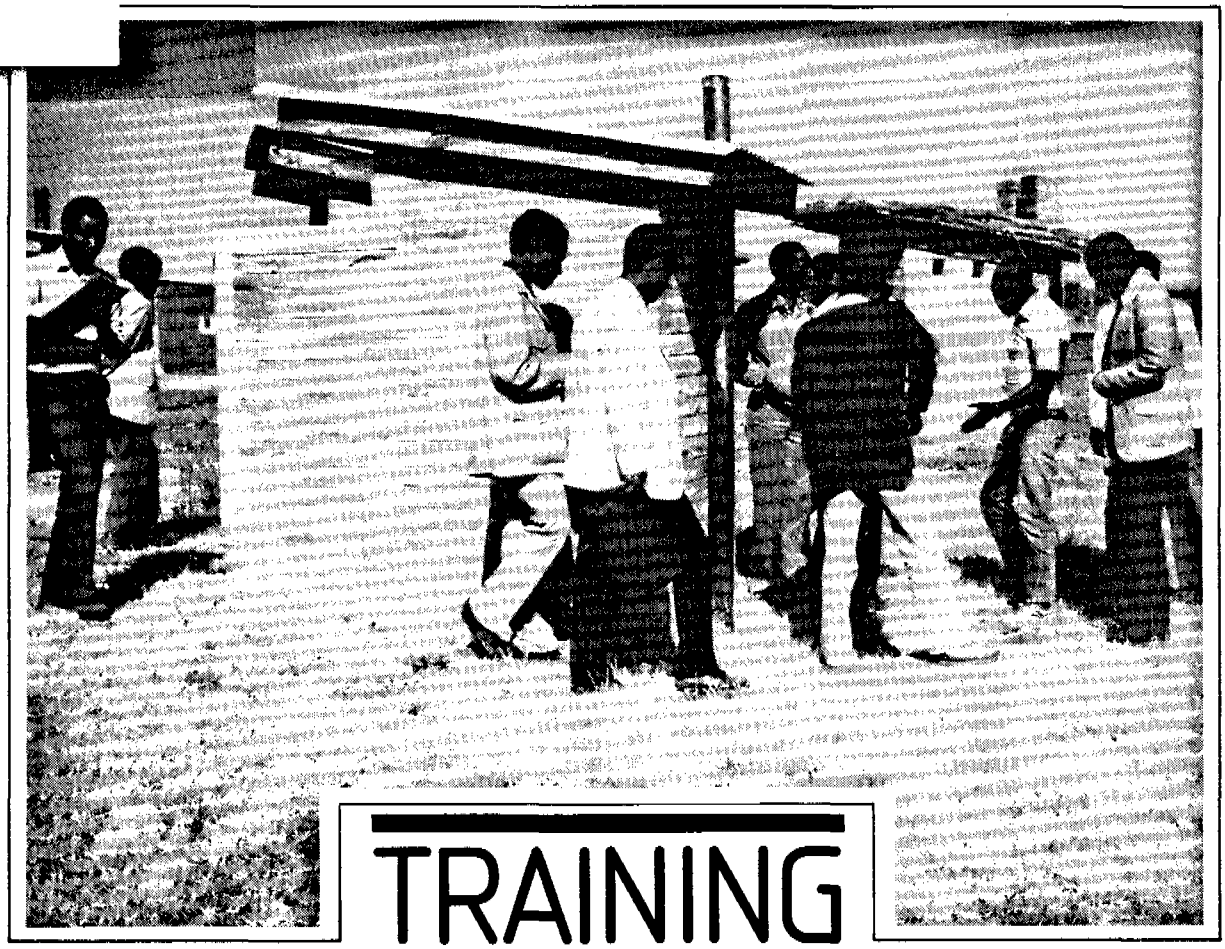

TRAINING MANUAL

for Courses on Low Cost Water Supply and Sanitation

Volume II

Mrs. E. Chaggu and Mr. H.A. Mengers

Centre for Housing Studies
ARDHI INSTITUTE
Dar es Salaam, Tanzania

In cooperation with:
The Institute for Housing Studies,
Rotterdam, the Netherlands

TRAINING MANUAL

FOR

COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

Mrs. E.CHAGGU and Mr. H.A.MENGERS

VOLUME II

In cooperation with:

The Institute for Housing Studies, Rotterdam, the Netherlands

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ANNEXES

ANNEX X

Description Sessions
Group Exercises
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E X E R C I S E O U T L I N E

FOR

COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	g-1 Elaboration of the Concept Basic Human Needs in the Context of providing Basic Infrastructure.
NUMBER OF SESSIONS	:	2-3
OBJECTIVES	:	To elaborate in a systematic manner the relation between Basic Human Needs and the Provision of Basic Infrastructure. The exercise should highlight what infrastructure component contribute most, when one departs from the definition of basic human needs, and what policy recommendation one can derive from the results.
ACHIEVEMENTS	:	To be able to analyze the concepts of Basic Human Needs and Basic Infrastructure in a systematic manner and to be able to state how these two concepts relate, and to formulate policy recommendations in respect of the provision of basic infrastructure.
DESCRIPTION	:	The exercise could be introduced by adding the question of what are basic human needs or what is basic infrastructure in the Bench Mark Test and start off the discussion from there. Another possibility is to show slides of a neighborhood that is deprived of infrastructure.

The methodology of this group exercise is as follows:

1. participants should be appointed to take minutes of the exercise;
2. the group should describe "What are HUMAN NEEDS in its broadest sense?";
3. the group should determine "What HUMAN NEEDS are considered as BASIC HUMAN NEEDS?". For this one should assume a particular human entity (urban, low-income, household level);
4. the group should describe "What is INFRA-STRUCTURE in the broadest sense?";
5. the Course Coordinator prepares on the blackboard (during a break) a cross-table which show the INFRASTRUCTURE component on the top horizontal axis, and the HUMAN and BASIC HUMAN NEEDS of the vertical left axis.
6. the Course Coordinator facilitates a discussion in which the group fills in each cells of table. The main discussion question is "Does infrastructure element X contribute to the (basic) human need Y?" One can give the cell three point if there is a crucial relation, two points if there is a considerable relation, one point of there is a marginal relation, and no points if there is no relation. This discussion can take quite some time, and can be done in smaller groups without the Course Coordinator facilitating the discussion.
7. By adding the appraisal points one gets an indication what infrastructure elements contribute most to HUMAN NEEDS and in particular BASIC HUMAN NEEDS. Thus, one can propose that those elements who have gathered most points are considered BASIC INFRASTRUC-TURE. "Is that so?", should be raised question in a plenary session, when the results are presented. Conclusions should be drawn and minutes taken.
8. The exercise can be extended by dealing with the following questions:
   - "Who are actually the main providers of these defined BASIC INFRASTRUCTURE elements: private, semi-public or public?";
   - "How are they performing in general?"; and
   - "What policy recommendation can we draw when we suppose that the government strives at providing basic infrastructure for all?". Report should be made of the arguments and conclusions.

BACKGROUND LITERATURE	:	H.Mengers, Report on the exercise "Elaboration of the relation between human needs and infrastructure", 51st ICHPB, Course Unit Low Cost Infrastructure, February 1988.
HAND-OUTS	:	Brief description of the steps and main questions of the exercise.
EXERCISE AIDS	:	- Blackboard, chalk (colored). - Large white sheets (in case of more groups). - Answers given in the first Bench Mark Test.
AUDIO-VISUAL MATERIAL	:	- Slides to sensitify the participants on basic human needs and the requirement of infrastructure (optional).
DISCUSSION TOPICS	:	See main questions in the description.

TH COURSE ON LOW-COST WATER SUPPLY AND SANITATION

EXERCISE : Elaboration of the Concept Basic Human Needs in the Context of providing Basic Infrastructure.

DATE :

DATE OF SUBMISSION :

DESCRIPTION : Human needs are very often used in connection with the provision of infrastructure, health, education, etc. But what are human needs? In the literature it is often used without being very specific about its meaning or giving any definition. Probably the authors assume a common understanding of human needs. However is clothing as essential as housing. Do we consider freedom of opinion and expression as a human need? Is it a matter of scaling and weighing the different human needs? Is a human need for one person a human need for someone else? Is there a general acceptable range of human needs that is common to all?

Another often used expression is basic (human) needs and expresses a more tight and narrowed perception of human needs. a high-income citizen regards a newspaper as a basic need. Also a television can be regarded essential for news and recreation. But what are the basic needs of a (very) low-income citizens in Dar es Salaam?

It is your task - as a policy advisory group - to define the concepts of human needs and basic (human) needs. Define first the context and the target group for which your definition applies and thereafter the indicators or characteristics of these needs.

The second part of your task is to define "infrastructure" and thereafter "basic infrastructure". "Infrastructure" is more broad than "basic infrastructure" I suspect. Anyhow it will be a matter of discussion and synthesis of the different ideas and opinions in the advisory group. Also here context and target group for

---

DESCRIPTION : which the definition does apply will be of importance. That certainly will be the case when defining "basic infrastructure". I would like to propose the advisory group a tool to define basic infrastructure. Draw a matrix which has on the vertical scale the defined human and basic human needs. On the horizontal scale you put down the defined "infrastructure" components. In every cell you appraise to what extent one component of infrastructure (e.g. telephone) contributes to the fulfillment of human needs and basic human needs. This method takes some time and discussion, but the advantage is that in the end you have a nice overview of what infrastructure is essential or "basic" and what infrastructure is less important and not considered basic. You will be surprised by the outcome. Use the black board for space.

MATRIX HUMAN NEEDS VERSUS INFRASTRUCTURE

INFRASTRUCTURE / (BASIC) HUMAN NEEDS	A	B	C	D	F	G	H	I.....
a								
b								
c								
d								
e								
f								
.								
.								
.								
Total								

Submit your conclusions and definitions.

REFERENCE MATERIAL:

H.Ramachandran (1985), Residents' perceptions of living conditions in Bangalore, India, Ekistics 312, May/June 1985, pp. 266-272.

UNCHS (1986), Delivery of Basic Infrastructure to Low-income settlements: issues and options, November 1986.

E X E R C I S E O U T L I N E

FOR

COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	**g-2** Land development through drainage provision.
NUMBER OF SESSIONS	:	2-3
OBJECTIVES	:	To apply the gained knowledge on drainage for the development of area, and to understand the implications of different technical options, under different circumstances in the sense of lay-out and costs.
ACHIEVEMENTS	:	To be able to analyze the requirements and implications of providing drainage under different circumstances.
DESCRIPTION	:	An area (as shown in the Annex) has been taken into consideration for development. At present the land is not developed, but the pond at the bottom of the area constitutes a serious health hazard. Especially Bilharzia and Malaria are spread through the permanent pond. Groups of participants are considered as members of the physical planning department, who are requested to advise on and design three options: 1. The area will be drained only. No other developments in the near future. 2. The area will be afforested and - if necessary - drained. 3. The area will be developed as a medium dense human settlement of 20,000 plots, and drainage be provided drainage provided for sullage, rain- and stormwater. The department is requested to determine the initial investments and running cost over a period 10, 20 and 40 years (determined by the terms of finance). Conclusions and recommendations should be added.

EXERCISE OUTLINE CONTINUED:

		The exercise can be done in groups of 5-8 participants each. The group work might take 1-2 sessions. Thereafter the groups will present their proposals and discussions needs to follow. The development reports are submitted to the Course Coordinator.
BACKGROUND LITERATURE	:	- Lecture notes on Drainage. - Bandung Drainage Design Manual, Bandung Urban Development Programme. - WEDC, Infrastructure Development: Services for Urban Income Housing, Loughborough University of Technology, 1986.
HAND-OUTS	:	Description of the Exercise, copies of hand-outs, Annexes and pocket calculator.
EXERCISE AIDS	:	Drawing paper and pocket calculator.
AUDIO-VISUAL MATERIAL	:	None.
DISCUSSION TOPICS	:	What does the comparisons over a 10, 20 and 40 years period show us?

Annexes:
- Exercise description
- Topography Area to be developed, scale 1:20,000.
- Annual Rainfall, Critical Shower Inflow Pattern and Runoff factors.
- Table Development Unit Costs Drainage.

TH COURSE ON LOW-COST WATER SUPPLY AND SANITATION

EXERCISE : Land development through drainage provision

DATE :

DATE OF SUBMISSION :

DESCRIPTION : An area (as shown in the Annex) has been taken into consideration for development. At present the land is not developed, but the pond at the bottom of the area constitutes a serious health hazard. Especially Bilharzia and Malaria are spread through the permanent pond.

Groups of participants are considered as members of the physical planning department, who are requested to advise on and design for three options:

1. The area will be drained only. No other developments in the near future.
2. The area will be afforested and - if necessary - drained.
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The department is requested to determine the initial investments and running cost over a period 10, 20 and 40 years (determined by the terms of finance). Conclusions and recommendations should be added.

BACKGROUND LITERATURE : - Bandung Drainage Design Manual, Bandung Urban Development Programme.
- WEDC, Infrastructure Development: Services for Urban Income Housing, Loughborough University of Technology, 1986.

TABLE DEVELOPMENT COSTS LAND DEVELOPMENT
in US$

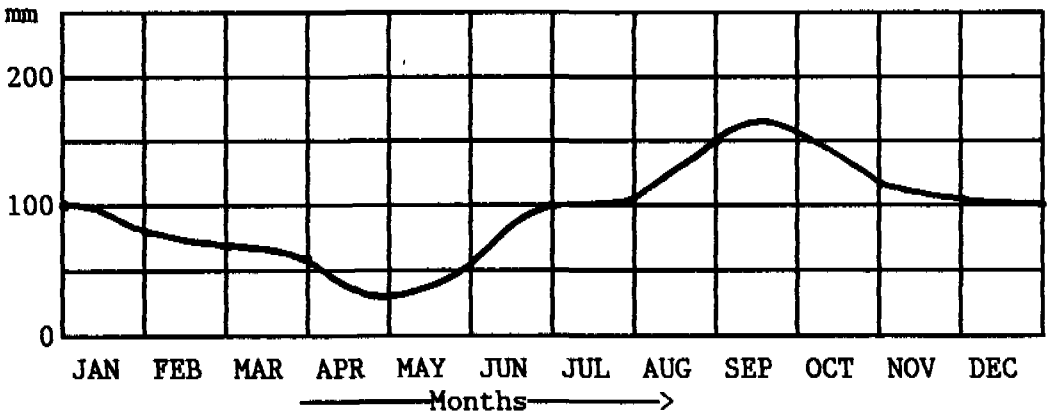
Item:	Initial Investment:	Recurrent Costs:
Open drain:	20 / ml	2 / ml.year
Tunnel:	1,200 / ml	0.5 / ml.year
Pumping station:	15,000	150 / year
Pump (200 m3/hour):	8,000	2,000 / year 10 / hour
Pipeline:	100 / ml	2 / ml.year
Reservoir:	100 / m2	2 / m2.year

RUNOFF FACTORS:

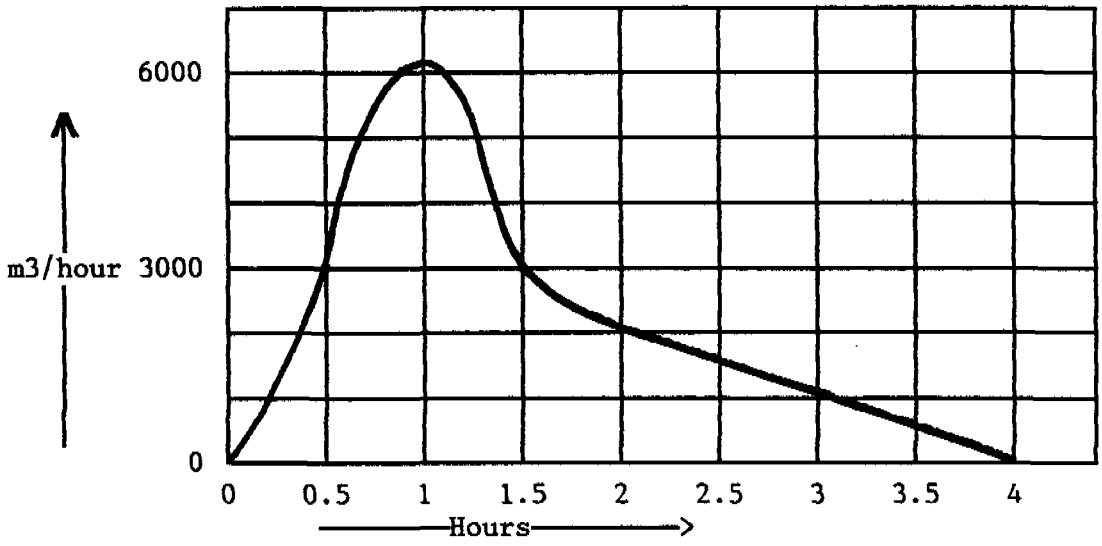
Bare land:	0.2
Forest:	0.05
Human settlement:	0.3

ANNUAL RAINFALL: 1200mm

GRAPH MONTHLY RAINFALL PATTERN
(10 year average):

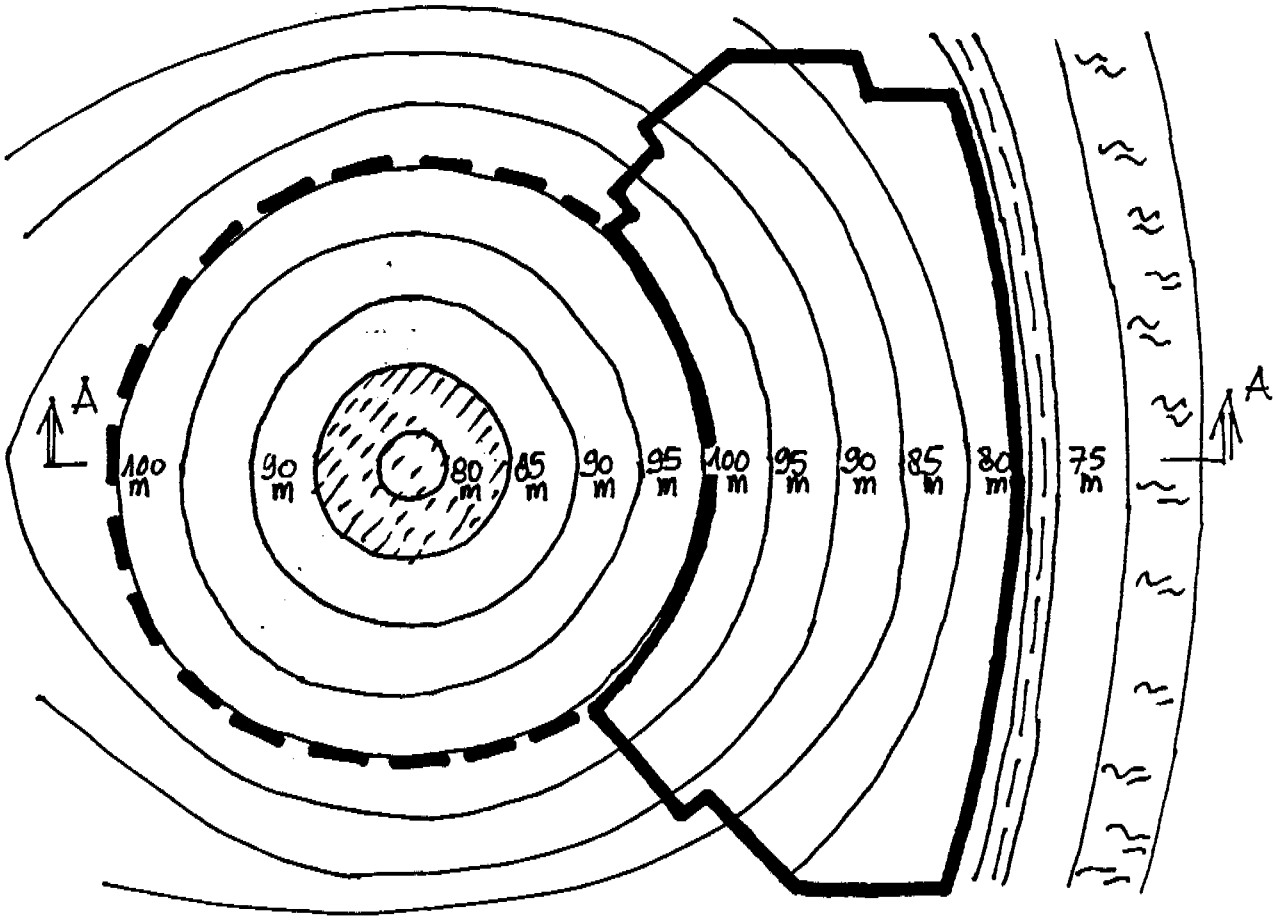


GRAPH CRITICAL SHOWER INFLOW AT BOTTOM OF AREA
(Every 10 year, Runoff factor = 0.2)

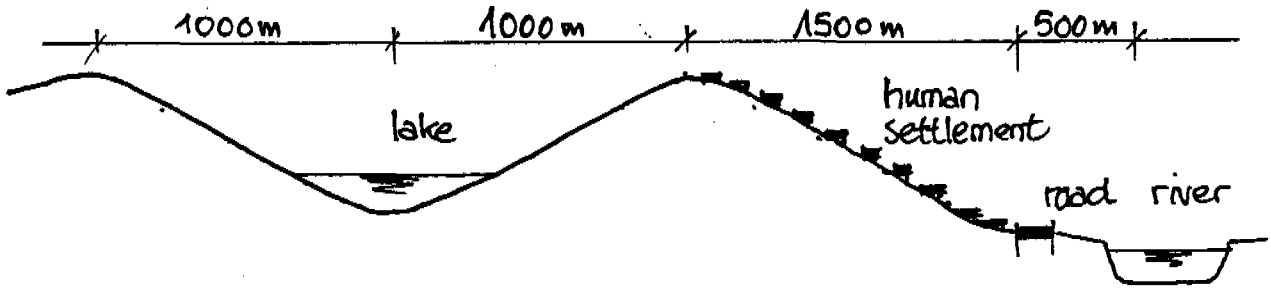


ANNEX EXERCISE g-2

TOPOGRAPHY AREA



CROSS SECTION A - A



Legend:

100 m	altitude
———	developed area
— — —	undeveloped area to be developed

EXERCISE OUTLINE

FOR

COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	**g-3** Roads and drainage design for an urban low-income neighborhood.
NUMBER OF SESSIONS	:	2-3
OBJECTIVES	:	To apply the presented knowledge on road and drainage design on an realistic case of an urban low-income neighborhood by designing the road and drainage lay-out and dimensions.
ACHIEVEMENTS	:	To be able apply road and drainage design guidelines on a presented case of an urban low-income neighborhood.
DESCRIPTION	:	The neighborhood shown and described in the Annexes is a poorly serviced area. The Ministry of Planning and Development has decided to improve the accessibility and the drainage in this settlement. It is understood that the existing drains cause a lot of nuisance and health risk. Some houses are even undermined by the erosive power of the gullies. The first step is to make a lay out of the roads, paths and drain. In the first stage of the project lined drains will be constructed, while roads and paths will be leveled and a rubble/grit surface will be compacted. Later (after some years) this base will receive a asphaltic or concrete macadam. That is at least the broad plan.

EXERCISE OUTLINE CONTINUED

		The consultant LBD Ltd. has been requested to advice on this plan and to make a proposal. The consultant assigned experts from different disciplines to a team that will draw and present this proposal. You are that team. Besides proposing several lay-outs and designs, also modes of cost recovery, operation, maintenance and social/cultural acceptability should be dealt with. The consultant should submit a project feasibility report. Several groups can be made of a size of 5-8 participants, each dealing with the exercise. About 2 sessions are required for the individual group activities and 1 for presentations and discussions. The proposal are presented and discussed in the whole group and reports submitted to the Course Coordinator.
BACKGROUND LITERATURE	:	WEDC, Infrastructure Development: Services for Urban Low Income Housing, Loughborough University of Technology, 1986. UNCHS, Guidelines on Design of Circulation in Low Income Urban Settlements, Nairobi, 1985. UNCHS, A review of Technologies for the Provision of Basic Infrastructure in Low-Income Settlements, Nairobi, 1984.
HAND-OUTS	:	Description exercise, reading material list and annexes physical and socio-economic data on urban project neighborhood (pocket calculators).
EXERCISE AIDS	:	Pocket calculators, drawing paper and pencils.
AUDIO-VISUAL MATERIAL	:	H.Mengers, IHS, has slides of the area before upgrading (country: Guinea-Bissau, city: Bissau).
DISCUSSION TOPICS	:	- To what extent is the community involved in the decision making and execution of the different project stages (including Operation and Maintenance)? - Is your proposal low-cost and affordable?

EXERCISE OUTLINE CONTINUED

Annexes:
- Exercise Description
- Physical and Socio-economic Data on Project Neighborhood.
- Actual Responsibilities Chart at Neighborhood level.
- Rain-fall and temperatures graphs.
- 8 Drawings A3-size (scale 1:20,000) of Project Area, Altitudes, Water Supply Mains, Water Sources, Sanitation facilities, Drainage and Solid Waste Disposal, Road lay-out, non-thematic drawing Project Area.

TH COURSE ON LOW COST WATER SUPPLY AND SANITATION

EXERCISE : LAY-OUT DESIGN FOR ROADS, PATHS AND DRAINS IN AN EXISTING LOW-INCOME NEIGHBORHOOD

DATE :

DATE OF SUBMISSION:

DESCRIPTION : The neighborhood shown and described in the Annexes is a poorly serviced area. The Municipality through its Public Works Department has decided to improve the accessibility and the drainage in this settlement. It is understood that the existing drains cause a lot of nuisance and health risk. Some houses are even undermined by the erosive power of the gullies. The first step is to make a lay out of the roads, paths and drain. In the first stage of the project lined drains will be constructed, while roads and paths will be leveled and a rubble/grit surface will be compacted. Later (after some years) this base will receive a asphaltic or concrete macadam. That is at least the broad plan.

The consultant LBD Ltd. has been requested to advice on this plan and to make a proposal. The consultant assigned experts from different disciplines to a team that will draw and present this proposal. You are that team. Besides proposing several lay-outs and designs, also modes of cost recovery, operation, maintenance and social/cultural acceptability should be dealt with.

Good luck.

READING MATERIAL: WEDC, Infrastructure Development: Services for Urban Low Income Housing, Loughborough University of Technology, 1986.

UNCHS, Guidelines on Design of Circulation in Low Income Urban Settlements, Nairobi, 1985.

UNCHS, A review of Technologies for the Provision of Basic Infrastructure in Low-Income Settlements, Nairobi, 1984.

