Balochistan

1. Mr. Mirza Qamar Beg — In Chair
   Additional Chief Secretary (Dev.)

2. Mr. Abdur Rauf Kasi
   Chief of Section (SDP)

3. Mr. Nasiruddin Ahmed
   Secretary UP & D Department

4. Mr. Mohsin Baloch
   Secretary, Local Government Department

5. Major (Retd.) Mohammad Ashraf Nasar
   Commissioner, Quetta Division

6. Mr. Syed Abbas Hussain
   Additional Secretary, Finance Department

Government of the Netherlands

1. Ms. Barbara Brouwer
   Chief, Development Cooperation Section

2. Ms. Diana Van Driel
   Directorate-General for International Cooperation
   Ministry of Foreign Affairs

3. Pim Plentinga
   Netherlands Embassy

Evaluation Mission

1. Dr. Emiel Wegelin
   Team Leader

2. Mr. Henk Van Schiek

3. Mr. Jens Bjerre

4. Mr. Haroon Ur Rashid

5. Dr. Syeda Zia Jalaly

6. Mr. Hidayat Ullah Khan
   Chief Co-ordinating Officer
   PMCU, P&D Department and Counterpart
   Mission Member.

BWASA

1. Mr. Salim Durrani
   Managing Director

2. Mr. Zahoorul Hassan
   Chief Engineer

3. Mr. Altamash Khan
   Project Director, QSSP

4. Mr. Saeed Ahmed
   Management Advisor

BKH Consultants

1. Mr. Jan Stofkoper
   Project Manager

2. Mr. Stan Vipond

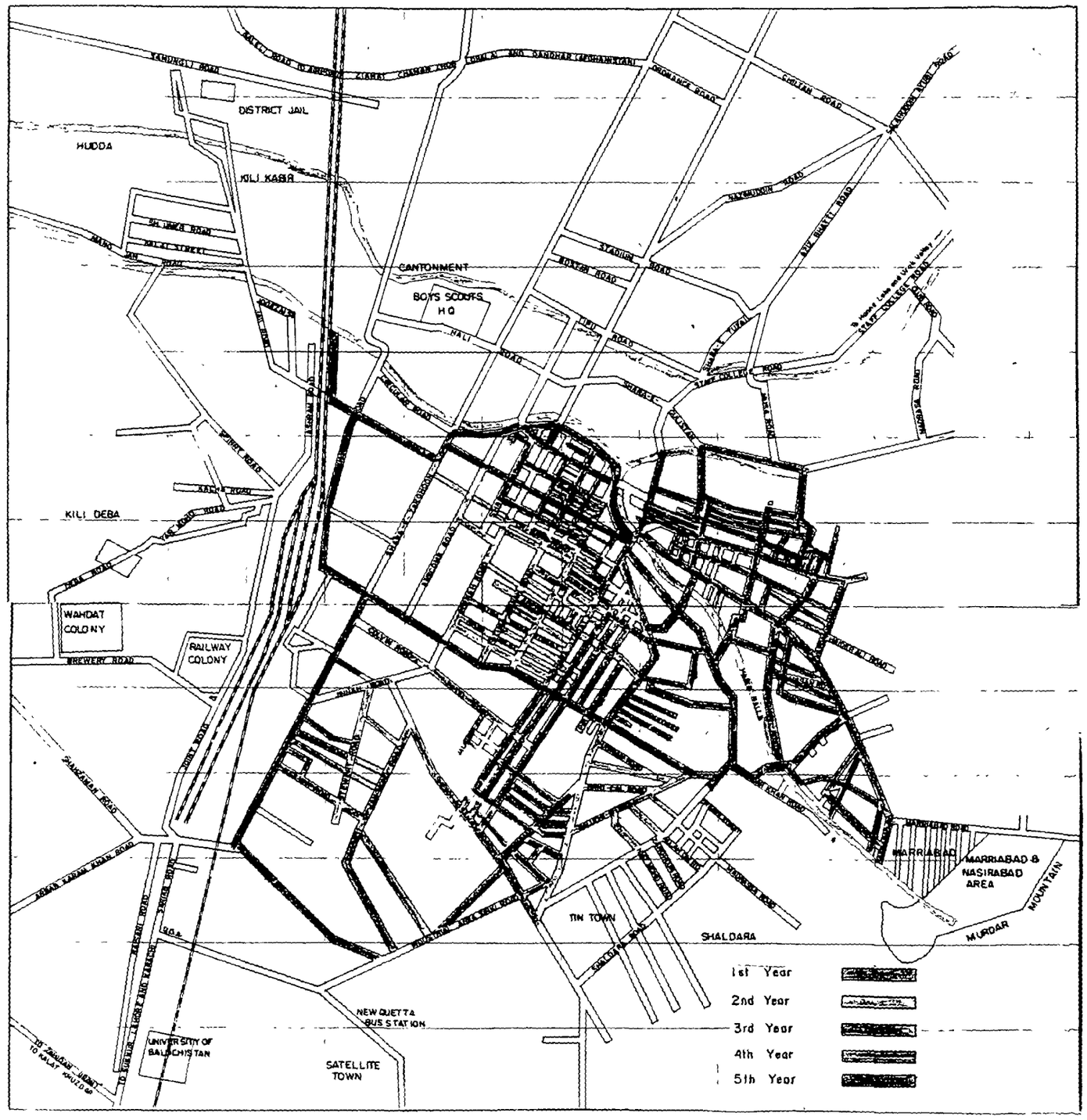
3. Ms. Akke Schuurmens

NESPAK

1. Mr. Sulaiman Akbar

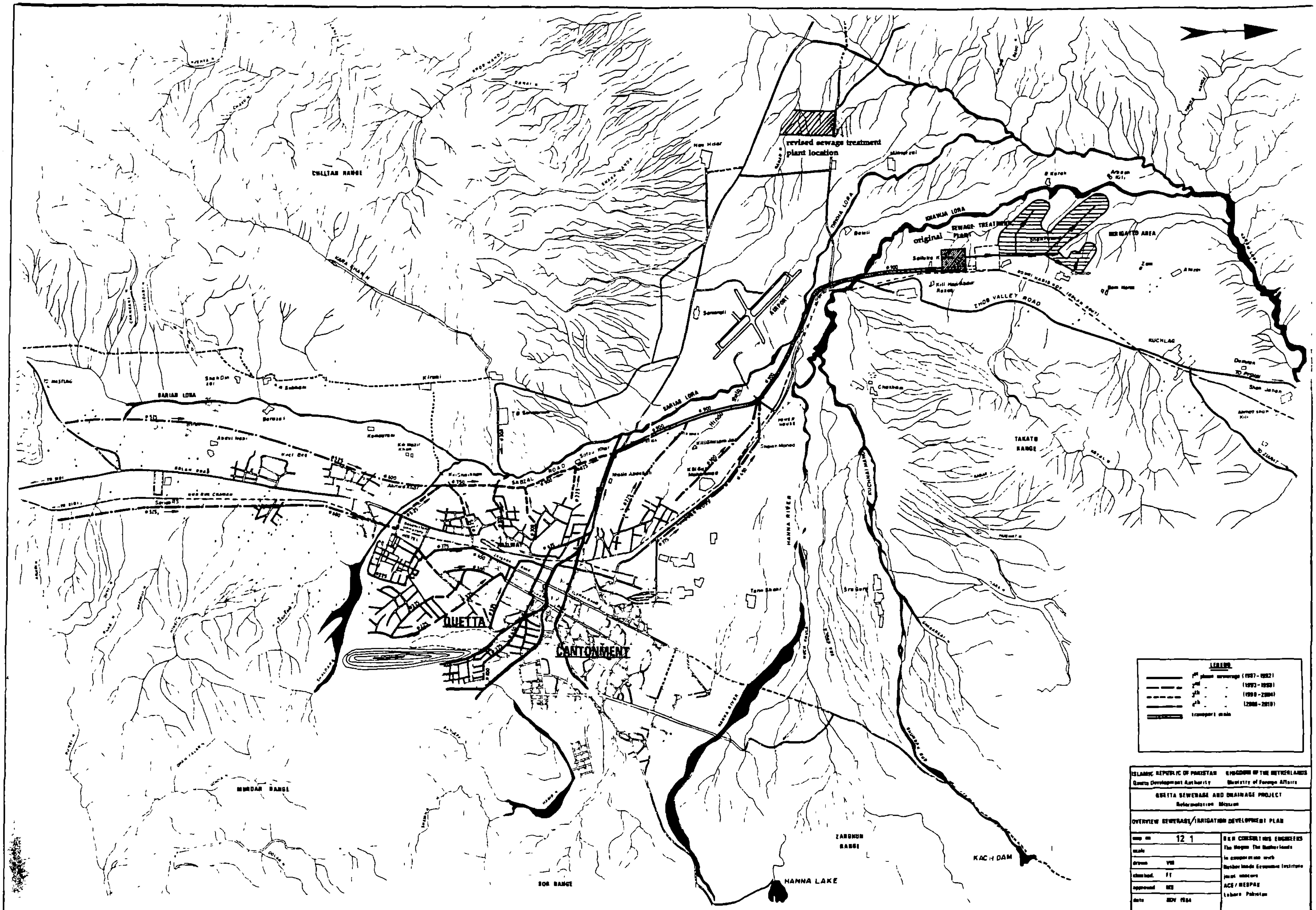
Annex 2a

Map indicating phasing of sewerage contracts


DISTRICT JAIL
HUDDA
KILI KABA
CANTONMENT
BOYS SCOUTS HQ
KILI DEBA
WAHDAT COLONY
RAILWAY COLONY
BREWERY ROAD
NEW QUETTA BUS STATION
UNIVERSITY OF BALOCHISTAN
SATELLITE TOWN
TIN TOWN
SHALDARA
MARRIABAD
MARRIABAD & NASIRABAD AREA
MURDAR MOUNTAIN
1st Year
2nd Year
3rd Year
4th Year
5th Year

Annex 2b

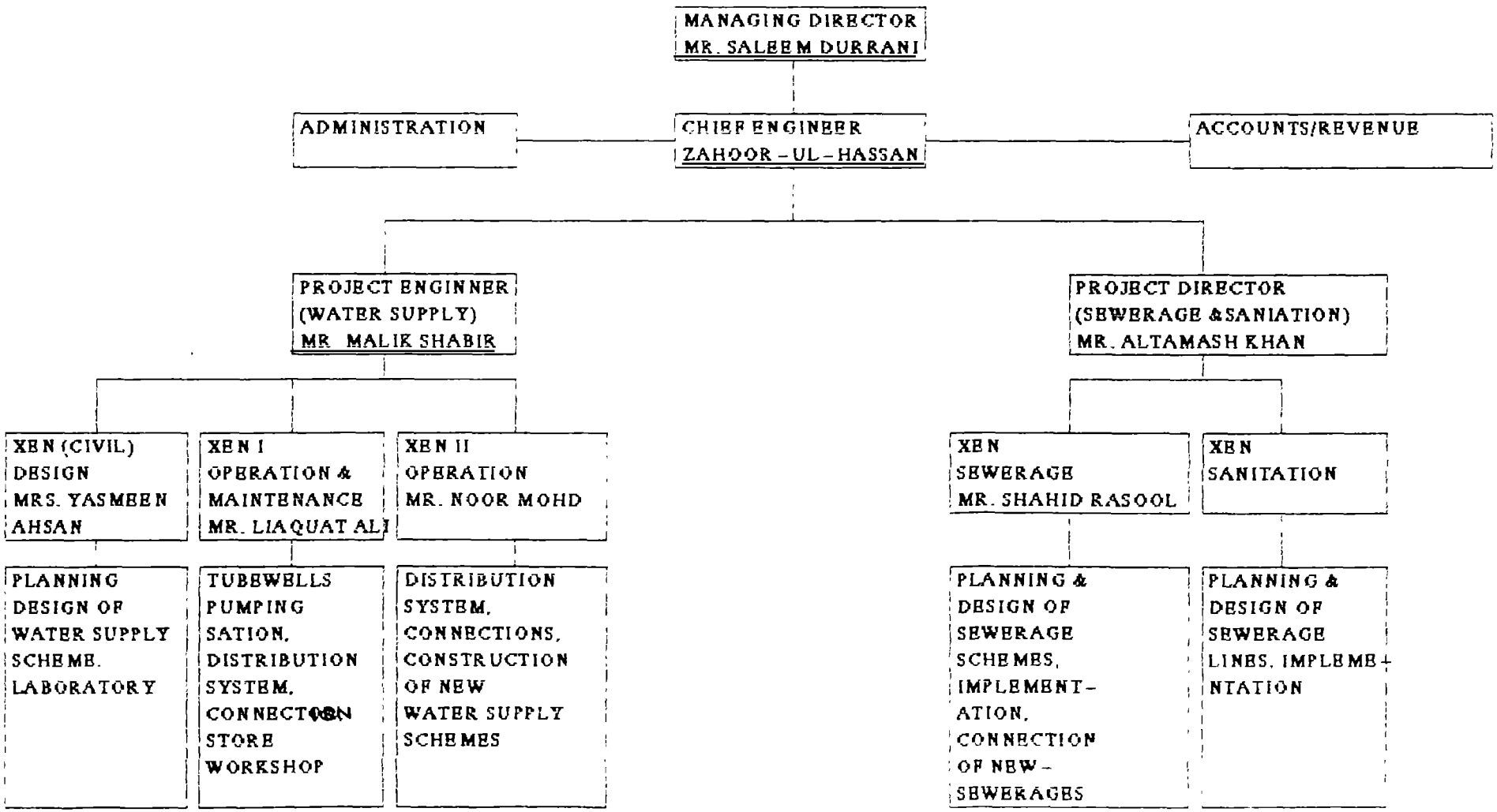
Map indicating overall sewerage scheme, including transport main and treatment plant locations


revised sewage treatment plant location
original sewage treatment plant
CHILTAN RANGE
IRRIGATED AREA
AIRPORT
ZHOB VALLEY ROAD
KUCHLAG
SARIAB LORA
TAKATU RANGE
HANNA RIVER
QUETTA
CANTONMENT
MURDAR RANGE
ZARGHUN RANGE
KACH DAM
HANNA LAKE
SOR RANGE
LEGEND
transport main
ISLAMIC REPUBLIC OF PAKISTAN
KINGDOM OF THE NETHERLANDS
Quetta Development Authority
Ministry of Foreign Affairs
QUETTA SEWERAGE AND DRAINAGE PROJECT
Reformulation Mission
OVERVIEW SEWERAGE/IRRIGATION DEVELOPMENT PLAN
map no 12 1
scale
drawn
checked
approved
date NOV 1984
The Hague The Netherlands
in cooperation with
Netherlands Economic Institute
joint venture
ACE/NESPAK
Lahore Pakistan