ANNEX

PHYSICAL AND SOCIO-ECONOMIC DATA ON PROJECT NEIGHBORHOOD SURVEY RESULTS

Project area:	14.5 ha.
Morphology:	Sandy slightly clayey permeable soils. Surface sloping down from South-West to North-East.
First constructions:	1914
Settlement development:	Southern part was mainly built in 1940-1960, Northern part in 1960-1970.
Number of houses:	279
Building activities:	Little due to high material cost for maintenance and construction and relatively declining urban incomes.
Property plots:	Plots are irregular of size and 50% of the plots are based on land title documents given out in colonial period. These are not sanctioned by the, as private ownerships of plots are not accepted within the city boundaries. The other 50% of the plots are registered and leased by the Ministry.
House ownership:	75% of the houses is owned by its occupier, of which one-third rents a part of the house to others. 25% of the houses is rented to one or more households. Rents vary from US$ 3-30 per month; average US$ 8.
Total inhabitants:	4510
Annual growth:	5%
Average household size:	9.9 persons
Illiteracy:	32%
Ethnic groups:	Mandinga 47% (muslim), Mancanha 13% (christian), others 40% (mixed religions).
Family composition:	Mainly extended families.
Head of households:	28% female, 72% male.
Income:	Average US$ 70 per month. 1.8 earners per household. Official minimum wage US$ 55 per month.
Income distribution:	US$ per month 25- 50: 32% 50- 70: 34% 70- 90: 10% 90-110: 10% 110-150: 10% >150 : 4% Total: 100%
Employment:	40% at public sector (mainly male, stable income), 60% private sector (variable and fluctuating incomes).
Unemployment:	42%
Economic activities:	Various, mainly small scale. Most prominent are tailors and furniture workshops.

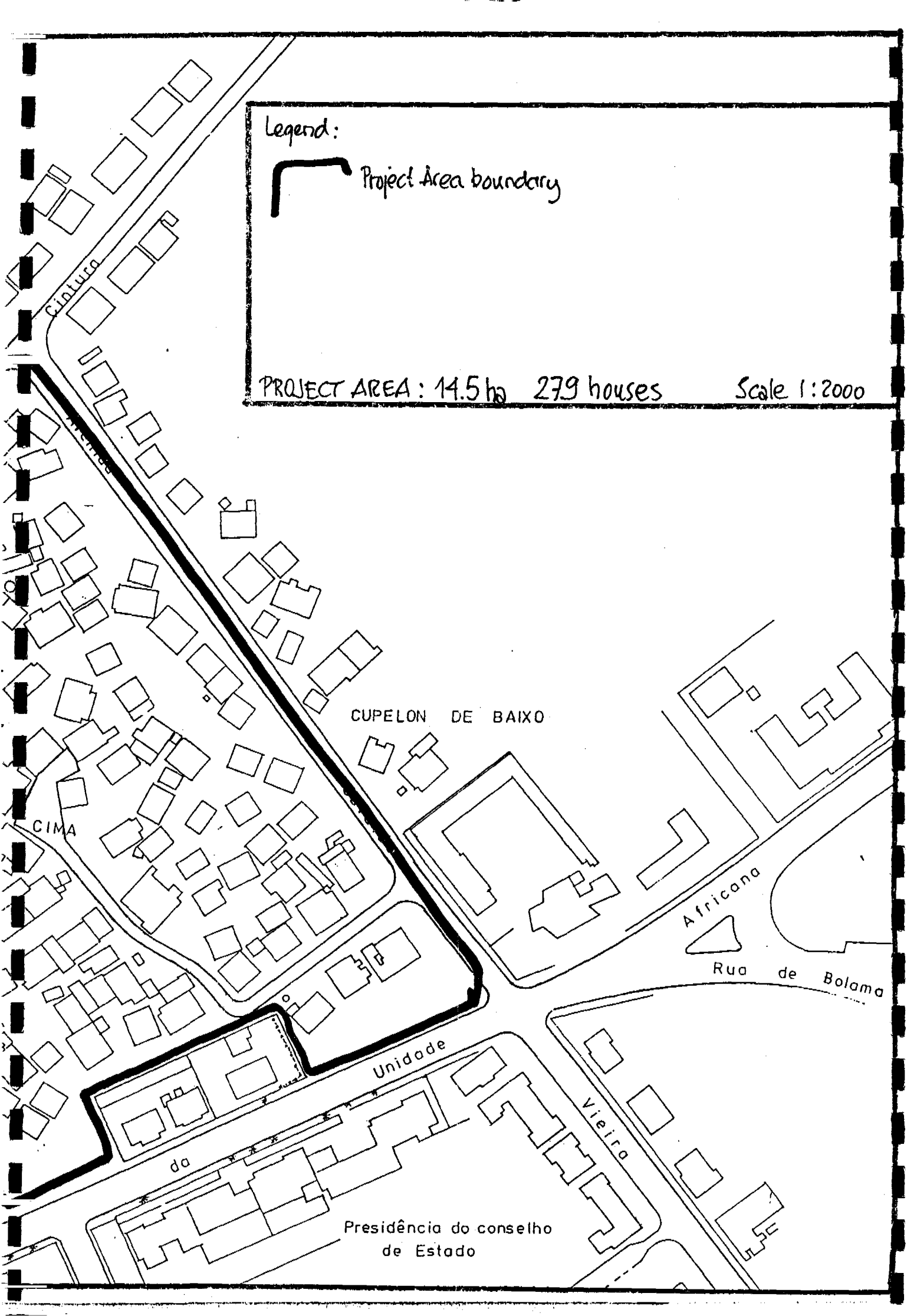
Neighborhood organizations:	Representative (political) neighborhood committee that has strong influence in the Southern part, a youth welfare organization and welfare organization for women.
Education and health facilities:	None
Drainage and solid waste collection:	Natural gullies and weekly solid waste collection only at edges of the neighborhood by vehicles of the Municipal Health Department.
Sanitation:	15% has uses flush latrines and septic tanks, 85% uses (shared) pit-latrines and water. No sewerage. Main operation responsibility for sanitation is with Municipal Health Department. Sewage treatment and discharge is responsibility of Ministry of Civil Works.
Water supply:	13% of the houses have private connection or yard connection (all located near to the mains), 87% use two public standpost and wells. Quality water supply: good. Quantity water supply: varying pressure and irregular supply. Wells: quality very bad (pathogens, minerals), but always supply. Depth water table: 8-15m. Main responsibility of operating water supply is with the municipal Water Corporation.
Water supply mains:	Along the main roads; diameter 100mm.
Roads:	Edging and centre road have asphaltic macadam. Unlined road side drains. Lanes in northern part leveled earth paths. Southern part mainly earth foot paths. One asphaltic access road up to the mosque. Road maintenance is with the Municipal Department of Public Works.
Aspirations inhabitants:	Regarding infrastructure, water supply is their main concern, thereafter health facilities and electricity. Willingness to contribute in labour and/or money is there. However prior aspiration is the improvement of the housing condition (roofing, plastering, extension).

ACTUAL RESPONSIBILITIES AT NEIGHBORHOOD LEVEL

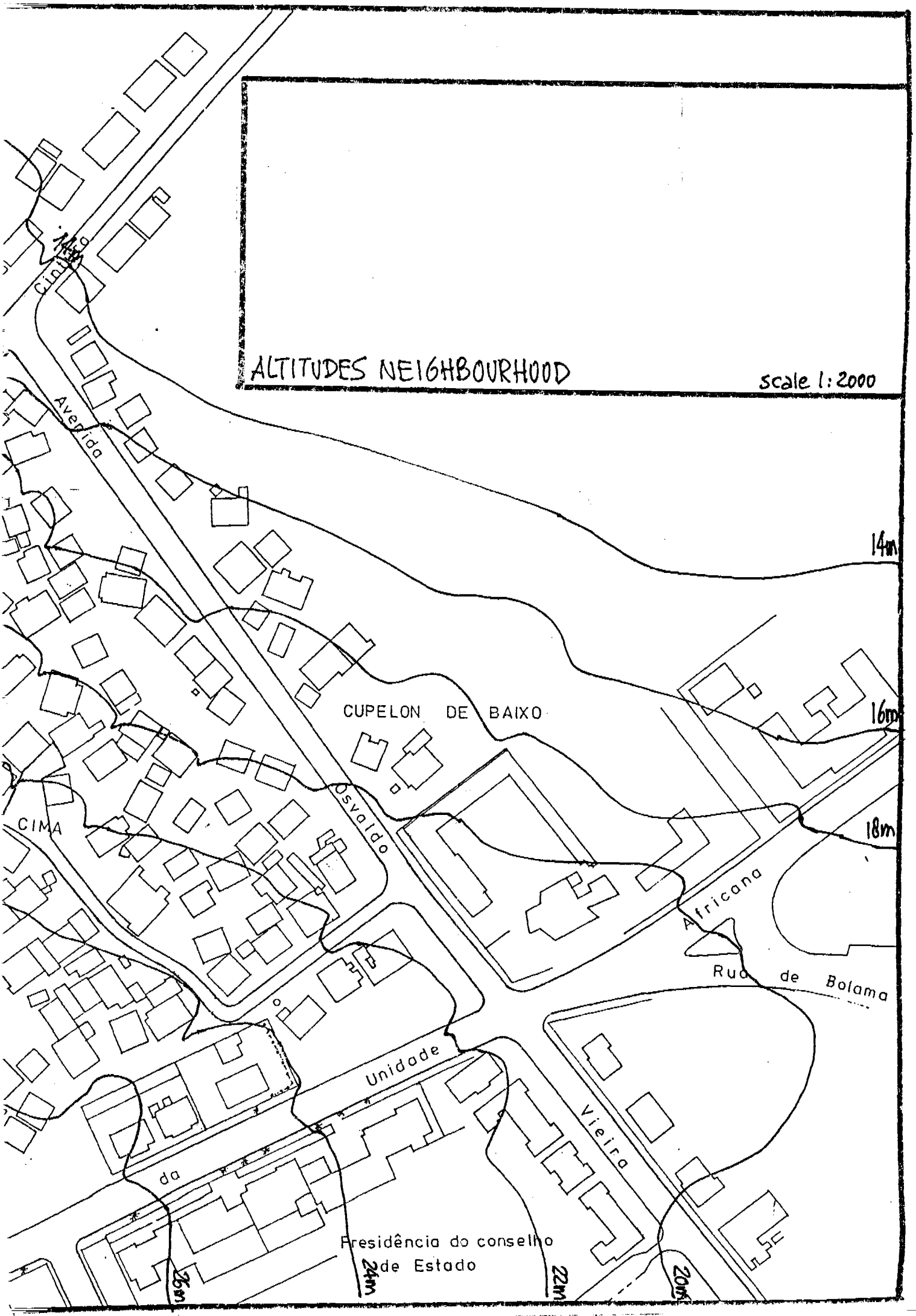
INFRASTRUCTURE RESPONSIBILITIES	WATER SUPPLY	SANITATION	DRAINAGE	SOLID WASTE	ROADS
PLANNING	MinPl&D	MinPl&D	MinPl&D	MinPl&D	MinPl&D
DESIGN	MinCW	MinH	MinCW	MinH	MinCW
IMPLEMENTATION	MinCW	MinH	MinCW	MinH	MinCW
SUPERVISION	MinCW MuWatCor	MinH MuHDep	MinCW MuPWDep	MinH MuHDep	MinCW MuPWDep
CONSTRUCTION	Contr (MuWatCor)	Contr	Contr	Contr	Contr
O&M	MuWatCor	MuHDep	MuPWDep	MuHDep	MuPWDep
FINANCE	MinFin	MinFin	MinFin	MinFin	MinFin
REVENUE COLLECTION	MuWatCor	-	-	-	-
PUBLIC HEALTH	MinH	MuHDep	-	MuHDep	-

MinFin = Ministry of Finance
MinPl&D = Ministry of Planning and Development
MinCW = Ministry of Civil Works
MinH = Ministry of Health
MuWatCor = Municipal Water Corporation
MuHDep = Municipal Health Department
MuPWDep = Municipal Public Works Department
Contr = Contractors


CUPELON DE BAIXO
Norte
Mesquito
AMEDALAI
CUPELON DE CIMA
Avenida
de
CUPELON
SINTRA
REINO


Legend:
Project Area boundary
PROJECT AREA : 14.5 ha 279 houses
Scale 1:2000
Cintura
CUPELON DE BAIXO
CIMA
Africana
Rua de Bolama
Unidade
Vieira
do
Presidência do conselho
de Estado


CUPELON DE BAIXO
Norte
Mesquita
Corga
Rua
AMEDALAI
CUPELON DE CIMA
Avenida
CUPELON DE
SINTRA
REINO
24m
22m
20m
18m
16m
14m
28m
26m
30m


ALTITUDES NEIGHBOURHOOD
scale 1:2000
Avenida
CUPELON DE BAIXO
CIMA
Osvaldo
Africana
Rua de Bolama
Unidade
Vieira
da
Presidência do conselho
de Estado
14m
16m
18m
24m
22m
20m


CUPELON DE BAIXO
Norte
Mesquita
Corco
AMEDALAI
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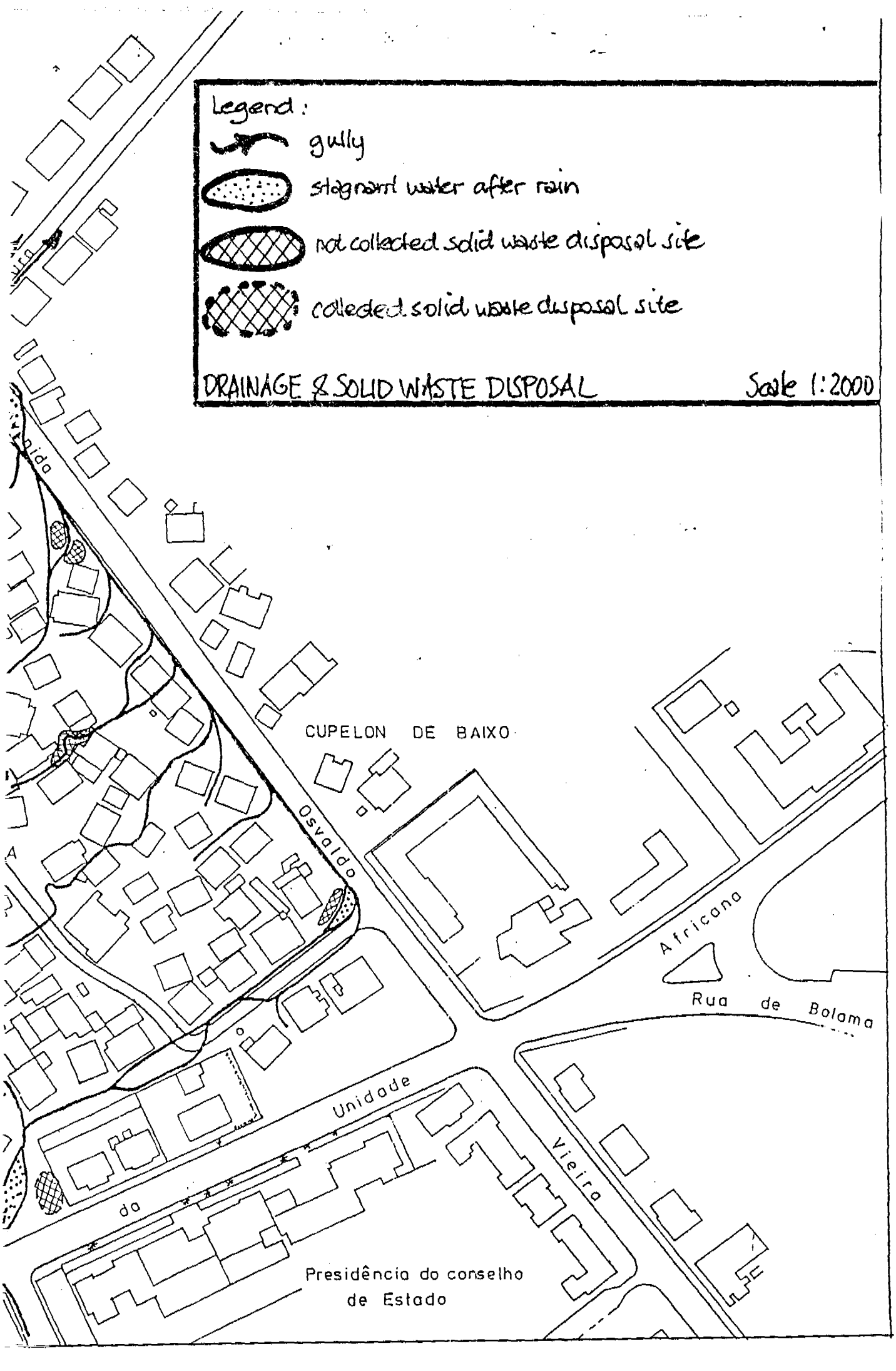
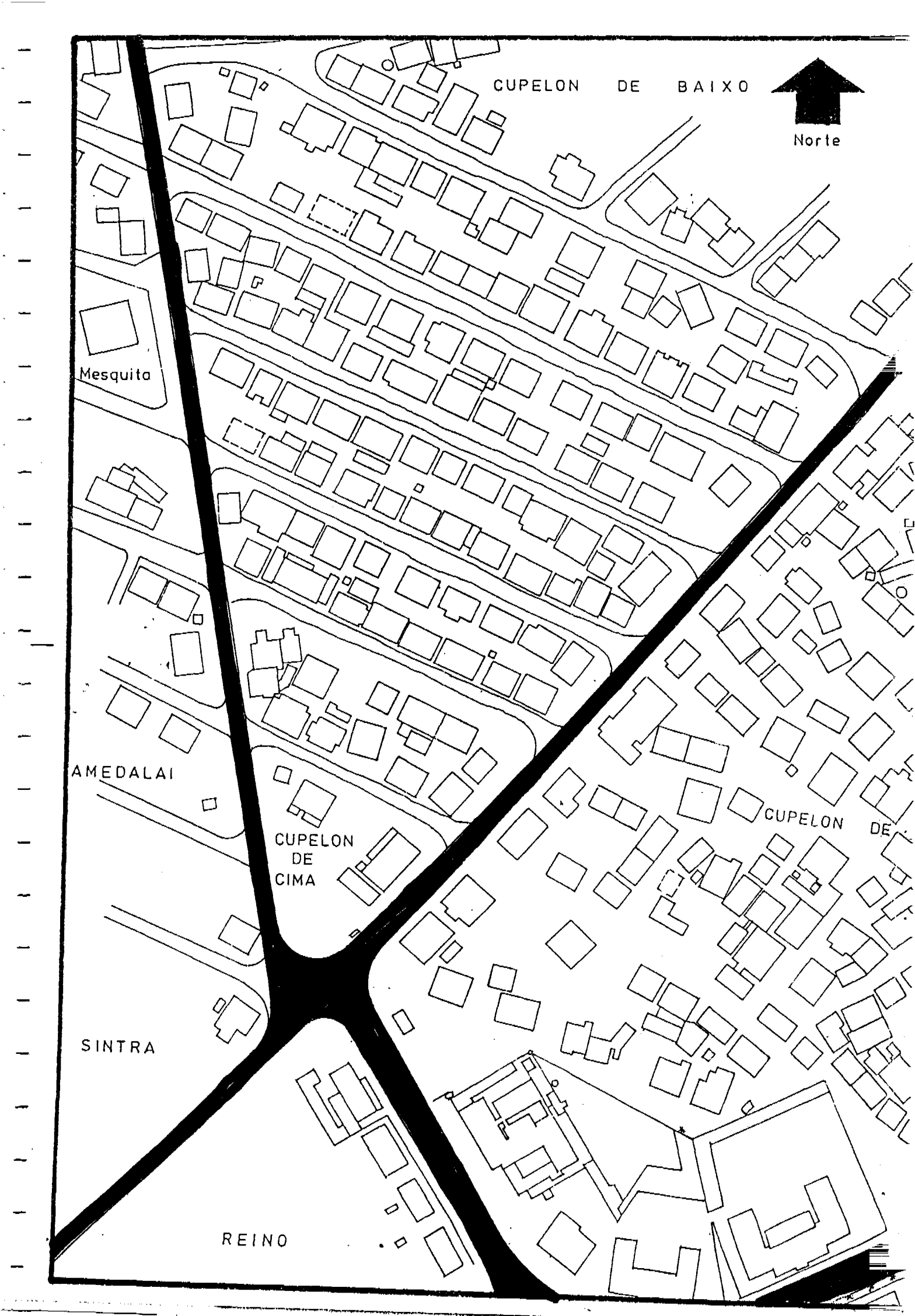
DE
CIMA
Rua
SINTRA
REINO
Avenida


Legend :
gully
stagnant water after rain
not collected solid waste disposal site
colleded solid waste disposal site
DRAINAGE & SOLID WASTE DISPOSAL
Scale 1:2000
CUPELON DE BAIXO
Osvaldo
Africana
Rua de Bolama
Unidade
Vieira
do
Presidência do conselho
de Estado


CUPELON DE BAIXO
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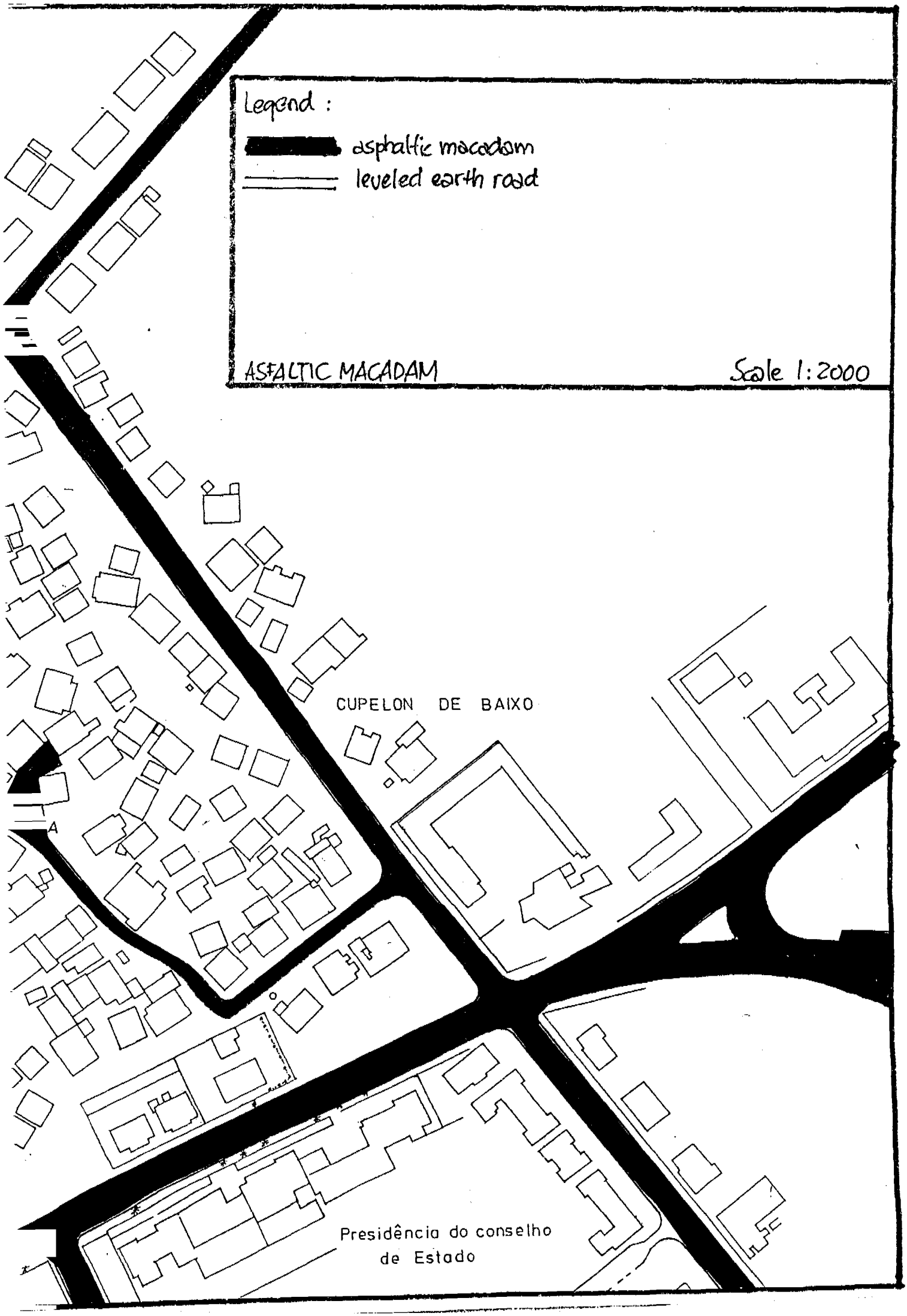
CUPELON DE
SINTRA
REINO


Legend :
asphaltic macadam
leveled earth road
ASFALTIC MACADAM
Scale 1:2000
CUPELON DE BAIXO
Presidência do conselho
de Estado

E X E R C I S E O U T L I N E

FOR

COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	**g-4** Solid Waste Samples Analysis for Waste Processing Determination.
NUMBER OF SESSIONS	:	2
OBJECTIVES	:	To apply the gained knowledge on solid waste management in the analysis of solid waste samples and to determine the possible waste processing options.
ACHIEVEMENTS	:	To be able to analyze solid waste samples and to determine the different options of waste processing.
DESCRIPTION	:	The Course Coordinator has gathered three samples of solid waste that have a different composition: e.g. domestic waste, office waste and construction waste, street cleaning waste. The samples are kept in plastic transparent bags in order to avoid any offence. Three groups of 5-8 participants are formed, each analyzing the contents of the bags. Participants are allowed to open bags. The contents of the bags are described according to a number of characteristics as given in the hand-out in the Annex. Secondly the groups should indicate the re-use, recycling, employment generative and ways of processing the waste. This will take one session. The groups will report their findings to the other groups in a plenary sessions. Reports are submitted to the Course Coordinator. The presentations might take another session.

EXERCISE OUTLINE CONTINUED:

BACKGROUND LITERATURE	:	- Lecture Notes on Solid Waste Management. - Cointreau: Management of Urban Solid Waste in Developing Countries, 1982.
HAND-OUTS	:	Exercise description, three waste samples in transparent plastic bags.
EXERCISE AIDS	:	Blackboard, overhead sheets or larger paper sheets for presentations.
AUDIO-VISUAL MATERIAL	:	Overhead sheet with exercise description.
DISCUSSION TOPICS	:	Comparison of the different group results.

Annexes: - Exercise description for participants.