Annex 3

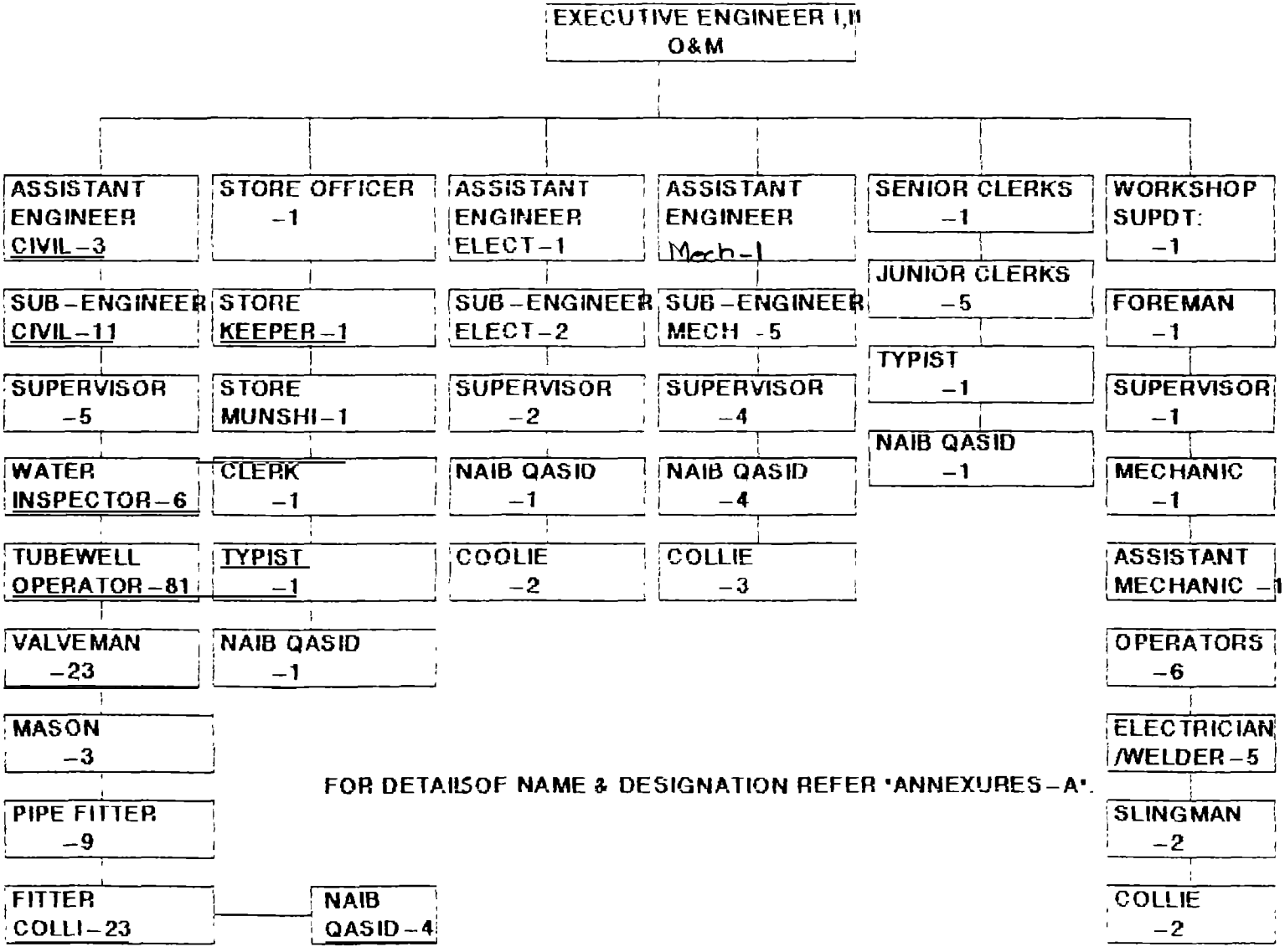
B-WASA organisational diagram

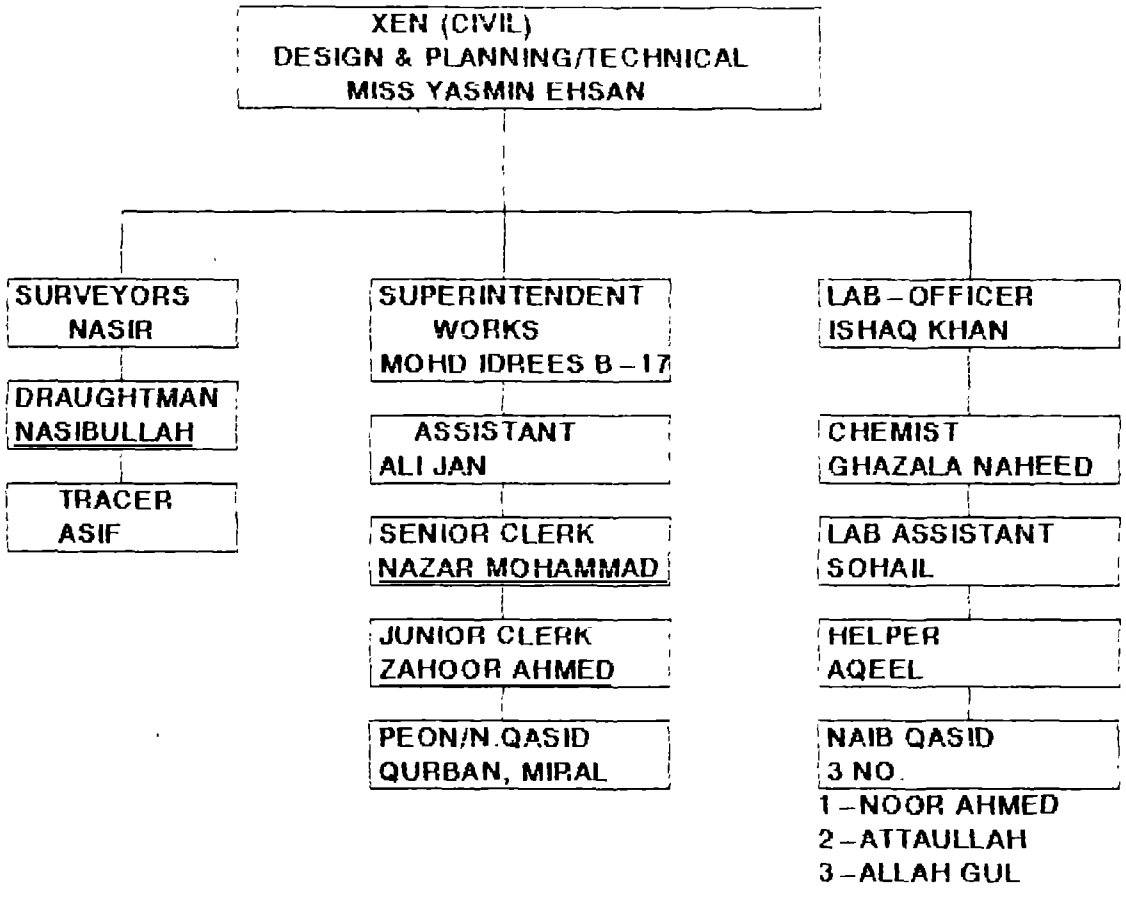
BALOCHISTAN WATER & SANITATION AUTHORITY QUETTA