TH COURSE ON LOW-COST WATER SUPPLY AND SANITATION

EXERCISE	:	Solid Waste Samples Analysis for Waste Processing Determination.
DATE	:	
DATE OF SUBMISSION	:	
DESCRIPTION	:	Three groups of 5-8 participants are formed, each analyzing the contents of the solid waste bags. Participants are allowed to open bags. The contents of the bags are described according to a number of characteristics as given below. Secondly, the groups should indicate the re-use, recycling, employment generative and ways of processing the waste. This will take one session. The groups will report their findings to the other groups in a plenary sessions. Reports are submitted to the Course Coordinator. The presentations might take another session.
BACKGROUND LITERATURE	:	- Lecture Notes on Solid Waste Management. - Cointreau: Management of Urban Solid Waste in Developing Countries, 1982.

BAG: / CHARACTERISTICS:	1	2	3
COMPOSITION: CHEMICALS:			
FLUIDS:			
ACIDS:			
METALS:			
PAPER:			
MINERALS:			
OTHER:			
ORGANIC/ANORGANIC:			
COMPOSTABLE:			
DRY/WET:			
WEIGHT/VOLUME:			
COMPRESSIBILITY:			
CALORIC VALUE:			
HEALTH RISKS:			

BAG: CHARACTERISTICS:	1	2	3
MANAGEMENT OPTIONS:			
DISPOSAL:			
COLLECTION:			
TRANSPORTATION:			
OVERHAUL:			
PROCESSING:			
RESIDUAL DISPOSAL:			
RE-USE:			
RECYCLING:			
EMPLOYMENT GENER.:			
OTHER COMMENTS:			

EXERCISE OUTLINE

FOR

COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	**g-5** Private Sector Involvement in the Provision of Infrastructure.
NUMBER OF SESSIONS	:	2-3
OBJECTIVES	:	To elaborate in a systematic manner where and how the private sector can or should be involved in the provision of infrastructure, and to come to criteria for their involvement.
ACHIEVEMENTS	:	To be able to approach the involvement of the private sector in the provision of infrastructure in a systematic manner, and to able to formulate where and under what condition their is involvement is recommended.
DESCRIPTION	:	The exercise should be preceded by a lecture that introduces the participants to the aspects of private sector involvement (Lecture Outline G-7). The article by H.A.Mengers, IHS, could serve as an outline for this lecture. Important is that the different infrastructure elements and the different aspects of the provision process are distinguished (preparation, production, design, operation, maintenance, training, etc, etc.). The participants in groups of 5-8 people are requested - as a policy advisory group - to formulate recommendation in respect of where and under what conditions private sector involvement is desired, distinguishing the infrastructure elements and the aspects of the provision process.

EXERCISE OUTLINE CONTINUED:

	The exercise can become quite lengthy and it is recommended that one group focusses upon one infrastructure component. Components are e.g. piped water supply, Ventilated Improved Pit Latrines and solid waste management. Participants should summarize their arguments and come with their recommendations. It may be helpful to make a cross-table of the different infrastructure elements and provision aspects, in which the different cells can be appraised by letter, such as R (= recommended), C (= considered), NR (= not recommended).
BACKGROUND LITERATURE :	H.Mengers (1988), The Aspects of Privatization of Basic Urban Infrastructure, IHS. Roth, Gabriel (1987), The Private Provision of Public Services in Developing Countries, World Bank-EDI.
HAND-OUTS :	Description exercise, sheets of paper, overhead sheets.
EXERCISE AIDS :	Lecture-notes, overhead sheets.
AUDIO-VISUAL MATERIAL :	None.
DISCUSSION TOPICS :	Is the private sector which you recommend to be involved in the provision of infrastructure capable enough? What can be the role of the public sector if this is not the case?

Annexes: - Exercise description.

TH COURSE ON LOW-COST WATER SUPPLY AND SANITATION

EXERCISE : Private Sector Involvement in the Provision of Infrastructure.

DATE :

DATE OF SUBMISSION :

DESCRIPTION : The participants in groups of 5-8 people are requested - as a policy advisory group - to formulate recommendation in respect of where and under what conditions private sector involvement is desired, distinguishing the infrastructure elements and the aspects of the provision process.

The exercise can become quite lengthy and it is recommended that one group focusses upon one infrastructure component. Components are e.g. piped water supply, Ventilated Improved Pit Latrines and solid waste management.

Participants should summarize their arguments and come with their recommendations. It may be helpful to make a cross-table of the different infrastructure elements and provision aspects, in which the different cells can be appraised by letter, such as R (= recommended), C (= considered), NR (= not recommended).

BACKGROUND LITERATURE : H.Mengers (1988), The Aspects of Privatization of Basic Urban Infrastructure, IHS.

Roth, Gabriel (1987), The Private Provision of Public Services in Developing Countries, World Bank-EDI.

E X E R C I S E O U T L I N E

FOR

COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	**g-6** Review of literature list Infrastructure.
NUMBER OF SESSIONS	:	1
OBJECTIVES	:	To review critically the contents of a number of relevant publications on infrastructure issues.
ACHIEVEMENTS	:	To be able to review and the discuss the contents of a number of provided infrastructure publications.
DESCRIPTION	:	Participants are requested to read and discuss the contents of a number of provided infrastructure publications. This can be done most effectively in groups of 5-8 participants. To guide the reviewing and discussion process questions on every publication are provided by the Course Coordinator, that should be discussed in the groups and conclusions be drawn. The group results are presented and discussed in a plenary meeting. The groups' conclusions and reports are submitted.
BACKGROUND LITERATURE	:	Not applicable.
HAND-OUTS	:	Copies of the literature to be reviewed, the exercise description, and the questions that belong to publications.

EXERCISE OUTLINE CONTINUED:

EXERCISE AIDS	:	Provided discussion questions.
AUDIO-VISUAL MATERIAL	:	None.
DISCUSSION TOPICS	:	What is the relevance of provided literature?

Annexes: - Discussion question number of infrastructure publications.

TH COURSE ON LOW-COST WATER SUPPLY AND SANITATION

EXERCISE : Review of literature list Infrastructure.

DATE :

DATE OF SUBMISSION :

DESCRIPTION : The following question are in support of your preparation of the reading material that will be discussed in the coming session.

E.S.Savas **On equity in providing public services, Ekistics 276, May/June 1979, pp. 144-148.**

1. Service performance of public bodies is measured in efficiency, effectiveness and equity. Summarize and explain the differences.

2. Are these three indicators of public performances satisfactory?

3. What measures could be taken if one or more of these indicators proves to be unsatisfactory?

4. How are private and public services distinguished? Please comment.

5. Do you agree with the principal equal payment for equal services provided? Comment on the example of refuse collection.

6. Explain the equal output principle. Is it appropriate?

7. Discuss the equal inputs princip e. What mode would you prefer?

8. Discuss also the equal satisfaction of demand. What mode would you find most adequate?

9. What is your comment about Savas' conclusions?

R.Gakenheimer and C.Brando **Infrastructure building: breaking the standards stalemate, Open House International, Vol.11, No.2, 1986, pp. 54-57.**

1. What are standards? Can you subscribe the definition?

2. Do you agree with the statement of the authors on too high standards in developing standards?

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3. By whom are the standards in your country set? Does it agree with the description of Gakenheimer and Brando on page 55, left column?

4. Discuss the five steps on page 56, right column.

J.Kirke **The provision of infrastructure and utility services, in Low-Income Housing in the Developing World, Edit. by G.K.Payne, Chapter 15, pp. 233-248.**

1. Summarize the arguments mentioned by Kirke, that make site development and upgrading costly, inappropriate and inadequate (pp. 233-236).

2. Discuss compatibility of several standards and the recovery of on-site and off-site costs on page 237.

3. What incremental development examples are described? Can you add some more?

4. What are Kirke's standards for the design of access and circulation. What is your comment?

5. What factors determine the investment cost for storm-water drainage?

6. Water supply and sanitation are dealt with in one paragraph. Why so?

7. What cost saving factors are mentioned for power supply?

8. Summarize Kirke's remarks on Community Participation. What is your comment?

UNCHS (Habitat) **A review of technologies for the provision of basic infrastructure in low-income settlements, Nairobi, 1984, 82 pp.**

1. Summarize and discuss the definition of "low-income settlements".

2. What would you consider as the minimum purchasing power required by the urban population in your country. How does it relate to their income?

3. The quality of water supply is its bacteriological and chemical/physical quality (p.8). Are there more indicators of quality of water supply service?

4. Would you accept the supply of water that is not absolutely safe?

5. How should the standard of water consumption be determined?

6. Lack of awareness and unsanitary habits are major causes of the ineffectiveness of water supply. What is required and more important how long does it take to take away these causes?

7. If solid waste has such low priority as is stated on page 10-11, should the public body provide for solid waste collection free of charge?

8. Summarize the importance of transportation, roads and footpaths.

9. Discuss the required investments for the targeted service levels in chapter 3. What is your expectation of reaching these targets?

10. Do you support the USAID basic criteria for investment (p. 24-25)?

11. The coordination of national agencies is described as a problem. Summarize and comment, please.

12. How would you determine the appropriateness of the discussed technologies in this publication in respect to your professional circumstances?

E X E R C I S E O U T L I N E

FOR

COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	**g-7** Development of data-collection methods for the Field Work Period.
NUMBER OF SESSIONS	:	3
OBJECTIVES	:	To prepare the data-collection requirements for the Field Work, by preparing and discussing households' questionnaires, officials' questionnaire and field survey check lists.
ACHIEVEMENTS	:	To be able to understand the process of preparing data-collection methods, and compiling questionnaires, etc.
DESCRIPTION	:	The exercise should be prepared by a lecture on socio-economic data-collection for infrastructure development (Lecture Outline P-3) and a lecture that explains the objectives, sites, hosting organizations and required results of the Fieldwork. It is supposed that for the Fieldwork data needs to be gathered from the households, the officials and through field observations. The participants are requested to develop the data-collection method for these three information sources. The main questions that the participants have to deal with is: - What information do we require in order to prepare a project proposal? - From where do we collect this information (Persons, households, key-informants, size of sample, number of questionnaires, field)?

EXERCISE OUTLINE CONTINUED:

	- How do we collect this information (Closed questions, open questions, questionnaires, checklists, observations)? - How do we organize the collection of data (manpower, transportation, finance, official requirements, letters, etc.)? As the outcome will be used in the field the exercise should at least result in: 1. A structured household questionnaires, using closed questions as much as possible. 2. A set of questionnaires, using open questions for a list identified officials. 3. A checklist for field observations. The Course Coordinator should guide the groups' process towards these results. The best way of working is to assign each part to one group of 5-8 participants. The results are exchanged and discussed. The final results will be typed and duplicated and taken to the field. In the field - during evening sessions - the developed data-collection method can be reviewed and suggestion for improvements discussed and included in the Field Work Report.
BACKGROUND LITERATURE :	- Lecture-notes H.Mengers, 1989. - DHV, Guidelines for socio-economic surveys, 1986, Amersfoort.
HAND-OUTS :	Description of exercise, paper.
EXERCISE AIDS :	None.
AUDIO-VISUAL MATERIAL :	None.
DISCUSSION TOPICS :	How do you want to operationalize the gathering of data. Do we have enough means to collect the data (manpower, transportation, finance)?

Annexes: - Exercise description.

E X E R C I S E

Development of Data-Collection Methods for the Field Work Period

In order to prepare the Field Work we need to develop the Data-Collection Methods. In the lecture about the fieldwork and socio-economic data-collection, we came to know the objectives of th Field Work, and what data-collections are available.

It is supposed that for the Fieldwork data needs to be gathered from the households, the officials and through field observations.

The participants are requested to develop the data-collection method for these three information sources. The main questions that you have to deal with are:

- What information do we require in order to prepare a project proposal?
- From where do we collect this information (Persons, households, key-informants, size of sample, number of questionnaires, field)?
- How do we collect this information (Closed questions, open questions, questionnaires, checklists, observations)?
- How do we organize the collection of data (manpower, transportation, finance, official requirements, letters, etc.)?

As the outcome will be used in the field the exercise should at least result in:

1. A structured household questionnaires, using closed questions as much as possible.
2. A set of questionnaires, using open questions for a list identified officials.
3. A checklist for field observations.

E X E R C I S E O U T L I N E

FOR

COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	**w-1** Piped Water Supply Design for an Urban Low-Income Neighborhood.
NUMBER OF SESSIONS	:	3
OBJECTIVES	:	To apply the presented knowledge on piped water supply design on an realistic case of an urban low-income neighborhood by designing the water supply lay-out and dimensions, and its organizational implications for public bodies and community.
ACHIEVEMENTS	:	To be able apply piped water supply design guidelines on a presented case of an urban low-income neighborhood.
DESCRIPTION	:	The neighborhood shown and described in the Annexes is a poorly serviced area. The Ministry of Planning and Development has decided to improve the water supply by providing a network for water supply. The consultant LBD Ltd. has been requested to advice on this plan and to make a proposal. The consultant assigned experts from different disciplines to a team that will draw and present this proposal. You are that team. Besides proposing several lay-outs and designs, also modes of cost recovery, operation, maintenance and social/cultural acceptability should be dealt with. The consultant should submit a project feasibility report.

EXERCISE OUTLINE CONTINUED

		Several groups can be made of a size of 5-8 participants, each dealing with the exercise. About 2 sessions are required for the individual group activities and 1 for presentations and discussions. The proposal are presented and discussed in the whole group and reports submitted to the Course Coordinator.
BACKGROUND LITERATURE	:	WEDC, Infrastructure Development: Services for Urban Low Income Housing, Loughborough University of Technology, 1986. D.A.Okun, Community Piped Water Supply Systems in Developing Countries, A Planning Manual, World Bank Technical Paper Number 60, 1987. UNCHS, A review of Technologies for the Provision of Basic Infrastructure in Low-Income Settlements, Nairobi, 1984.
HAND-OUTS	:	Description exercise, reading material list and annexes physical and socio-economic data on urban project neighborhood (pocket calculators).
EXERCISE AIDS	:	Pocket calculators, drawing paper and pencils.
AUDIO-VISUAL MATERIAL	:	H.Mengers, IHS, has slides of the area before upgrading (country: Guinea-Bissau, city: Bissau).
DISCUSSION TOPICS	:	- To what extent is the community involved in the decision making and execution of the different project stages (including Operation and Maintenance)? - Is your proposal low-cost and affordable? - Is your proposal easy upgradable in future?

EXERCISE OUTLINE CONTINUED

Annexes:

- Exercise description.
- Physical and Socio-economic Data on Project Neighborhood.
- Actual Responsibilities Chart at Neighborhood level.
- Rain-fall and temperatures graphs.
- 8 Drawings A3-size (scale 1:20,000) of Project Area, Altitudes, Water Supply Mains, Water Sources, Sanitation facilities, Drainage and Solid Waste Disposal, Road lay-out, non-thematic drawing Project Area.

TH COURSE ON LOW-COST WATER SUPPLY AND SANITATION

EXERCISE : WATER SUPPLY NETWORK DESIGN FOR AN EXISTING LOW INCOME NEIGHBORHOOD

DATE :

DATE OF SUBMISSION:

DESCRIPTION : The neighborhood shown and described in the Annexes is a poorly serviced area. The Ministry of Planning and Development wants to upgrade this deprived area and to start with the installation of a water supply network. The Ministry has assigned the consultant LBD Ltd. to make a proposal. The consultant assigned experts from different disciplines to a team that will draw and present this proposal. You are that team. Besides technical issues, like lay-out and properties estimation, also modes of cost recovery, operation, maintenance and its organization as well as social/cultural acceptability and constraints should be dealt with.

Good luck.

READING MATERIAL: WEDC, Infrastructure Development, Services for Urban Low Income Housing, 4th Edition Technical Guidelines, November, 1986.

D.A.Okun, Community Piped Water Supply Systems in Developing Countries, A Planning Manual, World Bank Technical Paper Number 60, 1987.

ANNEX

PHYSICAL AND SOCIO-ECONOMIC DATA ON PROJECT NEIGHBORHOOD
SURVEY RESULTS

Project area:	14.5 ha.
Morphology:	Sandy slightly clayey permeable soils. Surface sloping down from South-West to North-East.
First constructions:	1914
Settlement development:	Southern part was mainly built in 1940-1960, Northern part in 1960-1970.
Number of houses:	279
Building activities:	Little due to high material cost for maintenance and construction and relatively declining urban incomes.
Property plots:	Plots are irregular of size and 50% of the plots are based on land title documents given out in colonial period. These are not sanctioned by the, as private ownerships of plots are not accepted within the city boundaries. The other 50% of the plots are registered and leased by the Ministry.
House ownership:	75% of the houses is owned by its occupier, of which one-third rents a part of the house to others. 25% of the houses is rented to one or more households. Rents vary from US$ 3-30 per month; average US$ 8.
Total inhabitants:	4510
Annual growth:	5%
Average household size:	9.9 persons
Illiteracy:	32%
Ethnic groups:	Mandinga 47% (muslim), Mancanha 13% (christian), others 40% (mixed religions).
Family composition:	Mainly extended families.
Head of households:	28% female, 72% male.
Income:	Average US$ 70 per month. 1.8 earners per household. Official minimum wage US$ 55 per month.
Income distribution:	US$ per month 25- 50: 32% 50- 70: 34% 70- 90: 10% 90-110: 10% 110-150: 10% >150 : 4% Total: 100%
Employment:	40% at public sector (mainly male, stable income), 60% private sector (variable and fluctuating incomes).
Unemployment:	42%
Economic activities:	Various, mainly small scale. Most prominent are tailors and furniture workshops.

Neighborhood organizations:	Representative (political) neighborhood committee that has strong influence in the Southern part, a youth welfare organization and welfare organization for women.
Education and health facilities:	None
Drainage and solid waste collection:	Natural gullies and weekly solid waste collection only at edges of the neighborhood by vehicles of the Municipal Health Department.
Sanitation:	15% has uses flush latrines and septic tanks, 85% uses (shared) pit-latrines and water. No sewerage. Main operation responsibility for sanitation is with Municipal Health Department. Sewage treatment and discharge is responsibility of Ministry of Civil Works.
Water supply:	13% of the houses have private connection or yard connection (all located near to the mains), 87% use two public standpost and wells. Quality water supply: good. Quantity water supply: varying pressure and irregular supply. Wells: quality very bad (pathogens, minerals), but always supply. Depth water table: 8-15m. Main responsibility of operating water supply is with the municipal Water Corporation.
Water supply mains:	Along the main roads; diameter 100mm.
Roads:	Edging and centre road have asphaltic macadam. Unlined road side drains. Lanes in northern part leveled earth paths. Southern part mainly earth foot paths. One asphaltic access road up to the mosque. Road maintenance is with the Municipal Department of Public Works.
Aspirations inhabitants:	Regarding infrastructure, water supply is their main concern, thereafter health facilities and electricity. Willingness to contribute in labour and/or money is there. However prior aspiration is the improvement of the housing condition (roofing, plastering, extension).

ACTUAL RESPONSIBILITIES AT NEIGHBORHOOD LEVEL

INFRASTRUCTURE RESPONSIBILITIES	WATER SUPPLY	SANITATION	DRAINAGE	SOLID WASTE	ROADS
PLANNING	MinPl&D	MinPl&D	MinPl&D	MinPl&D	MinPl&D
DESIGN	MinCW	MinH	MinCW	MinH	MinCW
IMPLEMENTATION	MinCW	MinH	MinCW	MinH	MinCW
SUPERVISION	MinCW MuWatCor	MinH MuHDep	MinCW MuPWDep	MinH MuHDep	MinCW MuPWDep
CONSTRUCTION	Contr (MuWatCor)	Contr	Contr	Contr	Contr
O&M	MuWatCor	MuHDep	MuPWDep	MuHDep	MuPWDep
FINANCE	MinFin	MinFin	MinFin	MinFin	MinFin
REVENUE COLLECTION	MuWatCor	-	-	-	-
PUBLIC HEALTH	MinH	MuHDep	-	MuHDep	-

MinFin = Ministry of Finance
MinPl&D = Ministry of Planning and Development
MinCW = Ministry of Civil Works
MinH = Ministry of Health
MuWatCor = Municipal Water Corporation
MuHDep = Municipal Health Department
MuPWDep = Municipal Public Works Department
Contr = Contractors


CUPELON DE BAIXO
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de
CUPELON
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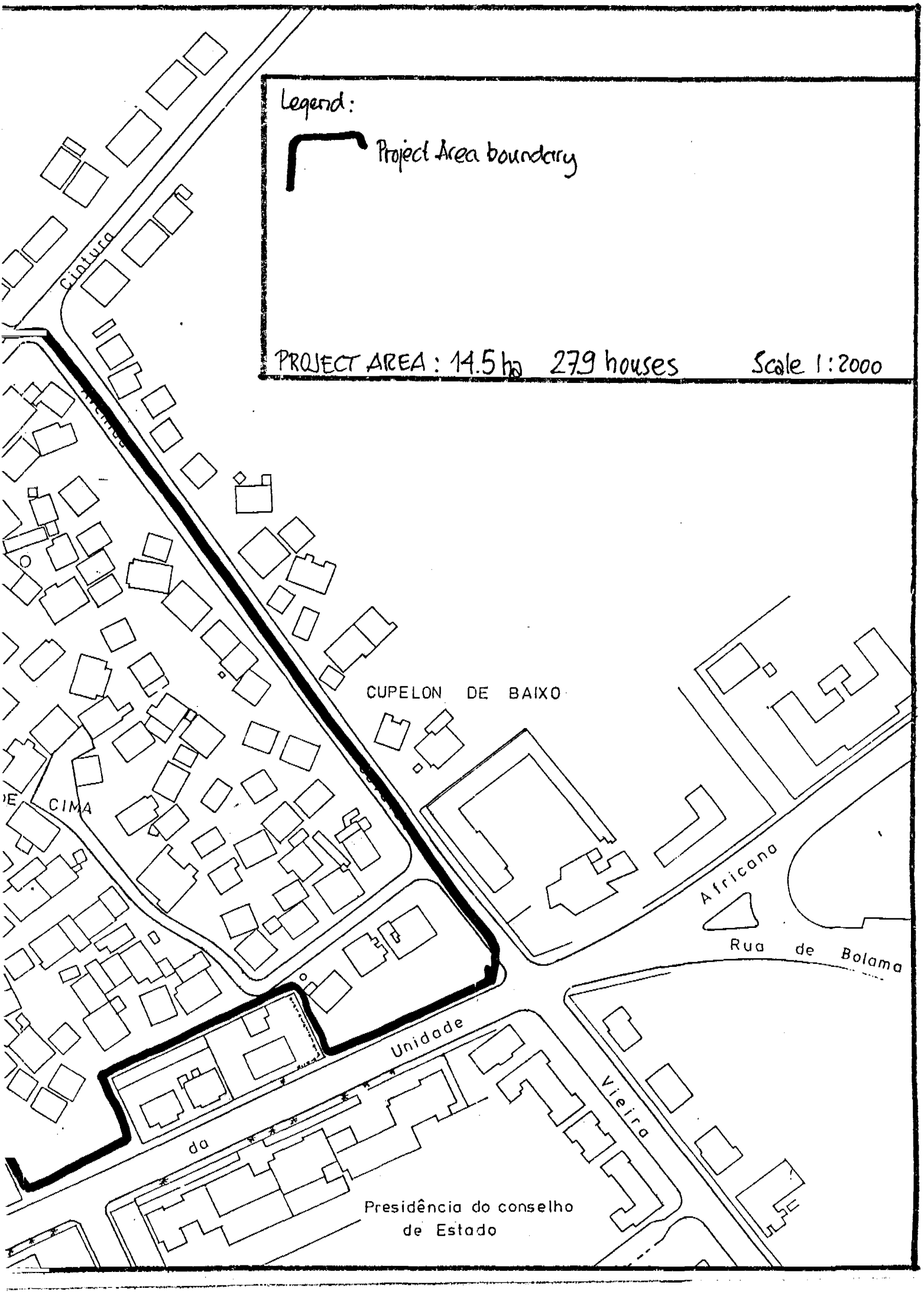
Legend:
Project Area boundary
PROJECT AREA : 14.5 ha 279 houses Scale 1:2000
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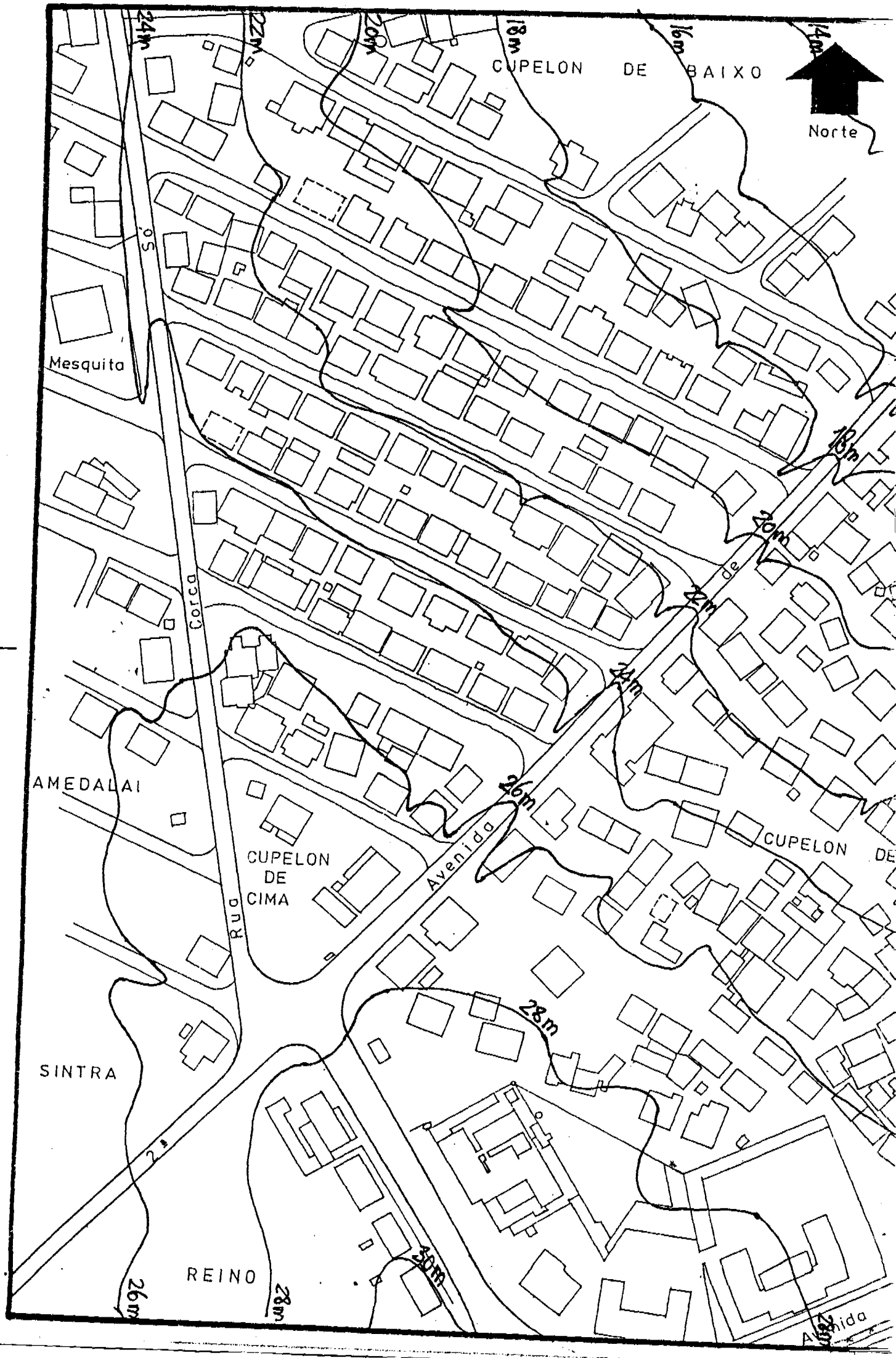
Unidade
da
Vieira
Presidência do conselho
de Estado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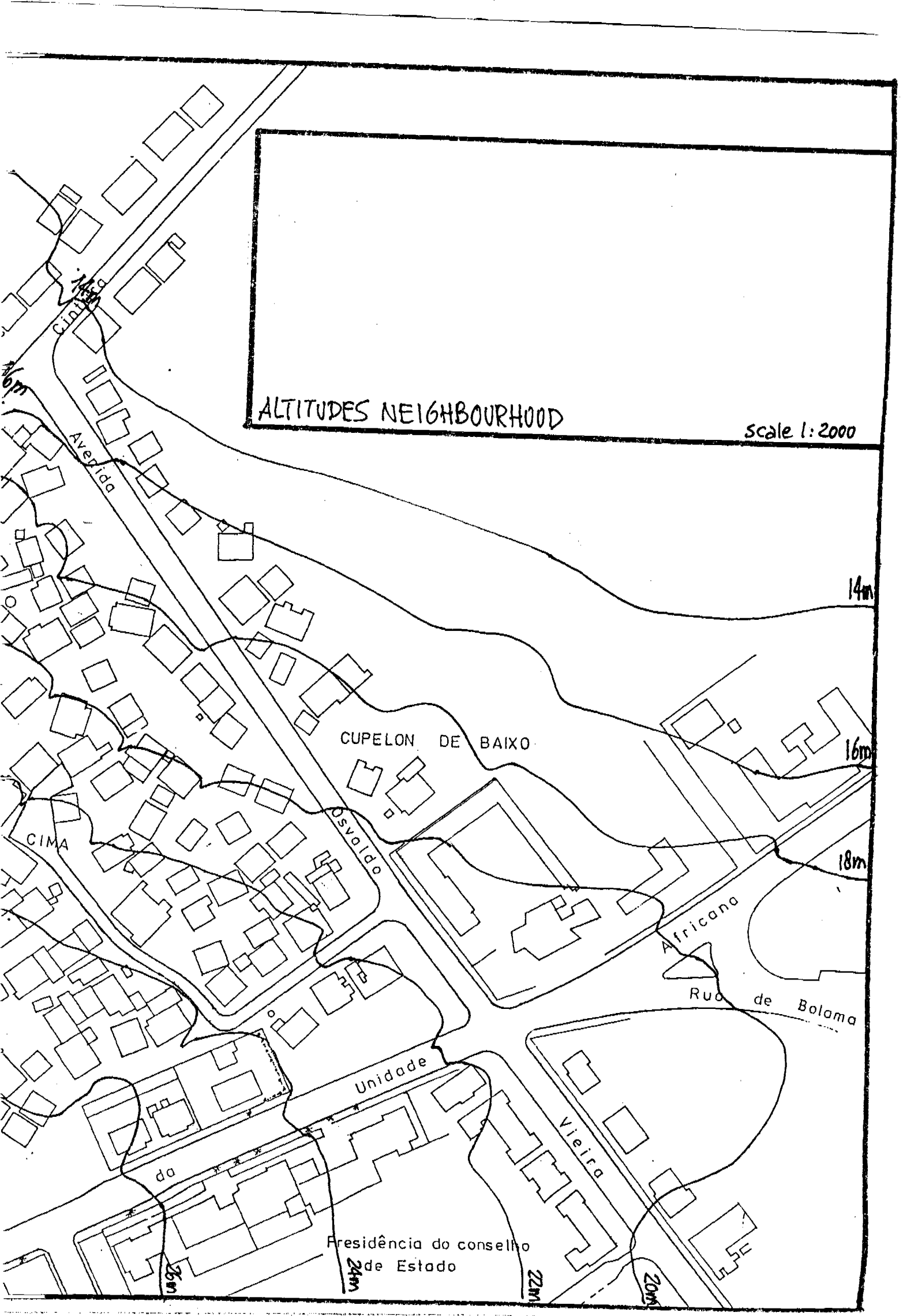
ALTITUDES NEIGHBOURHOOD
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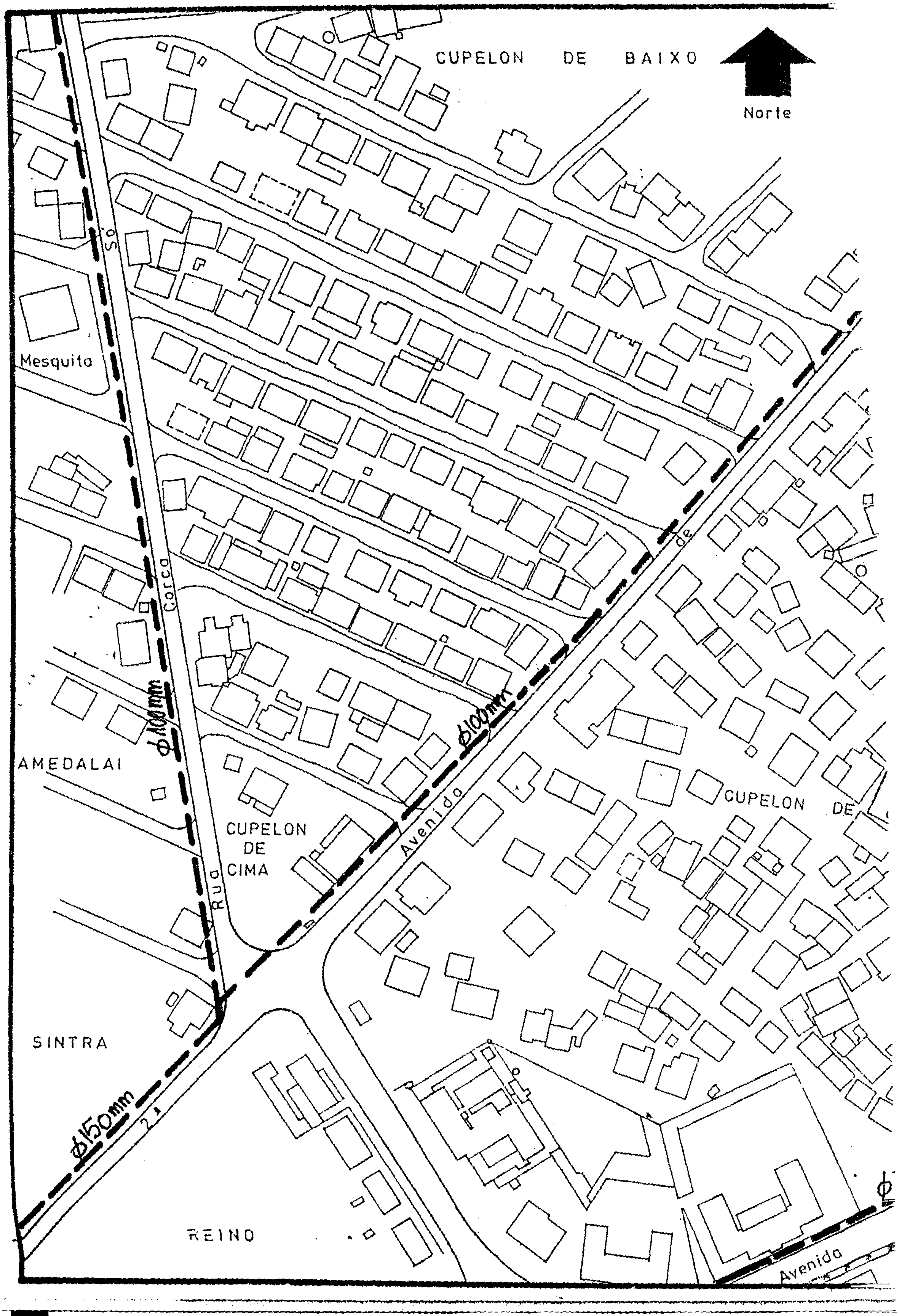

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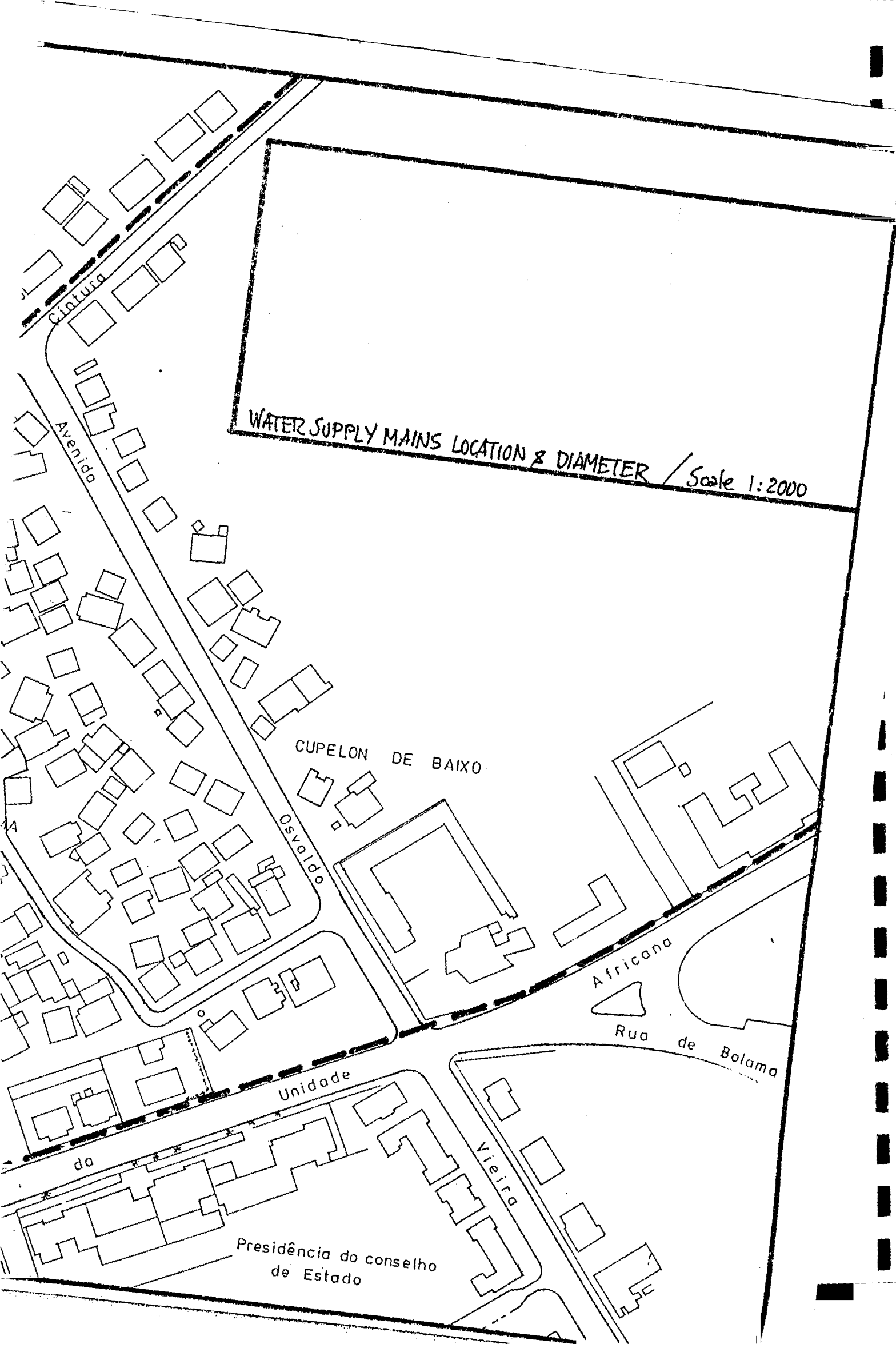
WATER SUPPLY MAINS LOCATION & DIAMETER / Scale 1:2000
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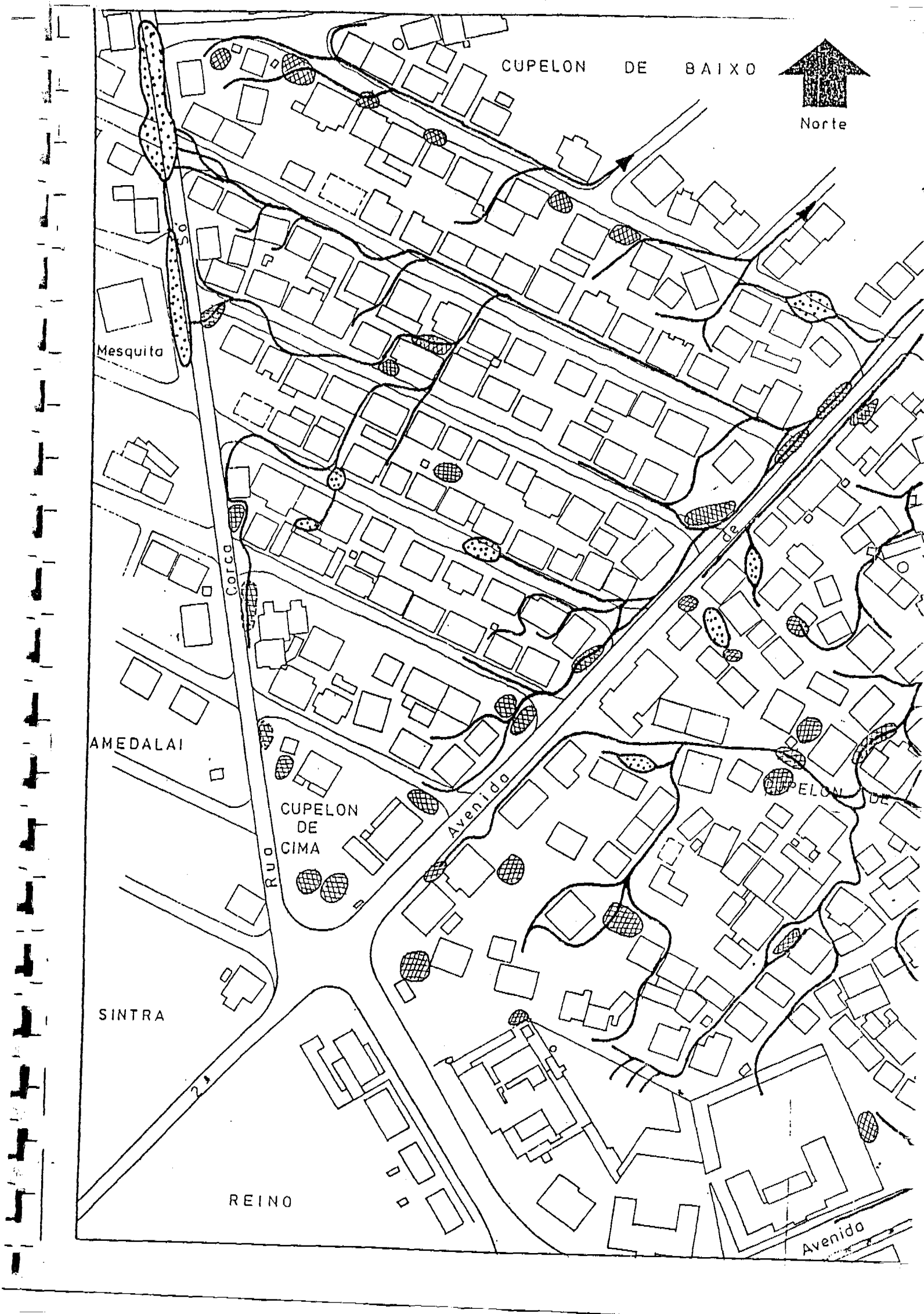
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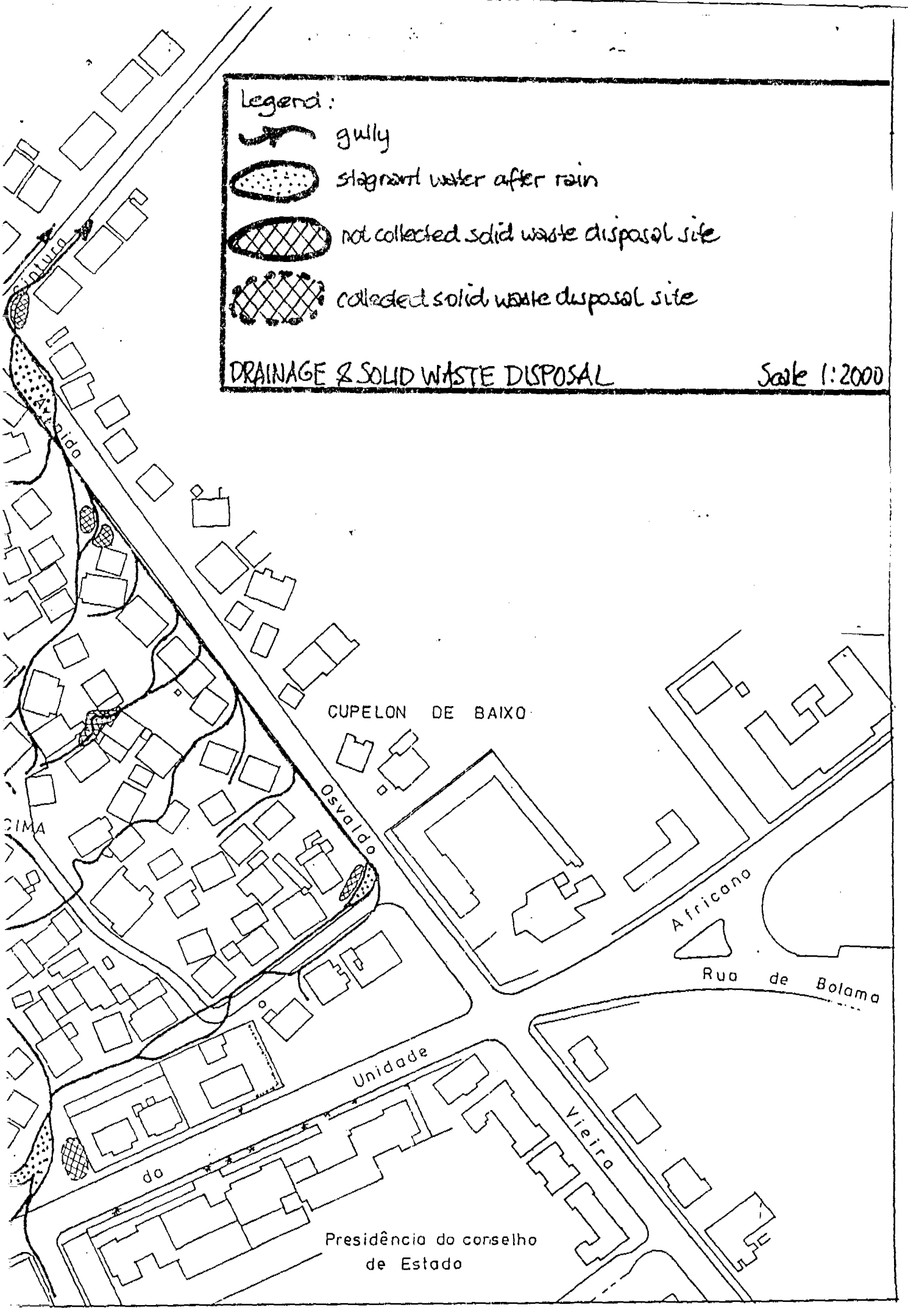
Legend :
gully
stagnant water after rain
not collected solid waste disposal site
collected solid waste disposal site
DRAINAGE & SOLID WASTE DISPOSAL
Scale 1:2000
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Osvaldo
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Presidência do conselho
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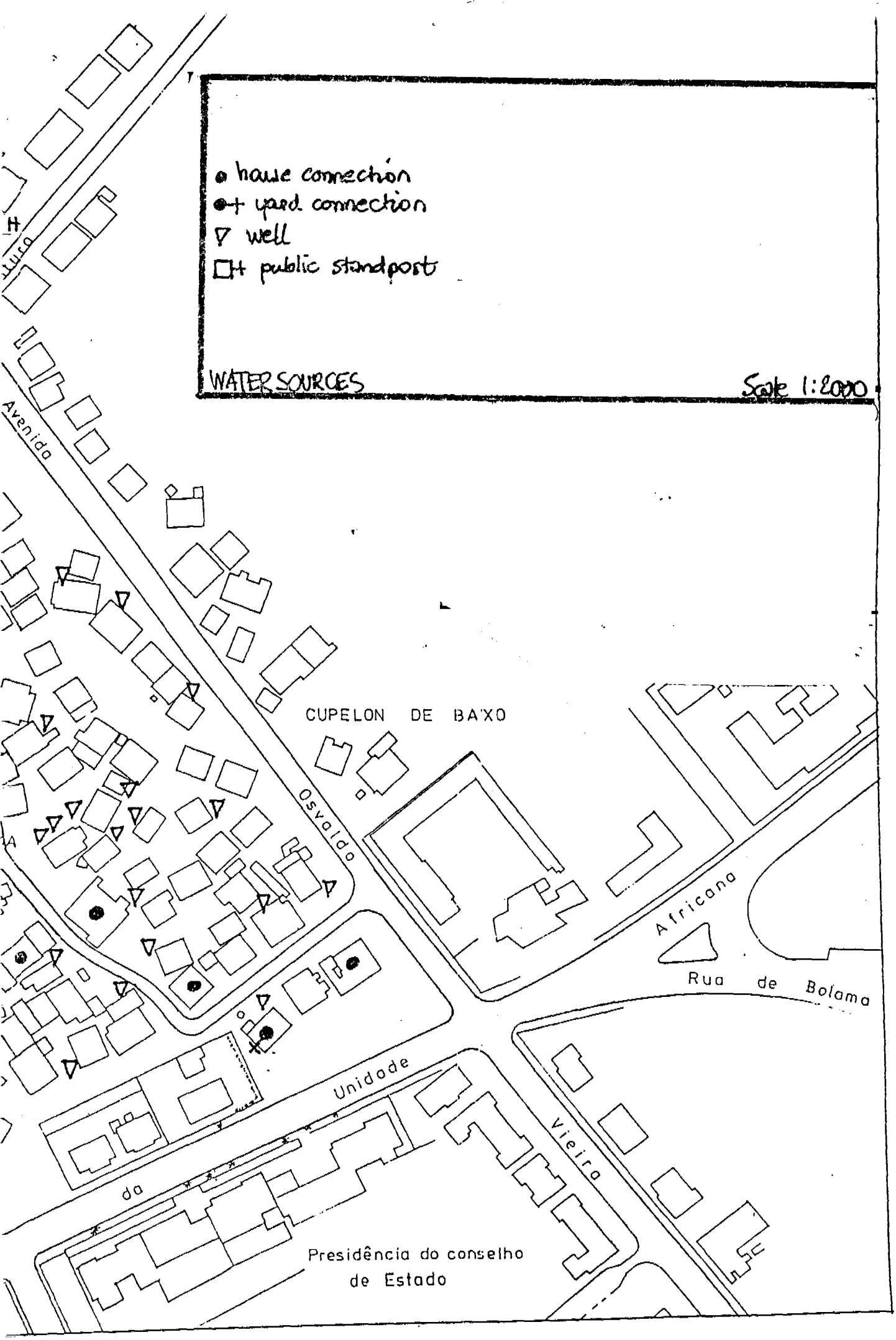
house connection
yard connection
well
public standpost
WATER SOURCES
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da
Presidência do conselho
de Estado

E X E R C I S E O U T L I N E

FOR

COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	w-2 Gravity-Flow Water Supply Design for a Rural Community.
NUMBER OF SESSIONS	:	3
OBJECTIVES	:	To apply the presented knowledge on gravity-flow piped water supply design on an realistic case of a rural community by designing the water supply lay-out and dimensions, and its organizational implications for public bodies and community.
ACHIEVEMENTS	:	To be able apply gravity-flow piped water supply design guidelines on a presented case of a rural community.
DESCRIPTION	:	The community shown and described in the Annexes has no safe water supply. The Ministry of Planning and Development has decided to improve the water supply by providing a gravity-flow water supply network. The consultant LBD Ltd. has been requested to advice on this plan and to make a proposal. The consultant assigned experts from different disciplines to a team that will draw and present this proposal. You are that team. Besides proposing several lay-outs and designs, also modes of cost recovery, operation, maintenance and social/cultural acceptability should be dealt with. The consultant should submit a project feasibility report.

EXERCISE OUTLINE CONTINUED

		Several groups can be made of a size of 5-8 participants, each dealing with the exercise. About 2 sessions are required for the individual group activities and 1 for presentations and discussions. The proposal are presented and discussed in the whole group and reports submitted to the Course Coordinator.
BACKGROUND LITERATURE	:	- Johnson, C.R. (1976), Standards and Procedures for the Design of Water Supply Systems in Rural Areas of Nepal and Bhutan, Unicef, Kathmandu, Nepal.
HAND-OUTS	:	Description exercise, reading material list and annexes physical and socio-economic data on rural project community (pocket calculators).
EXERCISE AIDS	:	Pocket calculators, drawing paper and pencils.
AUDIO-VISUAL MATERIAL	:	H.Mengers, IHS, has slides of the area before upgrading (country: Nepal, community: Chipli).
DISCUSSION TOPICS	:	- To what extent is the community involved in the decision making and execution of the different project stages (including Operation and Maintenance)? - How can the community maintain the system themselves, and what financial or training requirements do you consider? - Is your proposal low-cost and affordable? - Is your proposal easy upgradable in future?