CURRENT/EXISTING STAFF
ORGANIZATION CHART



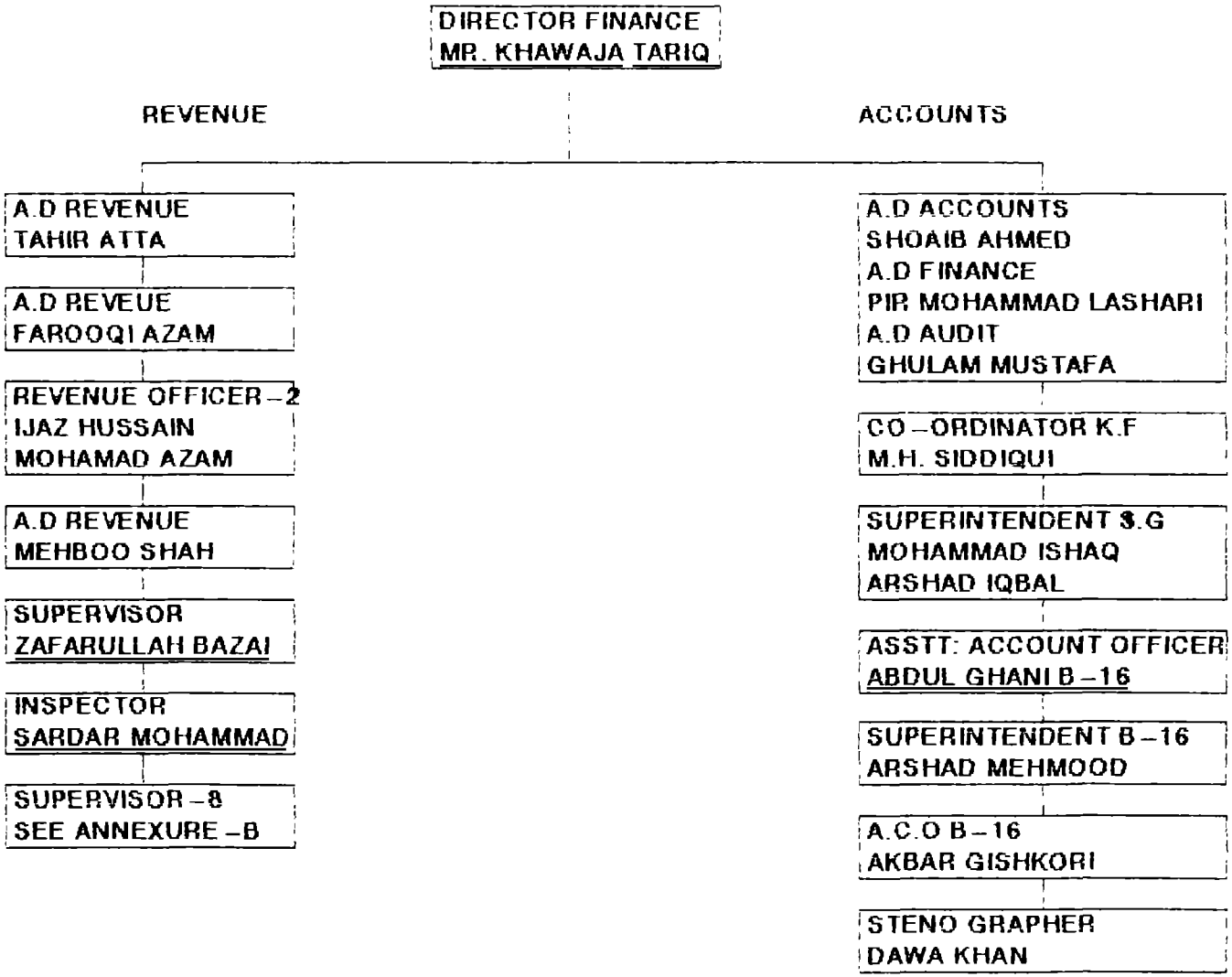
NOTE:- Presently two XEN's of B-WASA are surplus, having no divisions/place to be deputed.