EXERCISE OUTLINE CONTINUED

Annexes:
- Topography of village and springs and streams.
- Socio-economic data on villagers.
- Capacity of springs and consumption rates.
- Population growth.
- Main sources of income.
- Headloss tables of PVC, Galvanised Iron and HDP.

TH COURSE ON LOW-COST WATER SUPPLY AND SANITATION

EXERCISE : GRAVITY-FLOW WATER SUPPLY NETWORK DESIGN FOR AN EXISTING RURAL COMMUNITY

WEEK :

DATE OF SUBMISSION:

DESCRIPTION : The community shown and described in the Annexes has no safe water supply. The Ministry of Planning and Development has decided to supply this village with gravity-flow water supply network. The Ministry has assigned the consultant LBD Ltd. to make a proposal. The consultant assigned experts from different disciplines to a team that will draw and present this proposal. You are that team. Besides technical issues, like lay-out and properties estimation, also modes of cost recovery, operation, maintenance and its organization as well as social/cultural acceptability and constraints should be dealt with.

Good luck.

READING MATERIAL: - Johnson, C.R. (1976), Standards and Procedures for the Design of Water Supply Systems in Rural Areas of Nepal and Bhutan, Unicef, Kathmandu, Nepal.

ANNEX EXERCISE w-2

LAY-OUT RURAL VILLAGE

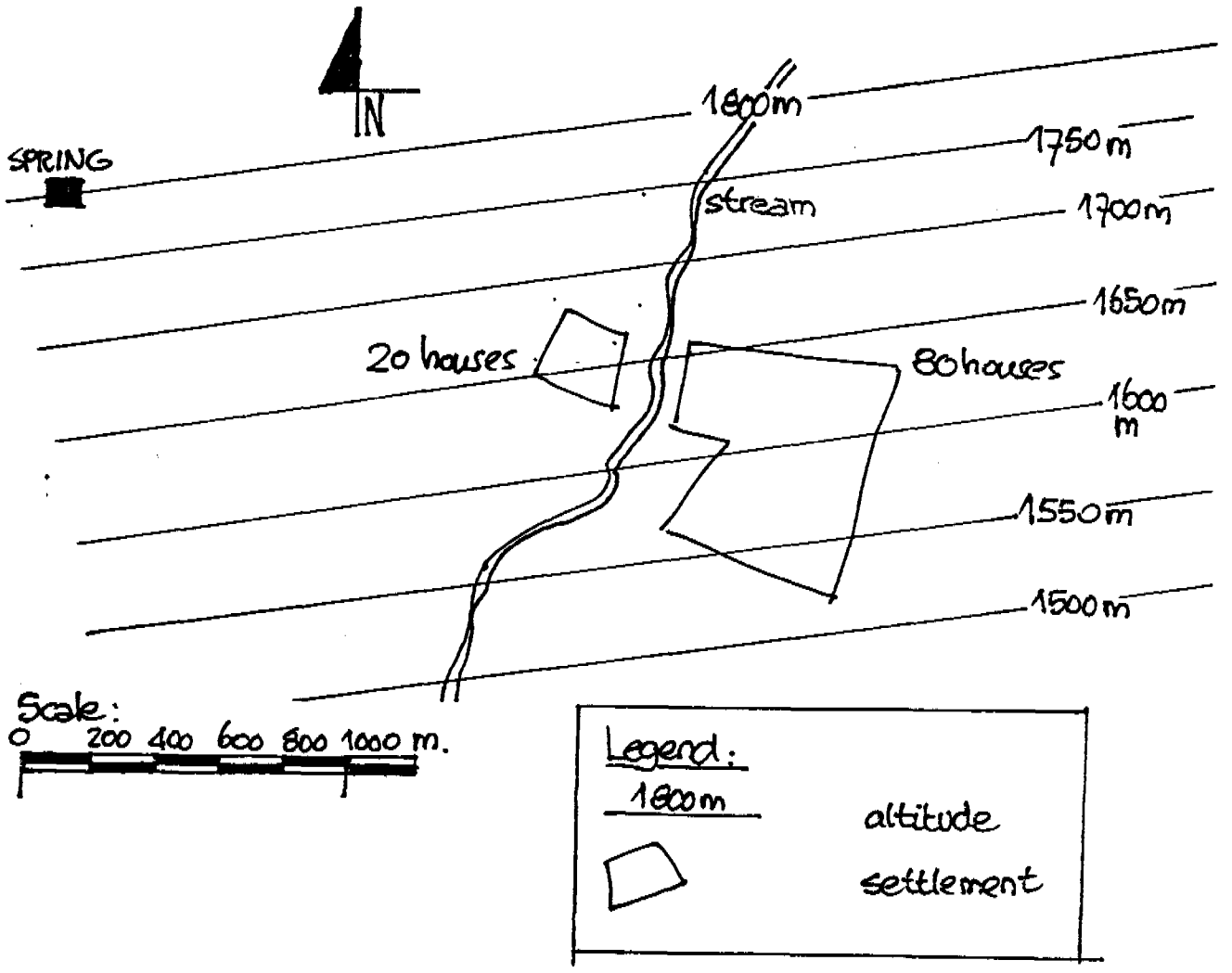
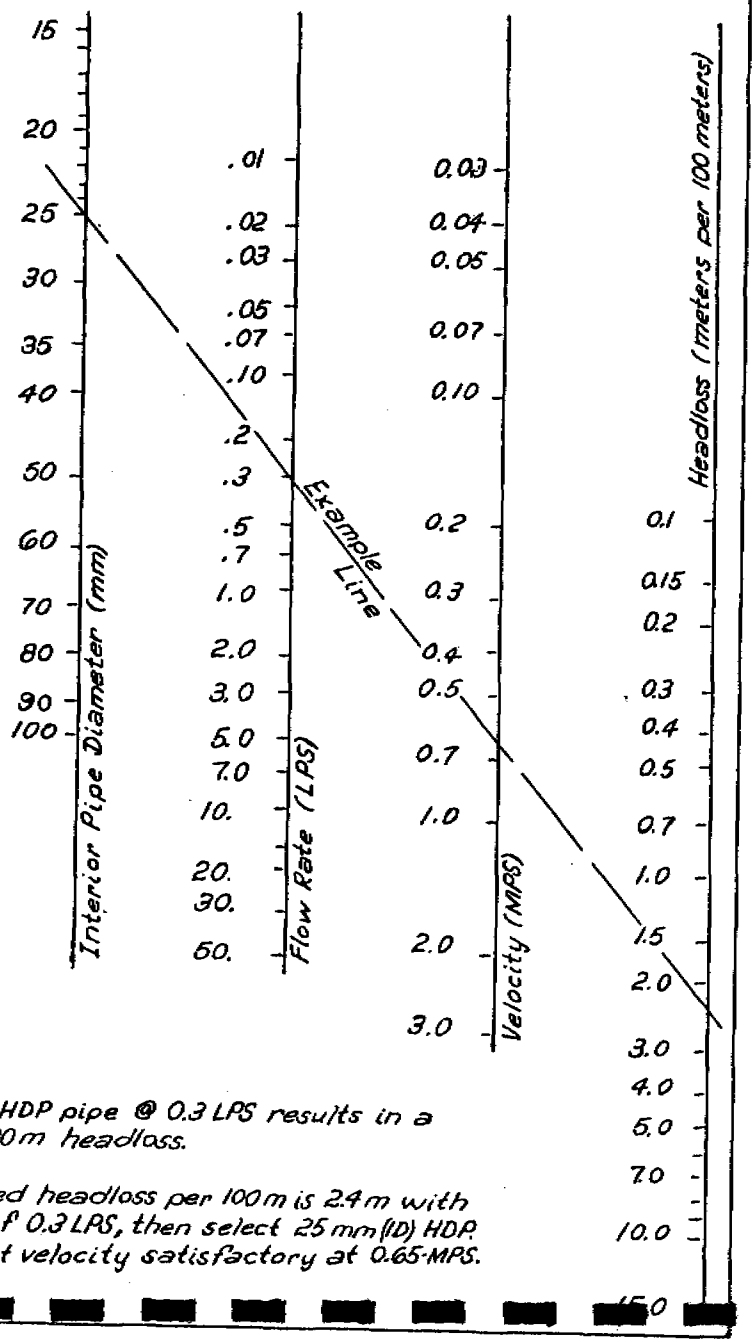


FIGURE 19. NOMOGRAPH FOR PIPE DESIGN



Note:

Headloss values apply to straight reaches of HDP pipe.

Example

A. 25-mm HDP pipe @ 0.3 LPS results in a 2.4m/100m headloss.

B. If desired headloss per 100m is 2.4m with a flow of 0.3 LPS, then select 25 mm (ID) HDP. Resultant velocity satisfactory at 0.65-MPS.

FIGURE 20. FRICTIONAL HEADLOSS TABLE FOR HDP PIPE

FLOW	PIPE SIZES				FLOW	PIPE SIZES		
	20x2	25x2	32x2	50x2		63x3.6	75x4.3	90x8.2
0.03	0.30				0.50	0.125	0.053	
0.04	0.52				0.55	0.147	0.060	
0.05	0.80	0.21			0.60	0.171	0.073	
0.06	1.09	0.30			0.65	0.195	0.088	
0.07	1.40	0.39			0.70	0.220	0.095	0.040
0.08	1.81	0.50			0.80	0.282	0.118	0.051
0.09	2.29	0.62			0.90	0.348	0.154	0.062
0.10	2.80	0.76	0.19		1.00	0.410	0.180	0.075
0.12		1.06	0.27		1.30	0.678	0.268	0.122
0.14		1.40	0.35		1.50	0.855	0.374	0.156
0.16		1.78	0.44		1.70	1.055	0.501	0.192
0.18		2.18	0.54		2.00	1.40	0.610	0.255
0.20		2.60	0.65	0.080	2.30	1.81	0.788	0.329
0.22		3.10	0.78	0.094	2.50	2.10	0.910	0.380
0.24		3.62	0.91	0.107	2.70	2.40	1.035	0.432
0.26		4.20	1.05	0.122	3.00	2.90	1.25	0.520
0.28		4.78	1.19	0.136	3.50	3.84	1.67	0.691
0.30		5.40	1.35	0.150	4.00	4.88	2.14	0.878
0.35		7.12	1.77	0.198	4.50	6.00	2.64	1.08
0.40		8.96	2.22	0.252	5.00	7.20	3.20	1.30
0.45		10.9	2.70	0.310	5.50	8.60	3.78	1.55
0.50		13.0	3.20	0.370	6.00	10.1	4.38	1.82
0.55		15.4	3.80	0.435	6.50	11.6	5.03	2.10
0.60		18.0	4.43	0.504	7.00	13.3	5.75	2.40
0.65		20.7	5.08	0.575	8.0	16.9	7.34	3.02
0.70		23.5	5.80	0.650	9.0	20.4	9.10	3.69
0.80			7 39	0.824	10.0	25.0	11.0	4.40
0.90			9.22	1.01	12.0			6.20
1.00			11.00	1.21	14.0			8.23
1.30				1.98	16.0			10.5
1.50				2.54	18.0			12.9
1.70				3.15	20.0			15.5
2.00				4.20				
2.30				5.45				
2.50				6.32				
2.70				7.21				
3.00				8.70				
3.30				10.4				
3.50				11.7				
3.70				13.0				
4.00				15.0				
4.30				17.2				
4.50				18.7				
4.70				20.2				
5.00				22.6				

Notes

1. Headloss values expressed as meters per 100 meters of straight pipe.
2. Pipe sizes listed as outside diameter in mm with respective wall thickness in mm.
3. Flow is expressed as liters per second.
4. Linear interpolation between values is possible.

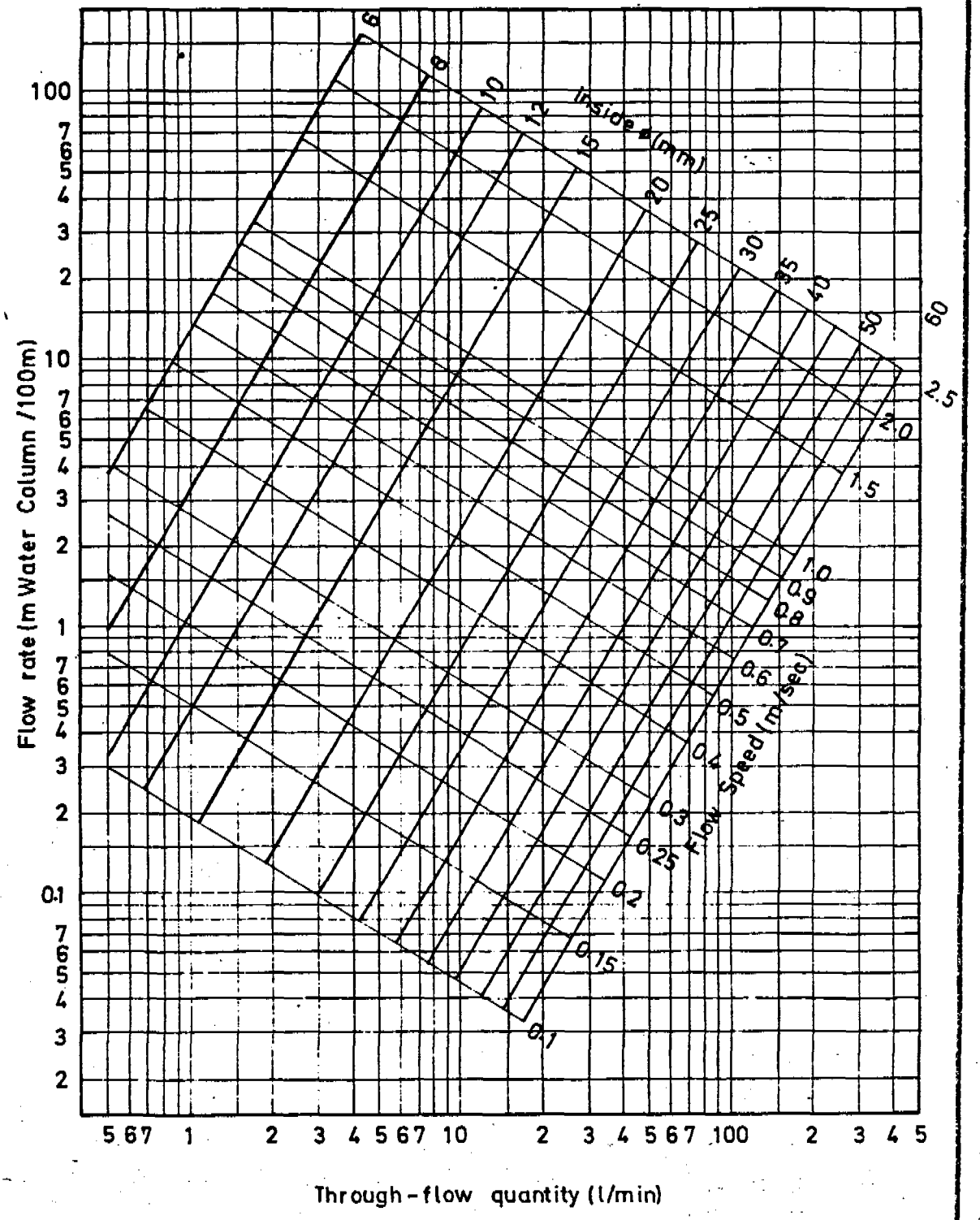
DW

LOSS OF HEAD - CHART P. E. - PIPES

TABLE 47

• Loss of head in Polyethylene-Pipe

Water of 10°c



EXERCISE OUTLINE

FOR

COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	**w-3** Water Tariffs Policy Making.
NUMBER OF SESSIONS	:	2
OBJECTIVES	:	To elaborate and discuss how water production costs (investment and running cost) can be recovered from the consumers by a tariff setting, and to formulate policy recommendations.
ACHIEVEMENTS	:	To be able to recommend a policy for the setting of water tariffs.
DESCRIPTION	:	The lecture is prepared by a lecture on water tariff systems, the present practice and problems faced (Lecture Outline). The Ministry of Water Works has decided to improve its financial basis by introducing a water tariff systems for its consumers, that should cover the total cost of water production (Investment and running costs). A policy document should be developed that covers questions, such as: - Will all consumers be charged equally? - Will cross-subsidy be applied for low-income consumers? - What will be considered as low-income? - Will a flat or progressive tariff system be adopted? - How will the consumption be determined? - How will the consumers be charged, and how will the charge be collected?

EXERCISE OUTLINE CONTINUED:

	- What civil procedures are required to sue non-payers and illegal connectors? - What organization does the ministry require to operate the new tariff system effectively? The participants are requested to develop such a policy documents that gives answers to these questions, either single answers or offering different options. The exercise can executed best by making groups of 5-8 participants who develop the policy document. This will take one session. The document is presented to the other groups and discussed in another session, and submitted to the Course Coordinator.
BACKGROUND LITERATURE :	Lecture hand-outs
HAND-OUTS :	Exercise description and paper.
EXERCISE AIDS :	
AUDIO-VISUAL MATERIAL :	
DISCUSSION TOPICS :	See questions in the description.

Annexes: - Exercise description.

TH COURSE ON LOW-COST WATER SUPPLY AND SANITATION

EXERCISE : Water Tariff Policy Making.

DATE :

DATE OF SUBMISSION :

The Ministry of Water Works has decided to improve its financial basis by introducing a water tariff systems for its consumers, that should cover the total cost of water production (Investment and running costs).

A policy document should be developed that covers questions, such as:
- Will all consumers be charged equally?
- Will cross-subsidy be applied for low-income consumers?
- What will be considered as low-income?
- Will a flat or progressive tariff system be adopted?
- How will the consumption be determined?
- How will the consumers be charged, and how will the charge be collected?
- What civil procedures are required to sue non-payers and illegal connectors?
- What organization does the ministry require to operate the new tariff system effectively?

The participants are requested to develop such a policy documents that gives answers to these questions, either single answers or offering different options.

The exercise can executed best by making groups of 5-8 participants who develop the policy document. This will take one session.

The document is presented to the other groups and discussed in another session, and submitted to the Course Coordinator.

REFERENCE MATERIAL :

E X E R C I S E O U T L I N E

FOR

COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	**s-1** Low-cost sanitation options for WEDCANA region.
NUMBER OF SESSIONS	:	2
OBJECTIVES	:	To apply the presented knowledge on low-cost sanitation to an imaginary region, with different physical and social circumstances.
ACHIEVEMENTS	:	To be able to apply low-cost sanitation options in a correct way in varying situations.
DESCRIPTION	:	The exercise is preceded by the introductory lecture on low-cost sanitation options (Lecture Outline S-3). Wedcana region is an imaginary region where physical and social circumstances vary considerably. The participants - after taking notice of the lecture on low-cost sanitation - are requested to propose the best low-cost sanitation solution to the 9 different settlements in the region. In the Annex the region is described. Groups of 5-8 participants should elaborate and discuss the different possible options and decide on the best one. One session is available for this group work. In another session the results are presented and discussed to other groups, and reports are submitted to the Course Coordinator.

EXERCISE OUTLINE CONTINUED:

SOLUTION EXERCISE:

VILLAGE	FIRST CHOICE	SECOND CHOICE
A	Conventional sewerage /1	Small bore sewers
B	Septic tanks	Small bore sewers /2
C	Small bore sewers /3	Conventional sewers
D	Overhung latrines /4	Twin pit latrines
E	Overhung latrines	Borehole latrines
F	Trenching /5	
G	Trenching	
H	Stepped/mound latrines /6	Compost latrines
I	VIP latrines	Compost latrines

Comments:
/1 Income of area is not known, but low income is assumed and no septic tank services. It is cheaper to construct conventional sewerage, than any other solution.
/2 Small bore sewers to discharge the overflow of existing septic tanks, when the waste water volume is too high.
/3 The use of septic tanks/small bore sewers may avoid pumping stations, which are costly.
/4 Pollution of nearby seashore only risk. If serious health hazard then twin pit latrine is proposed.
/5 Temporary measure by trenching is acceptable.
/6 Requires above ground solution.

BACKGROUND LITERATURE	:	- Lecture notes. - Kalbermattan, Appropriate Sanitation Alternatives: A Planning and Design Manual.
HAND-OUTS	:	Exercise description, annex and paper.
EXERCISE AIDS	:	

EXERCISE OUTLINE CONTINUED:

AUDIO-VISUAL MATERIAL	:	
DISCUSSION TOPICS	:	What have you considered as second best option? What uncertainties did you come across that do need additional information?

Annexes: - Exercise description and sketch of Wedcana district.

TH COURSE ON LOW-COST WATER SUPPLY AND SANITATION

EXERCISE : Low-cost sanitation for WEDCANA district.

DATE :

DATE OF SUBMISSION :

The district of Wedcana has unsatisfactory sanitation, except the town centre of A which is sewered. The sewerage is treated at the sewage works marked SW. The dense housing at the South of the town centre A, is served by bucket latrine. The housing B at the ridge is low density, with large houses and bungalows on large plots. A new high density low cost housing estate is constructed at the area C.

People in the villages D defecate on the river banks and seashore. The soil along the banks of the river Everflo' is expansive clay.

Fishermen at E live in huts built on stilts over the sea.

Farmers from the village F move to the flood plain west of F during the dry season. They live in temporary huts until the onset of the monsoon, when they return to their village.

The open land at the confluence of the rivers near village G, is the site of an annual religious festival when tens of thousands of people assemble for four days.

People living at the South of the Everflo' river have piped water supply and use water for anal cleansing. Elsewhere water is obtained from springs, rivers, streams and shallow wells, and there is a tradition of using leaves, grass and paper for anal cleansing.

In the North-West there is hard underlying rock, covered by a few millimeters of soil at H and increasing to a meter of soil at I.

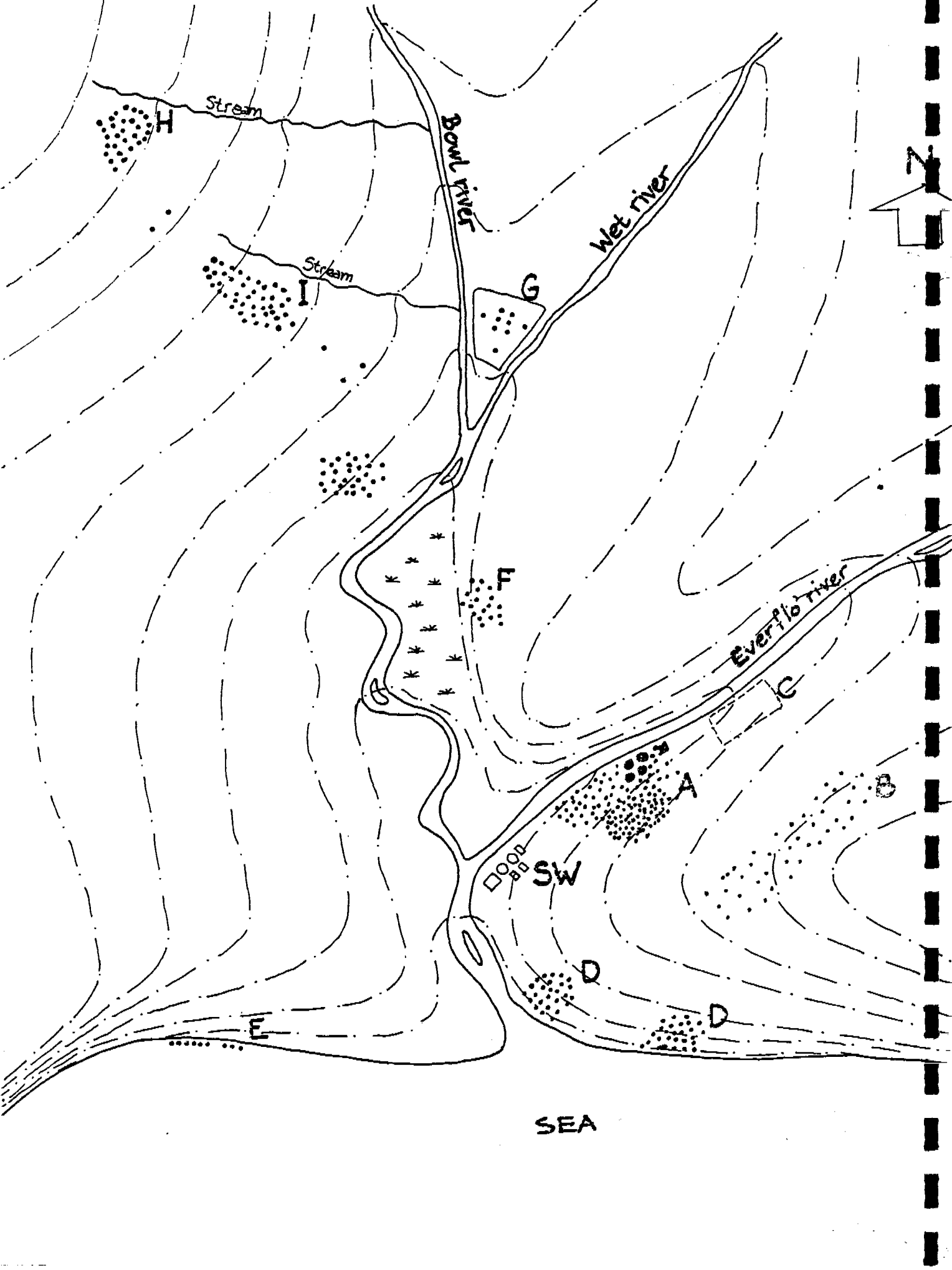
Which sanitation options are suitable for the following villages. Make a choice out of: conventional sewerage, small bore sewers, compost latrines, overhung latrines, open trench latrines, septic tanks, Ventilated Improved Pit latrines, borehole latrines, twin pit flush latrines, mound or step latrines.

EXERCISE CONTINUED:

VILLAGE	FIRST CHOICE	SECOND CHOICE
A		
B		
C		
D		
E		
F		
G		
H		
I		

REFERENCE MATERIAL : - Lecture notes.
- Kalbermattan, Appropriate Sanitation Alternatives: A Planning and Design Manual.

WEDCANA DISTRICT



E X E R C I S E O U T L I N E

FOR

COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	**s-2** Algorithm for selecting appropriate sanitation technologies in rural areas.
NUMBER OF SESSIONS	:	2-3
OBJECTIVES	:	To apply the presented knowledge on low-cost sanitation and the use of algorithms for selecting appropriate technologies to the development of a algorithm for rural areas.
ACHIEVEMENTS	:	To understand and be able to apply algorithms for the selection of appropriate sanitation technologies in rural areas.
DESCRIPTION	:	The exercise is preceded by the introductory lecture on low-cost sanitation options and application of algorithms for the selection of appropriate technologies (Lecture Outline S-3). The exercise takes the algorithm that has been presented by Kalbermattan in his Planning and Design Manual. The participants are requested to study and discuss this algorithm seriously, and to adopt it for a rural area (in Tanzania). The adopted algorithm should thus have relevant and area specific questions. Groups of 5-8 participants should elaborate and discuss the algorithm. One or two sessions are available for this group work. In another session the results are presented and discussed to other groups, and reports are submitted to the Course Coordinator.

EXERCISE OUTLINE CONTINUED:

BACKGROUND LITERATURE	:	- Lecture notes. - Kalbermattan (1982), Appropriate Sanitation Alternatives: A Planning and Design Manual.
HAND-OUTS	:	Exercise description, Kalbermattan algorithm and paper.
EXERCISE AIDS	:	
AUDIO-VISUAL MATERIAL	:	
DISCUSSION TOPICS	:	What uncertainties did you come across that do need additional information?

Annexes: - Exercise description and copy of Kalbermattan's algorithm.

TH COURSE ON LOW-COST WATER SUPPLY AND SANITATION

EXERCISE	:	Algorithm for selecting appropriate sanitation technologies in rural areas.
DATE	:	
DATE OF SUBMISSION	:	
DESCRIPTION	:	The exercise takes the algorithm that has been presented by Kalbermattan in his Planning and Design Manual. The participants are requested to study and discuss this algorithm seriously, and to adopt it for a rural area (in Tanzania). The adopted algorithm should thus have relevant and area specific questions. Groups of 5-8 participants should elaborate and discuss the algorithm. One or two sessions are available for this group work. In another session the results are presented and discussed to other groups, and reports are submitted to the Course Coordinator.
REFERENCE MATERIAL	:	- Lecture notes. - Kalbermattan (1982), Appropriate Sanitation Alternatives: A Planning and Design Manual.

Figure 6—1. First-stage Algorithm for Selection of Sanitation Technology

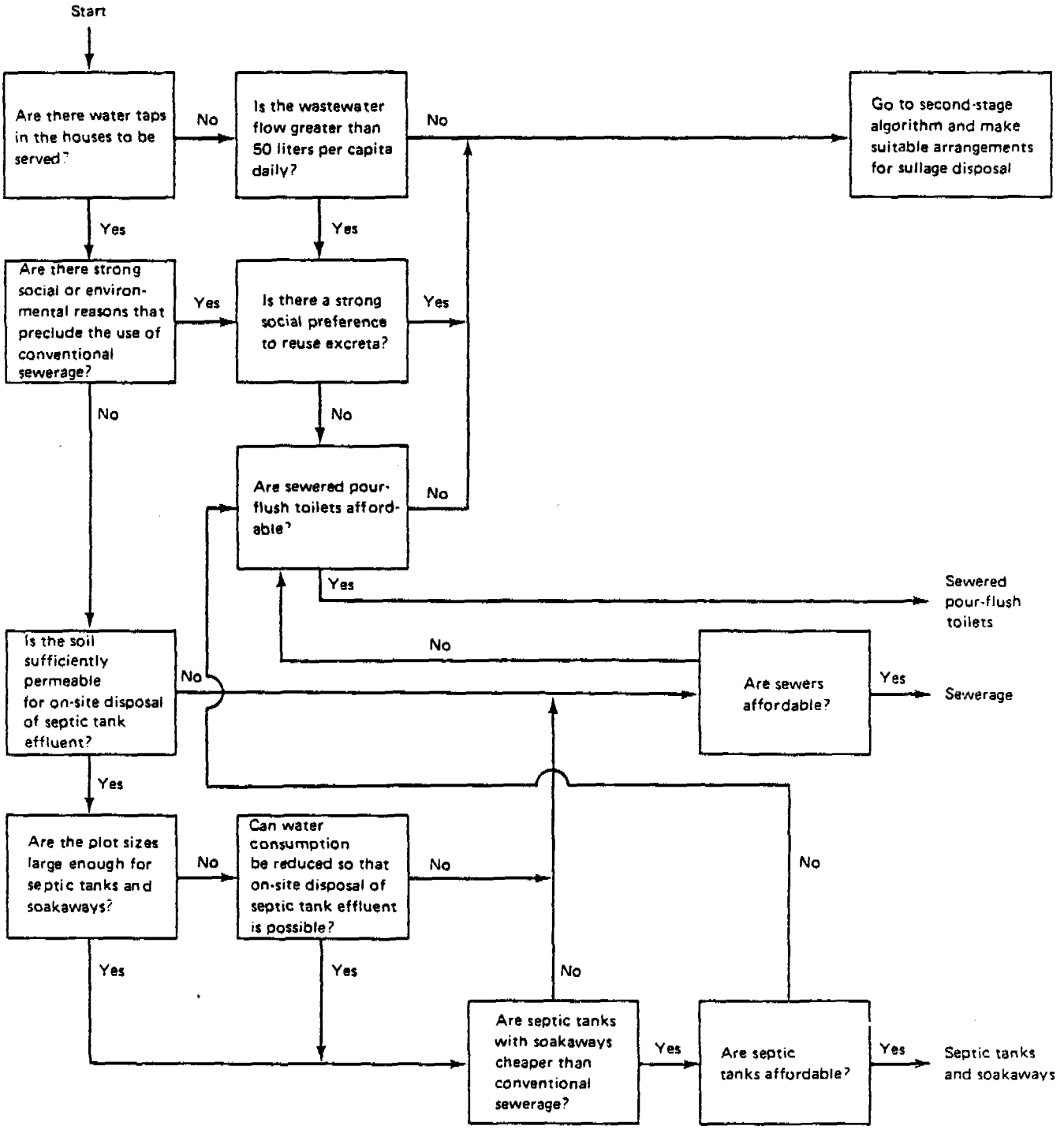


Figure 6–2. Second-stage Algorithm for Selection of Sanitation Technology

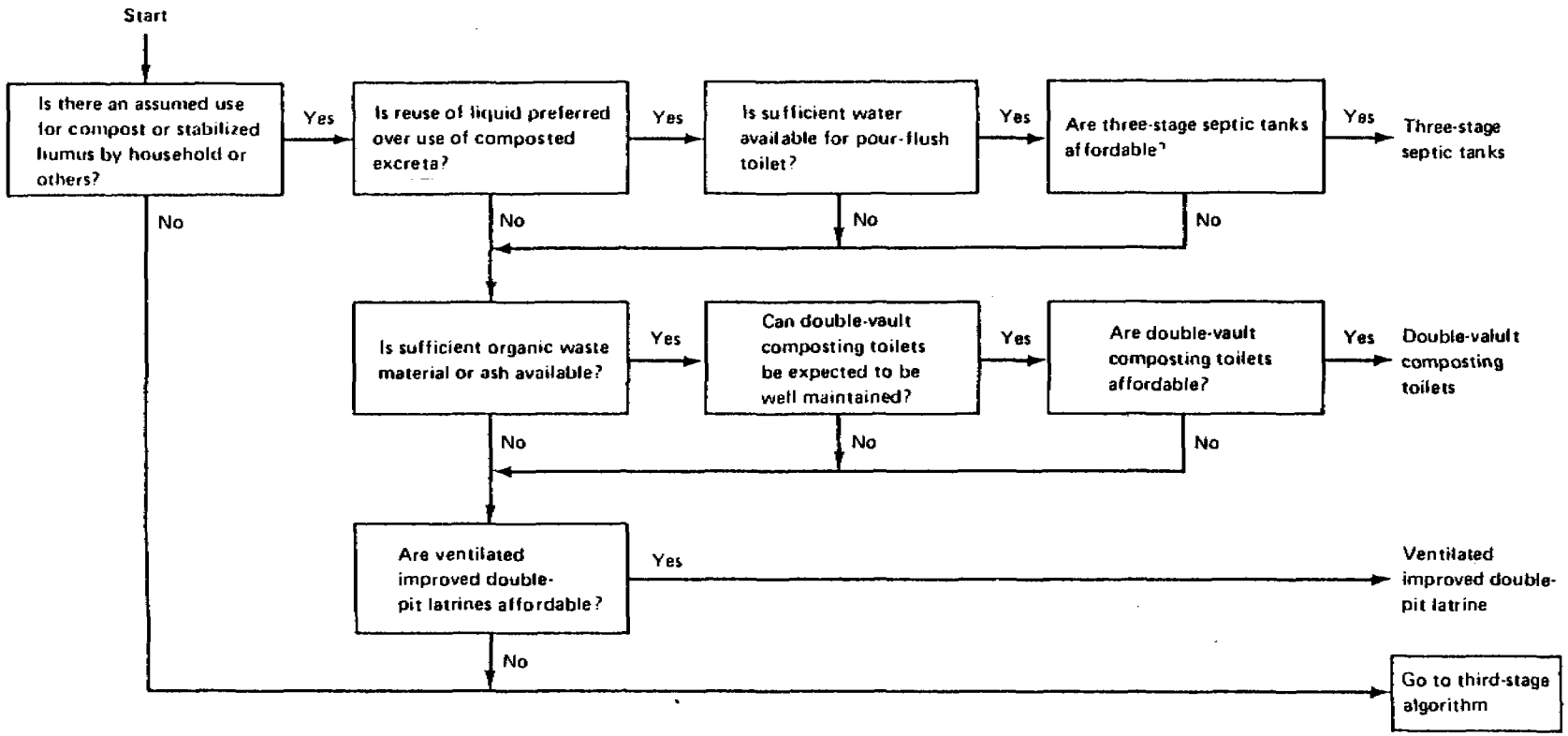
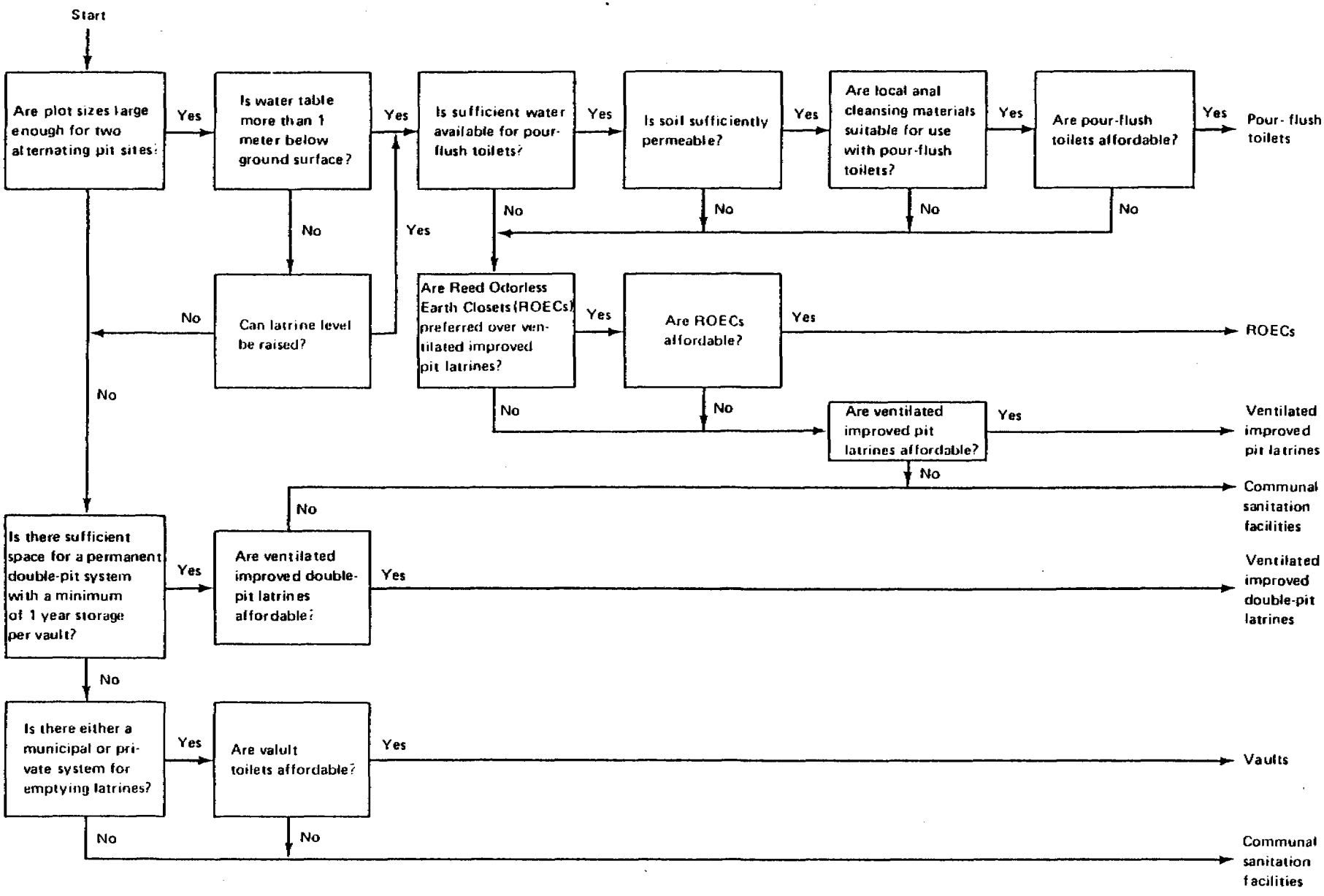


Figure 6–3. Third-stage Algorithm for Selection of Sanitation Technology



EXERCISE OUTLINE

FOR

COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	**s-3** Sanitation Design for an Urban Low-Income Neighborhood.
NUMBER OF SESSIONS	:	2-3
OBJECTIVES	:	To apply the presented knowledge on low-cost sanitation design on an realistic case of an urban low-income neighborhood by designing the sanitation options, and its organizational implications for public bodies and community.
ACHIEVEMENTS	:	To be able apply low-cost sanitation design guidelines on a presented case of an urban low-income neighborhood.
DESCRIPTION	:	The neighborhood shown and described in the Annexes is a poorly serviced area. The Ministry of Planning and Development has planned to upgrade the sanitation in this deprived area. In the long term sewer lines are planned for along the main roads. The existing septic tanks are in a bad condition due to lacking maintenance and regular emptying, it is quite common that septic tanks are overflowing and pollute the environment. The consultant LBD Ltd. on behalf of the Ministry of Health has been requested to make a proposal. The consultant assigned experts from different disciplines to a team that will draw and present this proposal.Besides proposing several technical sanitation options (individual, shared and public), also modes of cost recovery, operation, maintenance and its

EXERCISE OUTLINE CONTINUED

		organization, as well as social/cultural acceptability and constraints should be dealt with. The present and future options you proposed for water supply should be integrated. Make use of the algorithms on pages 47-53 in the below mentioned literature. Several groups can be made of a size of 5-8 participants, each dealing with the exercise. About 2 sessions are required for the individual group activities and 1 for presentations and discussions. The proposal are presented and discussed in the whole group and reports submitted to the Course Coordinator.
READING MATERIAL	:	J.M.Kalbermattan (1982), Appropriate Sanitation Alternatives; A Planning and Design Manual. Part One and Two, pp. 10-57.
HAND-OUTS	:	Description exercise, reading material list and annexes physical and socio-economic data on urban project neighborhood (pocket calculators).
EXERCISE AIDS	:	Pocket calculators, drawing paper and pencils.
AUDIO-VISUAL MATERIAL	:	H.Mengers, IHS, has slides of the area before upgrading (country: Guinea-Bissau, city: Bissau).
DISCUSSION TOPICS	:	- To what extent is the community involved in the decision making and execution of the different project stages (including Operation and Maintenance)? - Is your proposal low-cost and affordable? - Is your proposal easy upgradable in future?

EXERCISE OUTLINE CONTINUED

Annexes:

- Physical and Socio-economic Data on Project Neighborhood.
- Actual Responsibilities Chart at Neighborhood level.
- Rain-fall and temperatures graphs.
- 8 Drawings A3-size (scale 1:20,000) of Project Area, Altitudes, Water Supply Mains, Water Sources, Sanitation facilities, Drainage and Solid Waste Disposal, Road lay-out, non-thematic drawing Project Area.

TH COURSE ON LOW-COST WATER SUPPLY AND SANITATION

EXERCISE : SANITATION UPGRADING FOR AN EXISTING LOW INCOME NEIGHBORHOOD

WEEK :

DATE OF SUBMISSION:

DESCRIPTION : The neighborhood shown and described in the Annexes is a poorly serviced area. The Ministry of Planning and Development has planned to upgrade the sanitation in this deprived area. In the long term sewer lines are planned for along the main roads. The existing septic tanks are in a bad condition due to lacking maintenance and regular emptying, it is quite common that septic tanks are overflowing and pollute the environment.

The consultant LBD Ltd. on behalf of the Ministry of Health has been requested to make a proposal. The consultant assigned experts from different disciplines to a team that will draw and present this proposal. You are that team. Besides proposing several technical sanitation options (individual, shared and public), also modes of cost recovery, operation, maintenance and its organization, as well as social/cultural acceptability and constraints should be dealt with. Integrate the present and future options you proposed for water supply.

Make use of the algorithms on pages 47-53 in the below mentioned literature.

READING MATERIAL: J.M.Kalbermattan, Appropriate Sanitation Alternatives; A Planning and Design Manual. Part One and Two, pp. 10-57, 1982.

ANNEX

PHYSICAL AND SOCIO-ECONOMIC DATA ON PROJECT NEIGHBORHOOD
SURVEY RESULTS

Project area:	14.5 ha.
Morphology:	Sandy slightly clayey permeable soils. Surface sloping down from South-West to North-East.
First constructions:	1914
Settlement development:	Southern part was mainly built in 1940-1960, Northern part in 1960-1970.
Number of houses:	279
Building activities:	Little due to high material cost for maintenance and construction and relatively declining urban incomes.
Property plots:	Plots are irregular of size and 50% of the plots are based on land title documents given out in colonial period. These are not sanctioned by the, as private ownerships of plots are not accepted within the city boundaries. The other 50% of the plots are registered and leased by the Ministry.
House ownership:	75% of the houses is owned by its occupier, of which one-third rents a part of the house to others. 25% of the houses is rented to one or more households. Rents vary from US$ 3-30 per month; average US$ 8.
Total inhabitants:	4510
Annual growth:	5%
Average household size:	9.9 persons
Illiteracy:	32%
Ethnic groups:	Mandinga 47% (muslim), Mancanha 13% (christian), others 40% (mixed religions).
Family composition:	Mainly extended families.
Head of households:	28% female, 72% male.
Income:	Average US$ 70 per month. 1.8 earners per household. Official minimum wage US$ 55 per month.
Income distribution:	US$ per month 25- 50: 32% 50- 70: 34% 70- 90: 10% 90-110: 10% 110-150: 10% >150 : 4% Total: 100%
Employment:	40% at public sector (mainly male, stable income), 60% private sector (variable and fluctuating incomes).
Unemployment:	42%
Economic activities:	Various, mainly small scale. Most prominent are tailors and furniture workshops.

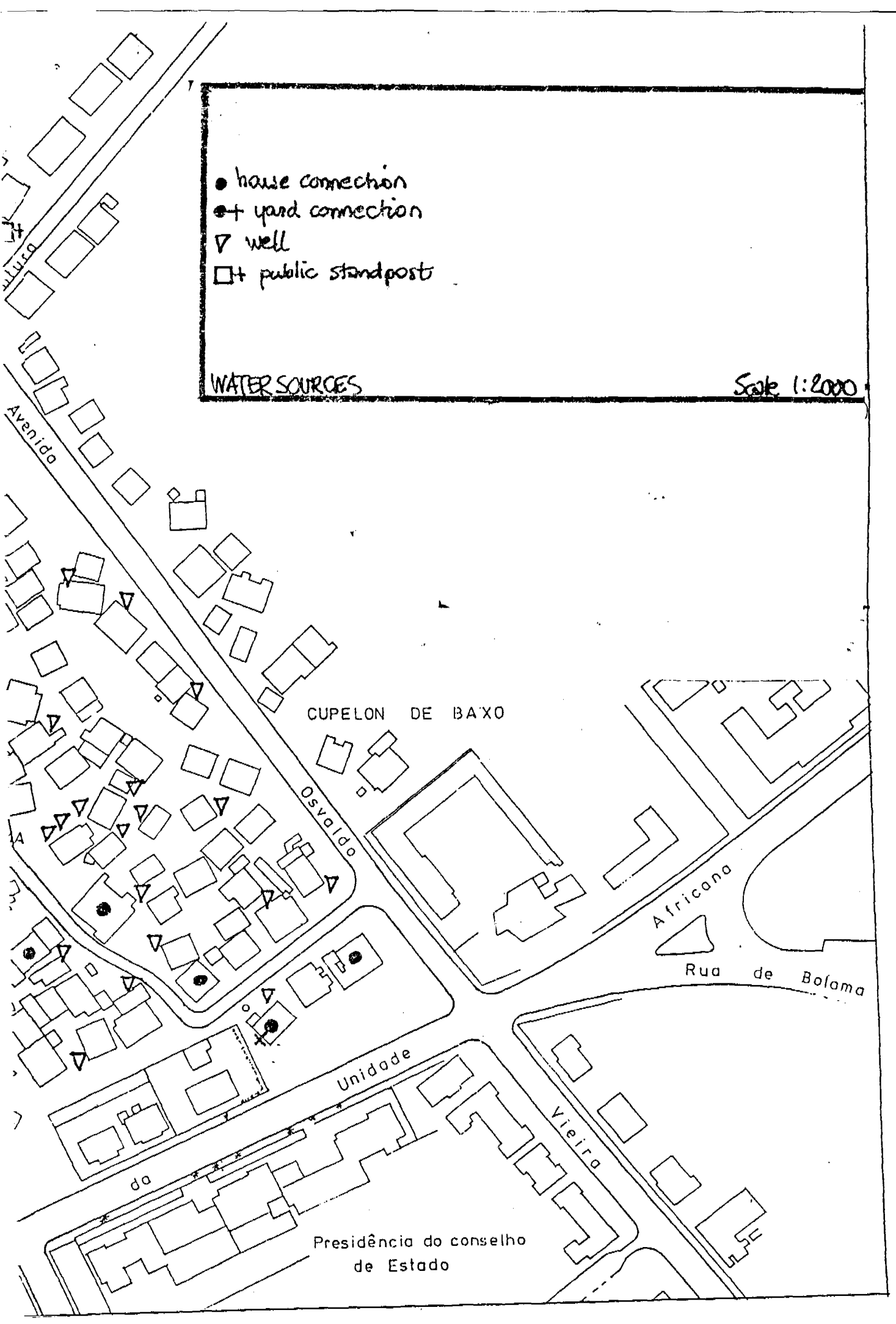
Neighborhood organizations:	Representative (political) neighborhood committee that has strong influence in the Southern part, a youth welfare organization and welfare organization for women.
Education and health facilities:	None
Drainage and solid waste collection:	Natural gullies and weekly solid waste collection only at edges of the neighborhood by vehicles of the Municipal Health Department.
Sanitation:	15% has uses flush latrines and septic tanks, 85% uses (shared) pit-latrines and water. No sewerage. Main operation responsibility for sanitation is with Municipal Health Department. Sewage treatment and discharge is responsibility of Ministry of Civil Works.
Water supply:	13% of the houses have private connection or yard connection (all located near to the mains), 87% use two public standpost and wells. Quality water supply: good. Quantity water supply: varying pressure and irregular supply. Wells: quality very bad (pathogens, minerals), but always supply. Depth water table: 8-15m. Main responsibility of operating water supply is with the municipal Water Corporation.
Water supply mains:	Along the main roads; diameter 100mm.
Roads:	Edging and centre road have asphaltic macadam. Unlined road side drains. Lanes in northern part leveled earth paths. Southern part mainly earth foot paths. One asphaltic access road up to the mosque. Road maintenance is with the Municipal Department of Public Works.
Aspirations inhabitants:	Regarding infrastructure, water supply is their main concern, thereafter health facilities and electricity. Willingness to contribute in labour and/or money is there. However prior aspiration is the improvement of the housing condition (roofing, plastering, extension).