CURRENT STRENGTH OF STAFF

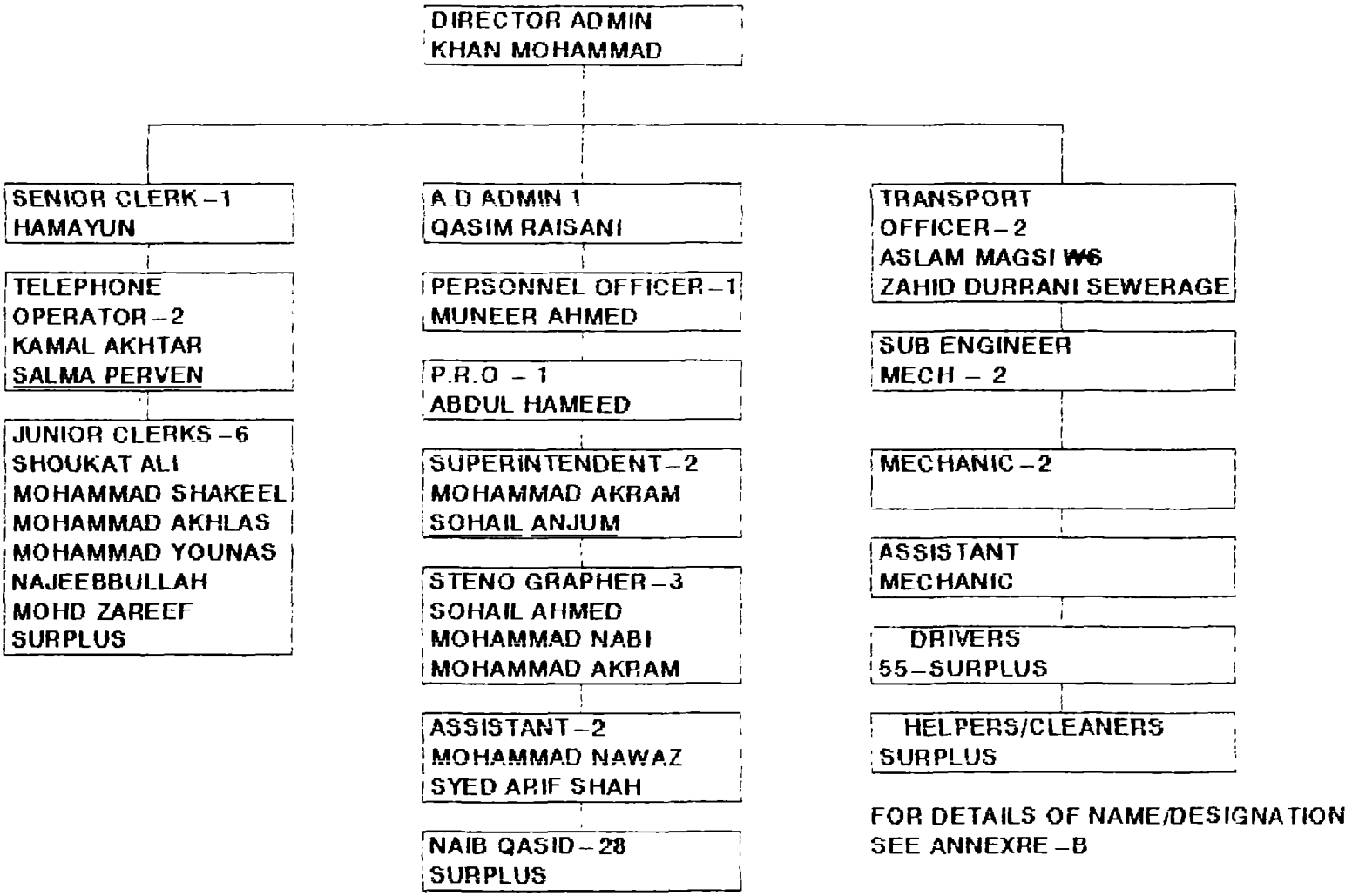



XEN (CIVIL)
DESIGN & PLANNING/TECHNICAL
MISS YASMIN EHSAN
SURVEYORS
NASIR
DRAUGHTMAN
NASIBULLAH
TRACER
ASIF
SUPERINTENDENT
WORKS
MOHD IDREES B – 17
ASSISTANT
ALI JAN
SENIOR CLERK
NAZAR MOHAMMAD
JUNIOR CLERK
ZAHOOR AHMED
PEON/N.QASID
QURBAN, MIRAL
LAB – OFFICER
ISHAQ KHAN
CHEMIST
GHAZALA NAHEED
LAB ASSISTANT
SOHAIL
HELPER
AQEEL
NAIB QASID
3 NO.
1 – NOOR AHMED
2 – ATTAULLAH
3 – ALLAH GUL