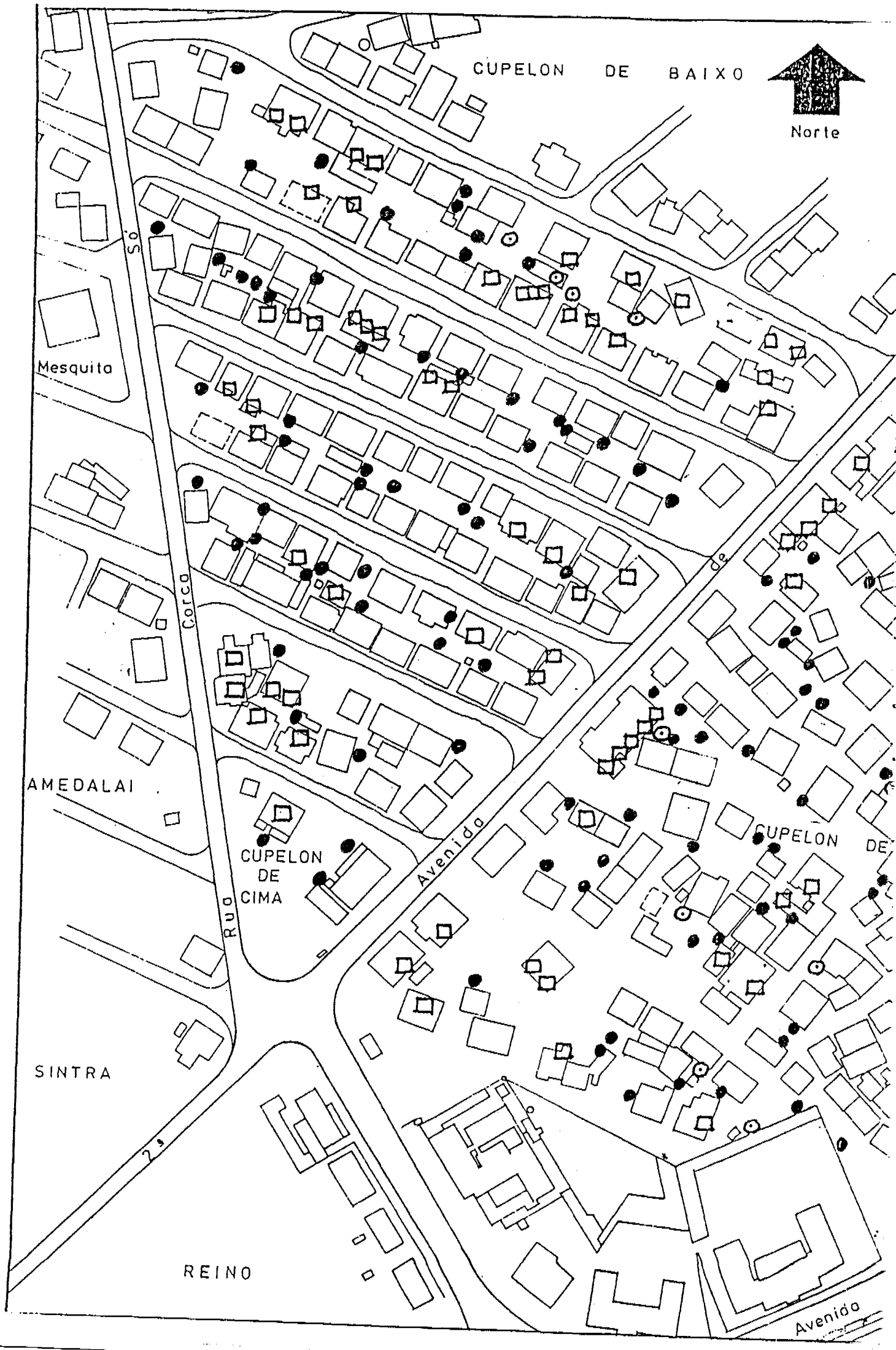
ACTUAL RESPONSIBILITIES AT NEIGHBORHOOD LEVEL

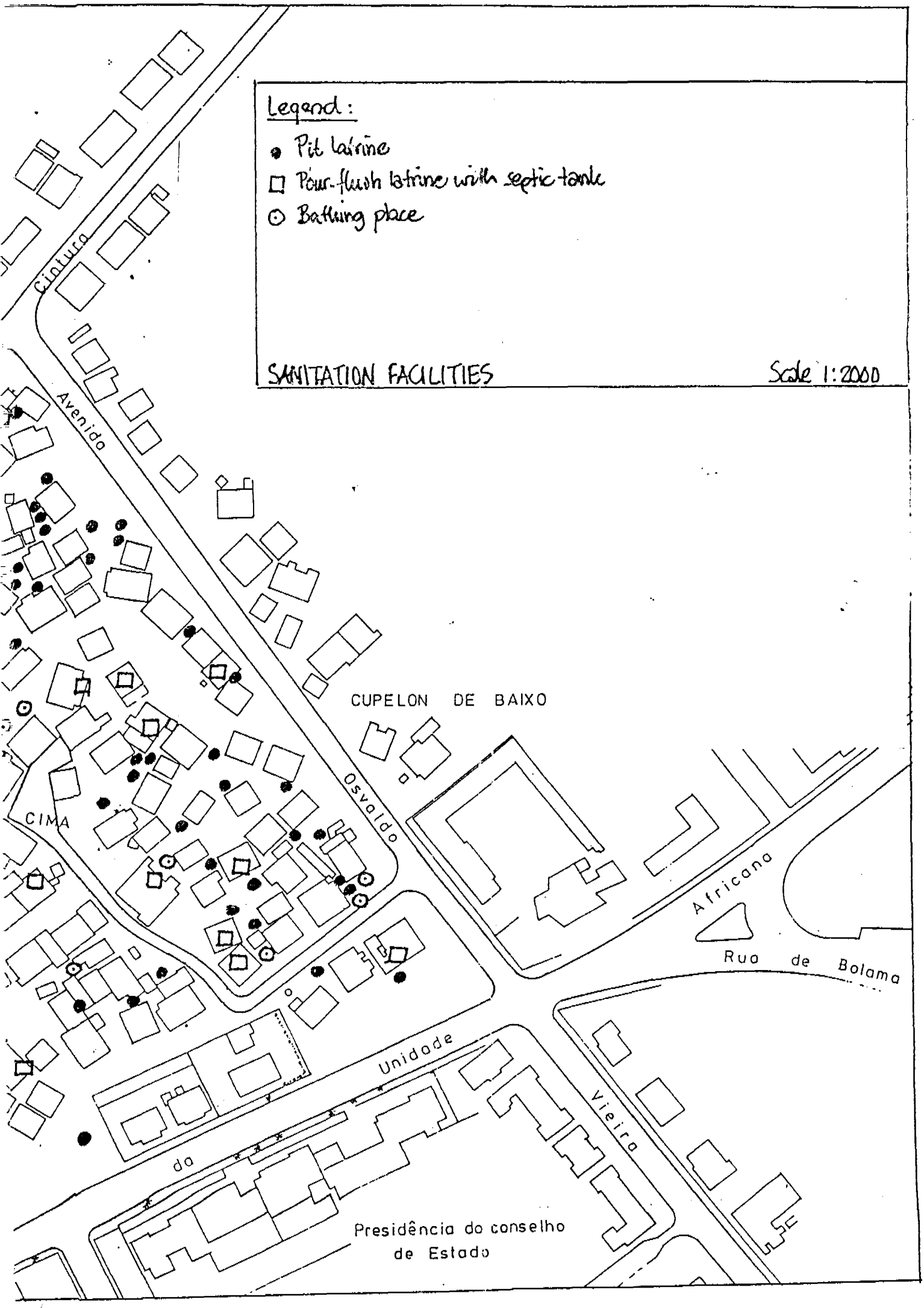
INFRASTRUCTURE RESPONSIBILITIES	WATER SUPPLY	SANITATION	DRAINAGE	SOLID WASTE	ROADS
PLANNING	MinPl&D	MinPl&D	MinPl&D	MinPl&D	MinPl&D
DESIGN	MinCW	MinH	MinCW	MinH	MinCW
IMPLEMENTATION	MinCW	MinH	MinCW	MinH	MinCW
SUPERVISION	MinCW MuWatCor	MinH MuHDep	MinCW MuPWDep	MinH MuHDep	MinCW MuPWDep
CONSTRUCTION	Contr (MuWatCor)	Contr	Contr	Contr	Contr
O&M	MuWatCor	MuHDep	MuPWDep	MuHDep	MuPWDep
FINANCE	MinFin	MinFin	MinFin	MinFin	MinFin
REVENUE COLLECTION	MuWatCor	-	-	-	-
PUBLIC HEALTH	MinH	MuHDep	-	MuHDep	-

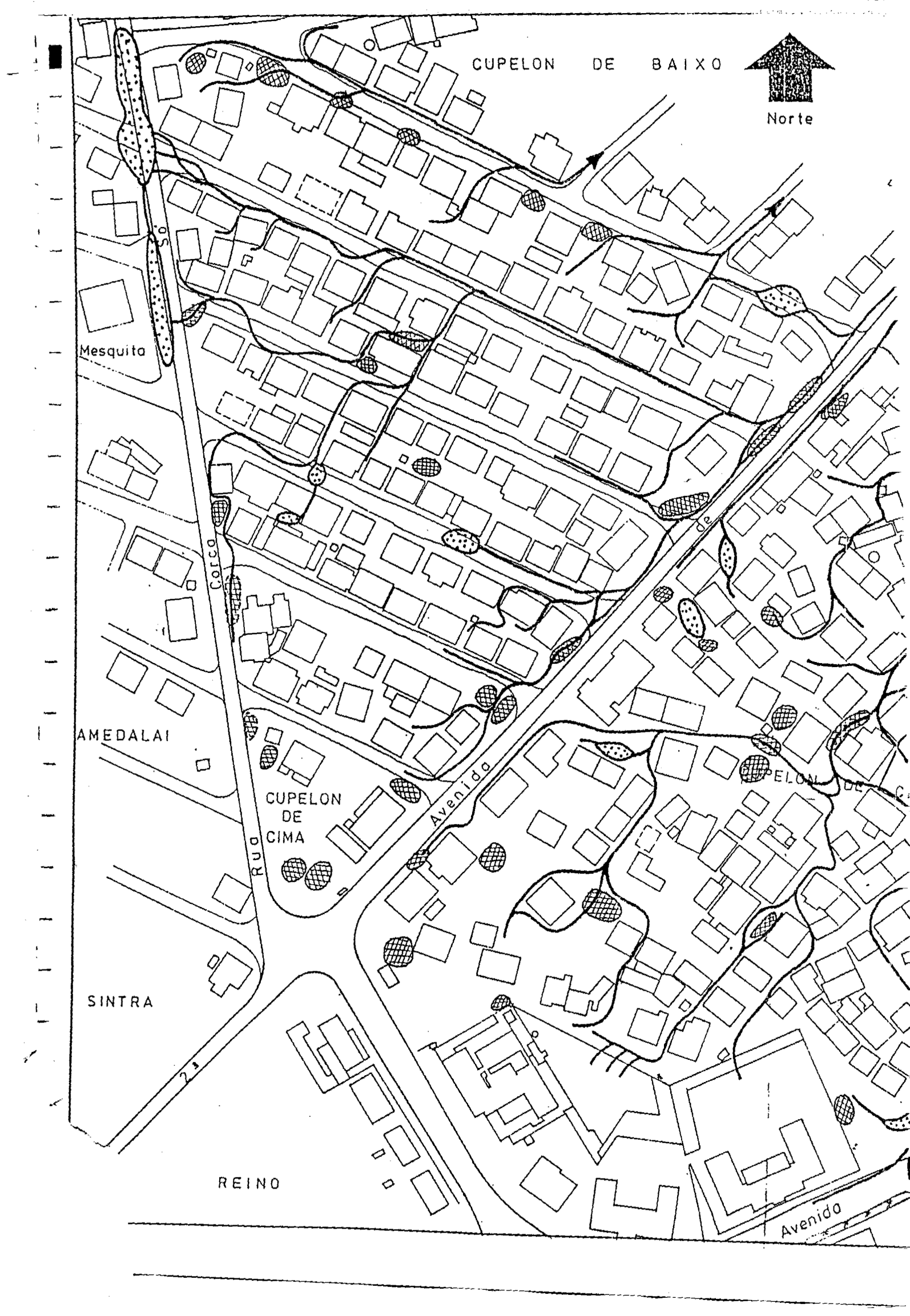
MinFin = Ministry of Finance
MinPl&D = Ministry of Planning and Development
MinCW = Ministry of Civil Works
MinH = Ministry of Health
MuWatCor = Municipal Water Corporation
MuHDep = Municipal Health Department
MuPWDep = Municipal Public Works Department
Contr = Contractors

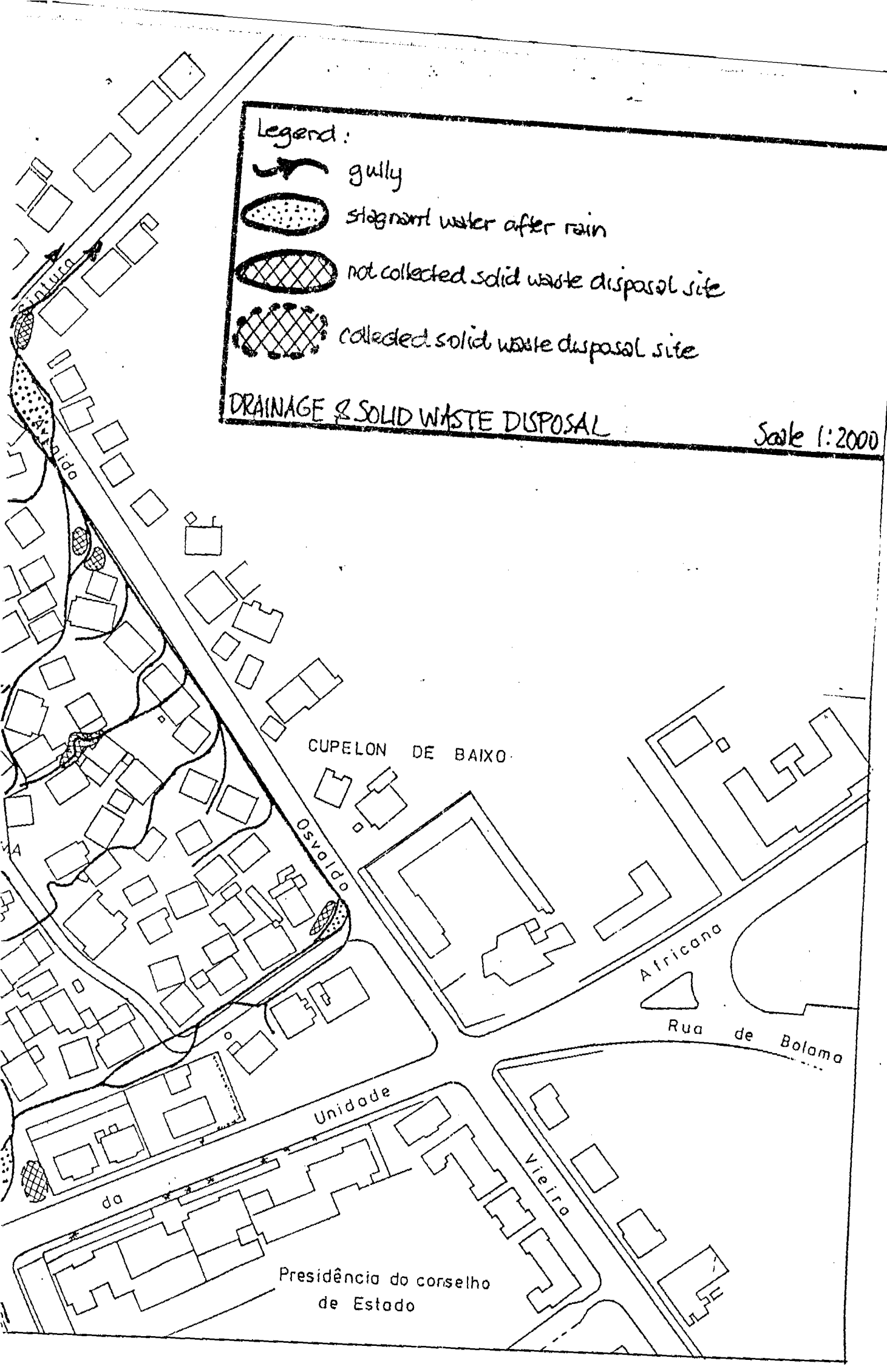

CUPELON DE BAIXO
Norte
Mesquita
Rua Corco
MEDALAI
CUPELON DE CIMA
Avenida
CUPELON DE
SINTRA
REINO
Avenida


● house connection
●+ yard connection
▽ well
□+ public standpost
WATER SOURCES
Scale 1:2000
Avenida
CUPELON DE BAIXO
Osvaldo
Africana
Rua de Bafama
Unidade
Vieira
da
Presidência do conselho
de Estado

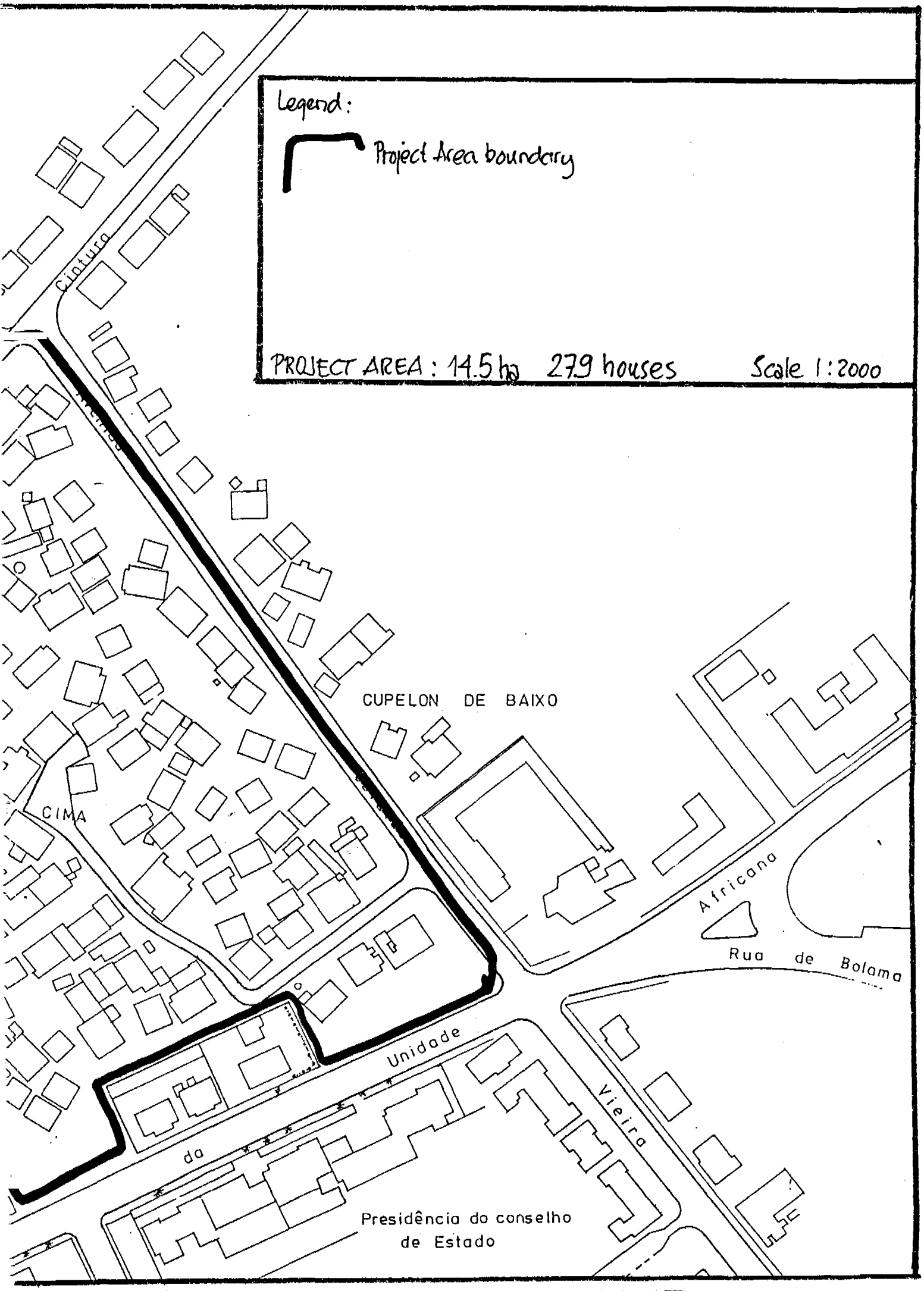

CUPELON DE BAIXO
Norte
Mesquita
Rua Corco
AMEDALAI
CUPELON DE CIMA
Avenida
CUPELON DE
SINTRA
REINO
Avenida


Legend :
Pit latrine
Pour-flush latrine with septic tank
Bathing place
SANITATION FACILITIES
Scale 1:2000
Cintura
Avenida
CUPELON DE BAIXO
Osvaldo
CIMA
Africana
Rua de Bolama
Unidade
do
Vieira
Presidência do conselho
de Estado


CUPELON DE BAIXO
Norte
Mesquita
Corco
AMEDALAI
CUPELON
DE
CIMA
Rua
Avenida
SINTRA
REINO
Avenida


Legend :
gully
stagnant water after rain
not collected solid waste disposal site
collected solid waste disposal site
DRAINAGE & SOLID WASTE DISPOSAL
Scale 1:2000
CUPELON DE BAIXO
Osvaldo
Africana
Rua de Bolama
Unidade
da
Vieira
Presidência do conselho
de Estado


CUPELON DE BAIXO
Norte
Mesquita
AMEDALAI
CUPELON DE CIMA
Avenida
CUPELON
SINTRA
REINO
Avenida


Legend:
Project Area boundary
PROJECT AREA : 14.5 ha 279 houses
Scale 1:2000
Cintura
CUPELON DE BAIXO
CIMA
Africana
Rua de Bolama
Unidade
da
Vieira
Presidência do conselho
de Estado

E X E R C I S E O U T L I N E

FOR

COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	s-4 Comparison of Water-borne Sanitation Systems.
NUMBER OF SESSIONS	:	2-3
OBJECTIVES	:	To elaborate the applicability, advantages and disadvantages of three water-borne systems (septic tanks, small-bore sewerage and conventional sewerage) in a systematic manner.
ACHIEVEMENTS	:	To be able to compare three water-borne system in a systematic manner, and to be able to specify the applicability, advantages and disadvantages of the three systems.
DESCRIPTION	:	The exercise is preceded by lectures that have dealt with septic tanks, small-bore sewerage and conventional sewerage (Lecture Outline S-4, and 6). Participants are requested to compare the three systems in a systematic manner, by: 1. specifying the different components of the systems. 2. specifying the advantages of every system, referring to the system components. 3. specifying the disadvantages of every system, referring to the system components. 4. To specify the magnitude of investment and running cost for a) households, and b) governments. 5. To draw conclusions.

EXERCISE OUTLINE CONTINUED:

		The exercise can be done in class or in groups of 5-8 persons. In the first case a participant should make a report on the class discussion and outcome. In the latter case every group prepares a report that is presented and discussed. Report are presented to the Course Coordinator.
BACKGROUND LITERATURE	:	- Handbook World Bank Module 5.2a, b and c. - Lecture notes.
HAND-OUTS	:	Exercise description, paper, copies of Handbook WB Modules 5.2.
EXERCISE AIDS	:	Overhead sheets.
AUDIO-VISUAL MATERIAL	:	World Bank Modules slide-sound show 5.2a-c.
DISCUSSION TOPICS	:	In what type of projects would such water-borne sanitation technologies be appropriate (in Tanzania)?

Annexes:
- Exercise description
- Outcome Exercise s-3 by participants 24th Course CHS, 3/3/89.

TH COURSE ON LOW-COST WATER SUPPLY AND SANITATION

EXERCISE : Comparison of Water-borne Sanitation Systems.

DATE :

DATE OF SUBMISSION :

DESCRIPTION : The exercise is preceded by lectures that have dealt with septic tanks, small-bore sewerage and conventional sewerage.

Participants are requested to compare the three systems in a systematic manner, by:
1. specifying the different components of the systems.
2. specifying the advantages of every system, referring to the system components.
3. specifying the disadvantages of every system, referring to the system components.
4. To specify the magnitude of investment and running cost for a) households, and b) governments.
5. To draw conclusions.

Results should be presented in class and a report should be submitted to the Course Coordinator.

REFERENCE MATERIAL : - Handbook World Bank Module 5.2a, b and c.
- Lecture notes.

OUTCOME EXERCISE S-3

BY PARTICIPANTS 24TH COURSE C.H.S., 3-3-1989

WATER-BORNE SYSTEM: ANALYSIS:	SEPTIC TANK:	SMALL-BORE SEWERAGE:	CONVENTIONAL SEWERAGE:
ELEMENTS:	- house connection - piping. - tank inlet, outlet, ventpipe, manholes. - flush toilet. - soakaway pit. - cesspool. - desludging operations.	- flush toilet. - house connection. - interceptor tank. - piping. - inlets, outlets, vent pipe, sewer. - pumping stations. - inspection manhole - treatment plant, and discharge.	- flush toilet. - house connection. - sewerlines. - inspection manhole - pumping stations. - treatment plant and discharge.
ADVANTAGES:	- on-site treatm. - anaerobic treatm - suitable in low and medium dense areas. - upgradable to small-bore sewer - local construct. materials. - little equipment	- semi-skilled labour required. - cheaper to install - flexible lay-out. - little excavation - low water use. - upgradable to convent. sewerage. - suitable in high density areas. - low cost. - no aerobic treatm.	- complete waste water treatment. - safe disposal at plots. - in dense areas applicable. - safe effluent after treatment. - sophisticated technology.
DISADVANT.:	- not in dense areas. - water consumpt. - high initial costs for househ - skilled labour to construct and desludge. - desludging and discharge system required. - truck access to plot required. - health risks at plot in case of overflowing.	- centralized maint. - desludging and discharge system required. - truck access req'd - risk of illegal connection without interceptors. - backflow risks. - health risks at plot. - skilled labour.	- highly skilled labour req'd. - high initial costs - intensive maint. - water consumption. - sophisticated equipment req'd. - not in unplanned areas. - high O&M costs. - complicated plann. - not flexible. - blockages in case of insuff. water supply.

CONCLUSIONS:
- Conventional sewerage in planned areas, city centres and dense areas.
- Small bore sewerage in unplanned areas of medium and low densities areas feasible. Not feasible in accessible areas.
- Septic tanks in low and medium dense unplanned areas feasible. Upgradation potentials. Not feasible in inaccessible areas.

COST COMPARISON WATER-BORNE SANITATION SYSTEMS.

WATER-BORNE SYSTEM:	SEPTIC TANK:		SMALL-BORE SEWERAGE:		CONVENTIONAL SEWERAGE:	
LEVEL:	Initial	Recurrent	Initial	Recurrent	Initial	Recurrent
HOUSEHOLDS:	HIGH	HIGH	VARIABLE	MEDIUM	VARIABLE	LOW
GOVERNMENT: (LOCAL)	LOW-MEDIUM	MEDIUM	MEDIUM	MEDIUM	HIGH	HIGH

E X E R C I S E O U T L I N E

FOR

COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	**e-1** Laboratory tests for Water Supply and Sanitation.
NUMBER OF SESSIONS	:	2-3
OBJECTIVES	:	To understand and to provide a basic skill to conduct laboratory test for Water Supply and Sanitation.
ACHIEVEMENTS	:	To be able to reproduce the basic steps of laboratory test for Water Supply and Sanitation.
DESCRIPTION	:	The laboratory test are preceded by a instruction lecture on laboratory test for Water Supply and Sanitation (Lecture Outline E-3). At a laboratory (to be identified) participants are demonstrated how to conduct: 1. Total coliform test. 2. E-coli test. 3. Staphylococcus Aureus test. Next, participants in groups of 5-8 people are requested to conduct the tests. The groups are assisted by a laboratory assistant. The groups need to report on the tests: methodology, requirements, execution, the results and conclusions. The results are presented in class and discussed, and the report submitted to the Course Coordinator.

EXERCISE OUTLINE CONTINUED:

BACKGROUND LITERATURE	:	- PHE Manuals (1988), Ardhi Institute. - Lecture notes.
HAND-OUTS	:	- Exercise description/instruction.
EXERCISE AIDS	:	Laboratory equipment.
AUDIO-VISUAL MATERIAL	:	
DISCUSSION TOPICS	:	When in Water Supply and Sanitation projects would these test prove their value?

Annexes: - Exercise description.

TH COURSE ON LOW-COST WATER SUPPLY AND SANITATION

EXERCISE : LABORATORY TESTS FOR WATER SUPPLY AND SANITATION PROJECTS.