ACCOUNTS/REVENUE



ADMINISTRATION



FOR DETAILS OF NAME/DESIGNATION
SEE ANNEXRE – B

Annex 4

Financial viability analysis of sewerage component

QSSP EVALUATION MISSION
Financial viability of sewerage component (in current Rs.000)

1	2	3	4	5	6	7	8	9	10		11
Year	capital costs	oper. costs	conn. charges	sewerage charge	revenue minus cost (5+4-3-2)	BREAKDOWN pipe supply	sewerage constr.	OF transport main	CAPITAL treatment plant	total	COSTS sewerage + pipes
1991	4650.0	0.0	0.0	0.0	-4650.0	2102.0	2548.0	0.0	0.0	4650.0	4650.0
1992	33659.0	0.0	0.0	0.0	-33659.0	7466.0	26193.0	0.0	0.0	33659.0	33659.0
1993	35842.0	3000.0	240.6	72.2	-38529.2	8433.0	27409.0	0.0	0.0	35842.0	35842.0
1994	35954.0	1000.0	481.3	309.3	-36163.5	8639.0	27315.0	35228.0	0.0	71182.0	35954.0
1995	46925.0	1500.0	577.5	808.6	-47038.9	10589.0	36336.0	37800.0	0.0	84725.0	46925.0
1996	43141.0	2000.0	822.3	1718.3	-42600.4	10651.0	32490.0	0.0	38400.0	81541.0	43141.0
1997	0.0	2100.0	783.8	2856.5	1540.2	47880.0	152291.0	73028.0	38400.0	311599.0	200171.0
1998	0.0	2205.0	0.0	3332.5	1127.5						
1999	0.0	2315.3	0.0	4199.0	1883.7						
2000	0.0	2431.0	0.0	5143.8	2712.7						
2001	0.0	2552.6	0.0	6172.5	3620.0						
2002	0.0	2680.2	0.0	7291.3	4611.1						
2003	0.0	6886.4	0.0	7655.8	769.4						
2004	0.0	2954.9	0.0	8038.6	5083.7						
2005	0.0	3102.7	0.0	8440.6	5337.9						
2006	0.0	3257.8	0.0	8862.6	5604.8						
2007	0.0	3420.7	0.0	9305.7	5885.0						
2008	0.0	3591.7	0.0	9771.0	6179.3						
2009	0.0	3771.3	0.0	10259.6	6488.3						
2010	0.0	3959.9	0.0	10772.5	6812.7						
2011	0.0	4157.9	0.0	11311.2	7153.3						
2012	0.0	4365.7	0.0	11876.7	7511.0						
2013	0.0	11217.3	0.0	12470.6	1253.3						
2014	0.0	4813.2	0.0	13094.1	8280.9						
2015	0.0	5053.9	0.0	13748.8	8694.9						
2016	0.0	5306.6	0.0	14436.2	9129.6						
2017	0.0	5571.9	0.0	15158.1	9586.1						
2018	0.0	5850.5	0.0	15916.0	10065.4						
2019	0.0	6143.0	0.0	16711.8	10568.7						
2020	0.0	6450.2	0.0	17547.3	11097.1						
2021	0.0	6772.7	0.0	18424.7	11652.0						

NPV: -116862.0
IRR: -1.5%

ASSUMPTIONS:
- ops.cost incr.

  fraction p.a. 0.05 after 1996
- sew. fee incr.
  fraction p.a. 0.05 after 1993
- discount rate
  for NPV: 10.0%

12 connection charge (Rs.)	13 user charge/m (Rs.)	14 pot. conn's (numbers)	15 perc. connected (% of 14)	16 perc. paying (% of 15)
500.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0
	50.0	1925.0	25.0	25.0
	52.5	4675.0	35.0	30.0
	55.1	6985.0	50.0	35.0
	57.9	9515.0	65.0	40.0
	60.8	11605.0	75.0	45.0
	63.8	11605.0	75.0	50.0
	67.0	11605.0	75.0	60.0
	70.4	11605.0	75.0	70.0
	73.9	11605.0	75.0	80.0
	77.6	11605.0	75.0	90.0
	81.4	11605.0	75.0	90.0
	85.5	11605.0	75.0	90.0
	89.8	11605.0	75.0	90.0
	94.3	11605.0	75.0	90.0
	99.0	11605.0	75.0	90.0
	103.9	11605.0	75.0	90.0
	109.1	11605.0	75.0	90.0
	114.6	11605.0	75.0	90.0
	120.3	11605.0	75.0	90.0
	126.3	11605.0	75.0	90.0
	132.7	11605.0	75.0	90.0
	139.3	11605.0	75.0	90.0
	146.3	11605.0	75.0	90.0
	153.6	11605.0	75.0	90.0
	161.3	11605.0	75.0	90.0
	169.3	11605.0	75.0	90.0
	177.8	11605.0	75.0	90.0
	186.7	11605.0	75.0	90.0
	196.0	11605.0	75.0	90.0

Only capital costs for sewerage pipes and the construction of the sewerage collection system have been included in the calculation (based on current phasing and including a 7.1% price escalation per annum).

For 1993, operation and maintenance expenditure includes an estimated Rs. 2.5 million on account of purchase of maintenance equipment. Similar inflation-adjusted amounts were included for equipment replacement in 2003 and 2013

For the purpose of the calculation it has been assumed that the capital outlays are financed through equity, i.e. that there are no borrowing costs to be charged to the project.

Both GOBAL and Netherlands equity have been included.

Technically possible number of sewerage connections is based on number of junction boxes in the bills of quantities for the sewerage contracts plus 10% to allow for multiple connections.

The monthly sewerage fee (surcharge on water rates) has been assumed at Rs. 50 per month per connection in 1993, with above postulated increases thereafter.

The sewerage connection charge has been assumed constant at Rs. 500 per connection.

Annex 5

Outline Terms of Reference

Annex 5 Outline Terms of Reference

a. Summary job descriptions BKH/NESPAK consultants staff

The present tasks of the QSSP staff (expatriate -local and international - and B-WASA staff) will change when the above recommendations are implemented. The job descriptions and staffing inputs should be adjusted accordingly.

It is recommended that for expatriate international staff:

- the PM will, in addition to overall project management, establish a practical O/M set up (training, procedures, staffing, work programming, budgeting etc). He will have the authority to inspect and verify the quality and quantity of the construction works on behalf of the GON.
- the "social" development advisor will prepare and advice on campaigns and mobilization for house connections and LCS as well as on user education on the use and benefits of the sewage system and LCS.

A small provision for short term consultancy on specific topics such as treatment plant design and irrigation should be included.

It is recommended that for the local expatriate staff:

- the deputy PM will advice the executive engineer of B WASA on the implementation of the sewage works.

b. Outline Terms of Reference Management Advisory Team to B-WASA

i. Tasks

Action plans
The Management Advisory Team (the team) to B-WASA will assist B-WASA management in implementing the following action plans:

a. The short-term B-WASA Institutional Development Action Plan, expected to be completed by 1 July 1993. This action plan is to be finalised by a B-WASA working group to be established for this purpose and to be agreed between B-WASA, GOBAL and GON/RNE by 31 december 1992;
b. The action plan for transfer from QMC to B-WASA of assets and liabilities on account of QMC water and sewerage operations; this action plan is to be finalised by a GOBAL (including QMC and B-WASA) working group to be established for this purpose, and to be agreed between GOBAL and GON/RNE by 31 January 1993; the action plan is likely to cover at least the calender year 1993;

As appropriate, the team's support will also be required by the action plan preparation working groups during the initial stage of its assignment and in assisting B-WASA to obtain necessary approvals as may be required. It is presently the intention that the working groups will remain active at the stage of action plan implementation and will provide an additional operational framework for the team.

The team will further assist B-WASA in mobilising other specialised technical assistance and training resources as may be required for an expeditious implementation of the above action plans, such as e.g. intermittent support from the Pakistan Country Team of the UNDP/WB Water and Sanitation Programme on computerised billing and revenue generation, and on development of training and promotional materials.

The team will further assist B-WASA in designing a B-WASA Institutional Action Plan for the second half of 1993, assist in its implementation, and assist in the design of an institutional action plan for 1994.

Additional tasks

- the team will assist and advise on the desirable institutional status of the LCS programme component of QSSP, assist in the development of an action programme for this to be adopted by end 1993;
- the team will further assist in the gradual integration of QSSP activities in B-WASA and will facilitate the necessary actions required in B-WASA for this purpose;
- the team will liaise with GOBAL agencies, QSSP and its consultants to facilitate administrative and organisational actions required for expeditious project development of QSSP (e.g. in matters of land acquisition, B-WASA Board meetings preparation).

ii. Team composition and duration of assignment

The team is envisaged to comprise of the following members:
- an expatriate management and organisations specialist/teamleader with experience in public utility management (10.5 months);
- a local utility systems engineer (12 months).
  It is envisaged that the assignment would start from 1 January 1993 for a period of one year, with possible extension.

Until the management advisory team is in place, the services of the present management adviser will be continued. An overlap with the advisory team would be desirable. At the initiative of the team leader, and if the workload requires, it may be considered to retain the present management adviser (who has an accounting background) as an additional member of the advisory team for part of 1993.

iii. Workplan and reporting

Within one month upon mobilisation of the team the team leader will submit a workplan to B-WASA, GOBAL and GON/RNE for approval, to be discussed and approved by the QSSP/B-WASA Steering Committee. The team leader will prepare and submit quarterly progress reports to the above parties represented in the Steering Committee, which will focus on issues to be resolved by the Committee. The last quarterly progress report will be subsumed in the final report, a draft of which will be presented to all parties one month before the end of the assignment.

iv. Logistics

The team will be provided with appropriate standard office facilities in the B-WASA main office. B-WASA will also assign an appropriate complement of support staff to the team.

The team leader's contract will include a modest provision for computerised office equipment and for the procurement of a team vehicle. P.O.L. and a driver for the vehicle will be provided by B-WASA.