DATE :

DATE OF SUBMISSION :

DESCRIPTION : The laboratory test are preceded by a instruction lecture on laboratory test for Water Supply and Sanitation (Lecture Outline E-3).

At a laboratory (to be identified) participants are demonstrated how to conduct:
1. Total coliform test.
2. E-coli test.
3. Staphylococcus Aureus test.

Next, participants in groups of 5-8 people are requested to conduct the tests.

The groups are assisted by a laboratory assistant. The groups need to report on the tests: methodology, requirements, execution, the results and conclusions.

The results are presented in class and discussed, and the report submitted to the Course Coordinator.

REFERENCE MATERIAL : - PHE Manuals (1988), Ardhi Institute.
- Lecture notes.

EXERCISE OUTLINE

FOR

COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	**p-1** Role-play for the implementation of an urban upgrading project.
NUMBER OF SESSIONS	:	2
OBJECTIVES	:	To improve the understanding by simulating the interaction between the different parties in the implementation of an urban upgrading project, with the focus upon the different interests of those parties.
ACHIEVEMENTS	:	To be able to understand and simulate the different interests of parties that are involved in urban upgrading projects.
DESCRIPTION	:	This exercise can be an extension of exercises w-1 and s-3, but can also be done independently when the general physical and socio-economic data on the urban neighborhood is provided. As preparation to this exercise the participants should closely read Shlomo Angel, Upgrading Slum Infrastructure; Divergent Objectives in Search of a Consensus, Third World Planning Review, Vol.5, No.1, February 1983, pp.5-22. Participants are requested to simulate a meeting during the feasibility stage of an urban upgrading project. In the Annex the neighborhood that has been selected for an upgrading project. The project comprises of the following: 1. More public tapstands (low income households). 2. Private connections (middle and high income households). 3. VIP-programme (low-income households). 4. Septic tanks upgrading programme (middle and high income households).

EXERCISE OUTLINE CONTINUED:

In a general meeting the project proposal will be discussed by 5 parties. Each party will try to defend its interests as described by the descriptions of actors, handed out to every actor (not shown to others of course). The 5 parties are

1. LBD Ltd. representatives, who have been involved in drafting project proposals. In Angel's terms they are the "housers".
2. Municipal engineers of the Municipal Water Corporation and Health departments.
3. Politicians, who are active in this period of forthcoming elections.
4. International donors.
5. The slum dwellers.

A chairman should be chosen (participant, or Course Coordinator). The chairman will take minutes of the meeting for the exercise report.

The participants should use the objectives and arguments given in Angel's article and add their own arguments to prepare themselves for the meeting. One should distinguish what to demand and what to offer (compromise) in respect of
- physical implementation;
- (social) organization;
- financial contribution.

Those main points should be written down and handed over to the chairman at the end of the exercise for the report.

It is recommended to appoint a spokesman/women for every party. It is the right of the other group members to interrupt the discussions to correct or replace the spokesman/women, when he/she is e.g. too compromising.

It is recommended to have two rounds. Before the first round (approx. 20 minutes) the groups should have time to lobby (10-20 minutes). The first meeting starts and the groups will try to compromise as little as possible. After 20 minutes. There will be opportunity to consult the other group members and to lobby again with the other parties (20 minutes). Then the second meeting starts and the chairman will try to come to some conclusion (which is not the same as a compromise!).

EXERCISE OUTLINE CONTINUED:

		The chairman will collect the main points of the parties and write out the minutes. The exercise will be evaluated and conclusions drawn in respect of its relevance and level of reality.
BACKGROUND LITERATURE	:	- Shlomo Angel, Upgrading Slum Infrastructure; Divergent Objectives in Search of a Consensus, Third World Planning Review, Vol.5, No.1, February 1983, pp.5-22.
HAND-OUTS	:	Exercise description and roles description after Angel's article.
EXERCISE AIDS	:	
AUDIO-VISUAL MATERIAL	:	
DISCUSSION TOPICS	:	How relevant is such a simulation, what can we learn out of it? Is the level of reality high?

Annexes: - Exercise description and roles description after Angel's article.

TH COURSE ON LOW-COST WATER SUPPLY AND SANITATION

EXERCISE : Role-play for the implementation of an urban upgrading project.

DATE :

DATE OF SUBMISSION :

DESCRIPTION : As preparation to this exercise the participants should closely read Shlomo Angel, Upgrading Slum Infrastructure; Divergent Objectives in Search of a Consensus, Third World Planning Review, Vol.5, No.1, February 1983, pp.5-22.

Participants are requested to simulate a meeting during the feasibility stage of an urban upgrading project. In the Annex the neighborhood that has been selected for an upgrading project. The project comprises of the following:
1. More public tapstands (low income households).
2. Private connections (middle and high income households).
3. VIP-programme (low-income households).
4. Septic tanks upgrading programme (middle and high income households).

In a general meeting the project proposal will be discussed by 5 parties. Each party will try to defend its interests as described by the descriptions of actors, handed out to every actor (not shown to others of course). The 5 parties are

1. LBD Ltd. representatives, who have been involved in drafting project proposals. In Angel's terms they are the "housers".
2. Municipal engineers of the Municipal Water Corporation and Health departments.
3. Politicians, who are active in this period of forthcoming elections.
4. International donors.
5. The slum dwellers.

A chairman should be chosen (participant, or Course Coordinator). The chairman will take minutes of the meeting for the exercise report.

The participants should use the objectives and arguments given in Angel's article and add their own arguments to prepare themselves for the

meeting. One should distinguish what to demand and what to offer (compromise) in respect of
- physical implementation;
- (social) organization;
- financial contribution.
Those main points should be written down and handed over to the chairman at the end of the exercise for the report.

It is recommended to appoint a spokesman/women for every party. It is the right of the other group members to interrupt the discussions to correct or replace the spokesman/women, when he/she is e.g. too compromising.

It is recommended to have two rounds. Before the first round (approx. 20 minutes) the groups should have time to lobby (10-20 minutes). The first meeting starts and the groups will try to compromise as little as possible. After 20 minutes. There will be opportunity to consult the other group members and to lobby again with the other parties (20 minutes). Then the second meeting starts and the chairman will try to come to some conclusion (which is not the same as a compromise!).

The chairman will collect the main points of the parties and write out the minutes.

The exercise will be evaluated and conclusions drawn in respect of its relevance and level of reality.

REFERENCE MATERIAL : Shlomo Angel, Upgrading Slum Infrastructure; Divergent Objectives in Search of a Consensus, Third World Planning Review, Vol.5, No.1, February 1983, pp.5-22.

ROLE DESCRIPTIONS EXERCISE P-2 ACCORDING TO S.ANGEL (Each description to be handed out to each party).

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1. THE HOUSERS; LBD LTD. CONSULTANTS:

- have a different professional backgrounds (social workers, health officers, architects and engineers);
- government fails to solve problems of housing and infrastructure;
- infrastructure plays an important role, gives aspiration for slum improvements, but is no guarantee for tenure security;
- assist and mobilize people for self-help improvements; and
- remove obstacles and constraints for this process.

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2. MUNICIPAL ENGINEERS:

- are professionals with engineering background;
- infrastructure serves health improvement;
- infrastructure is a technical problem;
- high standards and full coverage (= all components)
- low standards disapproved for its low quality. low status and high (expected) maintenance costs;
- standardization;
- low standard infrastructure is a temporary measure, preceding upgrading or clearance;
- sectoral approach, no integrated approach;
- community participation is troublesome, causing delays, they lack professional judgement, not effective;
- integrated approach not required; and
- due to favorable location, middle and high income housing is planned for in the long run.

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3. POLITICIANS:

- belonging to national elite;
- casual contact with the poor;
- support to poor opportunistic; serves political goals;
- slums are sore in the eye, affects political prestige (competence);
- loyalty and political stability main focus;
- improvement should serve visible improvement and gaining support of electorate;
- community involvement is not main focus;
- lower standards allowed as it serves goals; and
- slum upgrading is fashionable issue (publicity).

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4. INTERNATIONAL DONORS:

- Objective: economic development of the country;
- Rural development has main focus (less politicized), as well as industrialization;
- urban slum upgrading only side objective;
- missionaries of international paradigms's;
- financial resources is their main pressure instrument;
- tailoring towards political circumstances;
- infrastructure has high rate of return;
- through slum upgrading slums are integrated in the formal housing market;
- cost recovery has highest priority for sake of replicability; and
- lowering standards is acceptable.

5. SLUM DWELLERS:

- installation of infrastructure should be free of charge, as in other well-off residential areas;
- installation of infrastructure should be financed from general means;
- avoid eviction by government;
- secure cheap location to live;
- avoid labour input without payment;
- avoid payment for low priority services;
- government should provide;
- distrust of any government action (new exploitation, eviction); and
- hoping for economic and health benefits, as well as land tenure. Infrastructure only side objective, except for water.

EXERCISE OUTLINE

FOR

COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	**p-2** Planning of project and post-project tasks and roles for an urban upgrading project.
NUMBER OF SESSIONS	:	2
OBJECTIVES	:	To discuss and elaborate the best planning of project and post-project tasks and roles for an urban upgrading project.
ACHIEVEMENTS	:	To be able to formulate how project and post-project tasks and roles can be planned best.
DESCRIPTION	:	The exercise is preceded by a lecture about the project cycle (Lecture Outline P-1), and/or by the exercises w-1 and s-3. The case that will be used is the same as the one of exercise w-1 and s-3. Main focus of this exercise is the Chart "Actual Responsibilities at Neighborhood Level", included in the Annex. One can have a lot of doubt and criticism about the present distribution of responsibilities. A special Presidential Commission has been installed to review this present distribution of responsibilities (see Chart in Annex). The Presidential Commission has the following tasks:

EXERCISE OUTLINE CONTINUED:

	1. to review the present distribution of responsibilities in respect of upgrading projects. 2. To detail the different tasks and actions in each planning stage, i.e. Planning, Design, Implementation, Supervision, Construction, Operation, Maintenance and Evaluation, but also the tasks in respect of Finance, Revenue Collection and Public Health. 3. To advise for the improvement of the distribution of responsibilities, and what measures are required to come to this improved situation, and what disadvantages will exist in the new situation. Groups of 5-8 participants will constitute this Presidential Commission and work out these assigned tasks. This work might take 1-2 sessions. A report is made dealing with the three tasks and will be presented in class and discussed. The groups will present their findings on task 1, discuss it, draw conclusions and then go on with their findings on task 2, etc. Report will be submitted to the Course Coordinator. The presentations might take 1 or 2 sessions, as discussion is crucial.
BACKGROUND LITERATURE :	- Baum, The Project Cycle, Third World Planning Review, 1978. - Courtney, Urban Project Implementation: some insights from the practitioner, World Bank paper, 1986. - Lecture notes P-1.
HAND-OUTS :	- Exercise description and urban neighborhood description, including Chart "Actual Responsibilities at Neighborhood Level". - taken from literature.
EXERCISE AIDS :	Large sheet of table.
AUDIO-VISUAL MATERIAL :	None.
DISCUSSION TOPICS :	If we consider the interests of the slum dwellers only, what distribution of responsibilities would be the best?

Annexes: - Exercise description, description urban neighborhood, and Chart "Actual Responsibilities at Neighborhood Level".

TH COURSE ON LOW-COST WATER SUPPLY AND SANITATION

EXERCISE : Planning of project and post-project tasks and roles for an urban upgrading project.

DATE :

DATE OF SUBMISSION :

DESCRIPTION : The exercise is preceded by a lecture about the project cycle (Lecture Outline P-1), and/or by the exercises w-1 and s-3.

The case that will be used is the same as the one of exercise w-1 and s-3. Main focus of this exercise is the Chart "Actual Responsibilities at Neighborhood Level", included in the Annex. One can have a lot of doubt and criticism about the present distribution of responsibilities.

A special Presidential Commission has been installed to review this present distribution of responsibilities (see Chart in Annex). The Presidential Commission has the following tasks:

1. To review the present distribution of responsibilities in respect of upgrading projects.
2. To detail the different tasks and actions in each planning stage, i.e. Planning, Design, Implementation, Supervision, Construction, Operation, Maintenance and Evaluation, but also the tasks in respect of Finance, Revenue Collection and Public Health.
3. To advise for the improvement of the distribution of responsibilities, and what measures are required to come to this improved situation, and what disadvantages will exist in the new situation.

Groups of 5-8 participants will constitute this Presidential Commission and work out these assigned tasks. This work might take 1-2 sessions. A report is made dealing with the three tasks and will be presented in class and discussed. The groups will present their findings on task 1, discuss it, draw conclusions and then go on with their findings on task 2, etc.

EXERCISE CONTINUED:

	The Commission's Report will be submitted to the Course Coordinator.
REFERENCE MATERIAL :	- Baum, The Project Cycle, Third World Planning Review, 1978. - Courtney, Urban Project Implementation: some insights from the practitioner, World Bank paper, 1986. - Lecture notes.

ANNEX

PHYSICAL AND SOCIO-ECONOMIC DATA ON PROJECT NEIGHBORHOOD SURVEY RESULTS

Project area:	14.5 ha.
Morphology:	Sandy slightly clayey permeable soils. Surface sloping down from South-West to North-East.
First constructions:	1914
Settlement development:	Southern part was mainly built in 1940-1960, Northern part in 1960-1970.
Number of houses:	279
Building activities:	Little due to high material cost for maintenance and construction and relatively declining urban incomes.
Property plots:	Plots are irregular of size and 50% of the plots are based on land title documents given out in colonial period. These are not sanctioned by the, as private ownerships of plots are not accepted within the city boundaries. The other 50% of the plots are registered and leased by the Ministry.
House ownership:	75% of the houses is owned by its occupier, of which one-third rents a part of the house to others. 25% of the houses is rented to one or more households. Rents vary from US$ 3-30 per month; average US$ 8.
Total inhabitants:	4510
Annual growth:	5%
Average household size:	9.9 persons
Illiteracy:	32%
Ethnic groups:	Mandinga 47% (muslim), Mancanha 13% (christian), others 40% (mixed religions).
Family composition:	Mainly extended families.
Head of households:	28% female, 72% male.
Income:	Average US$ 70 per month. 1.8 earners per household. Official minimum wage US$ 55 per month.
Income distribution:	US$ per month 25- 50: 32% 50- 70: 34% 70- 90: 10% 90-110: 10% 110-150: 10% >150 : 4% Total: 100%
Employment:	40% at public sector (mainly male, stable income), 60% private sector (variable and fluctuating incomes).
Unemployment:	42%
Economic activities:	Various, mainly small scale. Most prominent are tailors and furniture workshops.

Neighborhood organizations:	Representative (political) neighborhood committee that has strong influence in the Southern part, a youth welfare organization and welfare organization for women.
Education and health facilities:	None
Drainage and solid waste collection:	Natural gullies and weekly solid waste collection only at edges of the neighborhood by vehicles of the Municipal Health Department.
Sanitation:	15% has uses flush latrines and septic tanks, 85% uses (shared) pit-latrines and water. No sewerage. Main operation responsibility for sanitation is with Municipal Health Department. Sewage treatment and discharge is responsibility of Ministry of Civil Works.
Water supply:	13% of the houses have private connection or yard connection (all located near to the mains), 87% use two public standpost and wells. Quality water supply: good. Quantity water supply: varying pressure and irregular supply. Wells: quality very bad (pathogens, minerals), but always supply. Depth water table: 8-15m. Main responsibility of operating water supply is with the municipal Water Corporation.
Water supply mains:	Along the main roads; diameter 100mm.
Roads:	Edging and centre road have asphaltic macadam. Unlined road side drains. Lanes in northern part leveled earth paths. Southern part mainly earth foot paths. One asphaltic access road up to the mosque. Road maintenance is with the Municipal Department of Public Works.
Aspirations inhabitants:	Regarding infrastructure, water supply is their main concern, thereafter health facilities and electricity. Willingness to contribute in labour and/or money is there. However prior aspiration is the improvement of the housing condition (roofing, plastering, extension).

ACTUAL RESPONSIBILITIES AT NEIGHBORHOOD LEVEL

INFRASTRUCTURE RESPONSIBILITIES	WATER SUPPLY	SANITATION	DRAINAGE	SOLID WASTE	ROADS
PLANNING	MinPl&D	MinPl&D	MinPl&D	MinPl&D	MinPl&D
DESIGN	MinCW	MinH	MinCW	MinH	MinCW
IMPLEMENTATION	MinCW	MinH	MinCW	MinH	MinCW
SUPERVISION	MinCW MuWatCor	MinH MuHDep	MinCW MuPWDep	MinH MuHDep	MinCW MuPWDep
CONSTRUCTION	Contr (MuWatCor)	Contr	Contr	Contr	Contr
O&M	MuWatCor	MuHDep	MuPWDep	MuHDep	MuPWDep
FINANCE	MinFin	MinFin	MinFin	MinFin	MinFin
REVENUE COLLECTION	MuWatCor	-	-	-	-
PUBLIC HEALTH	MinH	MuHDep	-	MuHDep	-

MinFin = Ministry of Finance
MinPl&D = Ministry of Planning and Development
MinCW = Ministry of Civil Works
MinH = Ministry of Health
MuWatCor = Municipal Water Corporation
MuHDep = Municipal Health Department
MuPWDep = Municipal Public Works Department
Contr = Contractors

EXERCISE OUTLINE

FOR

COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	**p-3** Methodology design for socio-economic data-collection for urban neighborhood upgrading project.
NUMBER OF SESSIONS	:	2
OBJECTIVES	:	To apply the knowledge gained on Data-collection methods by designing a research methodology for a urban upgrading project.
ACHIEVEMENTS	:	To be able to design a socio-economic data-collection method for a urban neighborhood upgrading project.
DESCRIPTION	:	The exercise is preceded by a lecture on Socio-economic data-collection for infrastructure projects (Lecture Outline P-3), where participants have been introduced to the data-collection methods of Participatory Observation (P), Interviewing Key-Informants (KI), Household Questionnaires (HQ) and Physical Site-surveys (S). The Data-Collection Methodologies have to designed for an urban neighborhood that is planned for an upgrading project. The project components are as follows: - more public tapstands, - construction of storm water drains, - levelling and paving of some roads, - collection of latrines (shared), - communal disposal points for solid waste, and - provision of materials for upgrading houses.

EXERCISE OUTLINE CONTINUED:

	The objectives of data-collection is to supply the planners and designers with adequate information in order to elaborate a project proposal. This information should comprise of: 1. Description of present infrastructure and housing conditions. 2. Demographic description. 3. Description of incomes. 4. Willingness to contribute for Operation and Maintenance of the amenities. 5. Capability to purchase and demand for building material. 6. Use of water. 7. Use of latrines. The participants are assigned in groups of 5-8 people to: a) Select the methods of data-collection for the required information (P, KI, HQ, S) and explain the selection. b) Operationalize the methods into checklist and questionnaires. This part of the assignment might take 1-2 sessions. The proposed methodologies are presented and discussed in class and the report is submitted to the Course Coordinator. This part might take one session.
BACKGROUND LITERATURE :	- DHV, Guidelines for socio-economic surveys. - H.Mengers (1989), Lecture Notes Methodologies for Socio-economic data-collection.
HAND-OUTS :	- Exercise description and annexes urban neighborhood.
EXERCISE AIDS :	
AUDIO-VISUAL MATERIAL :	
DISCUSSION TOPICS :	What is the approximate time and sequences planning of the data-collection methods you propose? How can we verify the reliability of the information we collect? Is qualitative data (P, KI) more valuable than quantitative data (HQ and S)?

Annexes: - Exercise description and annexes urban neighborhood.

TH COURSE ON LOW-COST WATER SUPPLY AND SANITATION

EXERCISE : METHODOLOGY DESIGN FOR SOCIO-ECONOMIC DATA-COLLECTION FOR AN URBAN NEIGHBORHOOD UPGRADING PROJECT.

DATE :

DATE OF SUBMISSION :

DESCRIPTION : The exercise is preceded by a lecture on Socio-economic data-collection for infrastructure projects (Lecture Outline P-3), where participants have been introduced to the data-collection methods of Participatory Observation (P), Interviewing Key-Informants (KI), Household Questionnaires (HQ) and Physical Site-surveys (S).

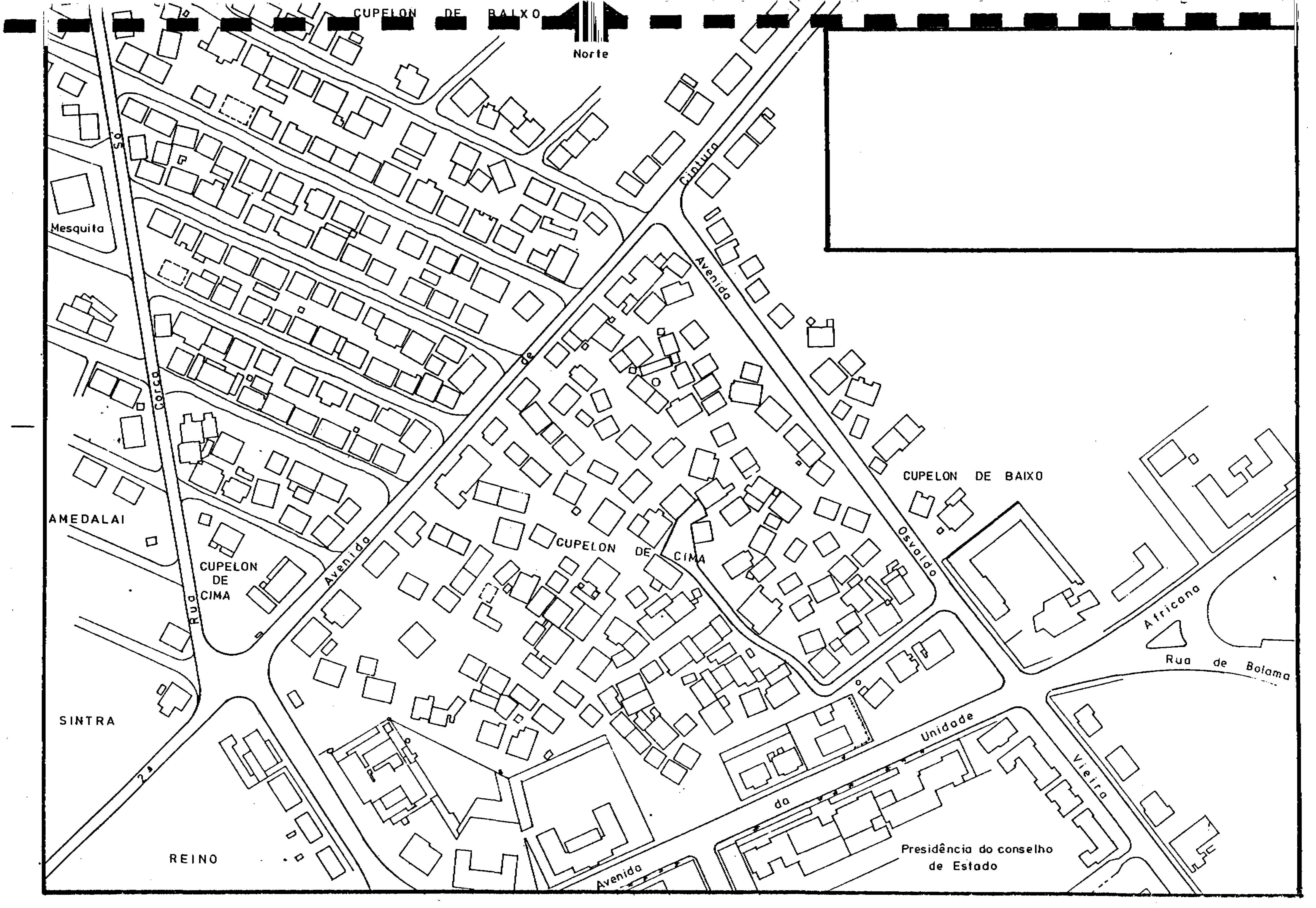
Methodologies for Data-Collection have to designed for an urban neighborhood that is included in an upgrading project. The project components are as follows:
- more public tapstands,
- construction of storm water drains,
- levelling and paving of some roads,
- collection of latrines (shared),
- communal disposal points for solid waste, and
- provision of materials for upgrading houses.

The objectives of data-collection is to supply the planners and designers with adequate information in order to elaborate a project proposal. This information should comprise of:
1. Description of present infrastructure and housing conditions.
2. Demographic description.
3. Description of incomes.
4. Willingness to contribute for Operation and Maintenance of the amenities.
5. Capability to purchase and demand for building material.
6. Use of water.
7. Use of latrines.

The participants are assigned in groups of 5-8 people to:
a) Select the methods of data-collection for the required information (P, KI, HQ, S) and explain the selection.
b) Operationalize the methods into checklist and questionnaires.
This part of the assignment might take 1-2 sessions.

The proposed methodologies are presented and discussed in class and the report is submitted to the Course Coordinator. This part might take one session.

REFERENCE MATERIAL : - DHV, Guidelines for socio-economic surveys.
- H.Mengers (1989), Lecture Notes Methodologies for Socio-economic data-collection.


CUPELON DE BAIXO
Norte
Cintura
Avenida
Osvaldo
CUPELON DE BAIXO
Mesquita
Avenida
de
CUPELON DE CIMA
AMEDALAI
CUPELON
DE
CIMA
Rua
Corca
Africana
Rua de Bolama
Unidade
da
Vieira
Avenida
Presidência do conselho
de Estado
SINTRA
REINO

EXERCISE OUTLINE

FOR

COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	**p-4** DEVELOPMENT OF TRAINING CURRICULUM FOR URBAN UPGRADING PROJECT.
NUMBER OF SESSIONS	:	2
OBJECTIVES	:	To apply the principles of human resource development in developing a training curriculum for a urban upgrading project.
ACHIEVEMENTS	:	To be able to apply the principles of human resource development.
DESCRIPTION	:	The exercise is preceded by a lecture that deals with human resource development (Lecture Outline P-7), and programming training. The urban upgrading project that has been dealt with in other exercises is taken as a case, for which a training curriculum needs to be developed. Groups of participants (5-8) are requested to develop training curriculums for: 1. locally selected inhabitants for the minor maintenance of public tapstands. 2. project storekeepers (per neighborhood one) to run a store for project tools, materials, equipment, spare parts, etc. Groups prepare the curriculums in about one session and present and discuss the outcome in class, which will take another session. Report are submitted to the Course Coordinator.

EXERCISE OUTLINE CONTINUED:

BACKGROUND LITERATURE	:	- Handbook World Bank Module 2.2. - UNESCO/UNEP, Handbook for the Organization and Design of Courses, Volume 1, July 1977, Table 5: Major Steps in Course Design, page 60. - IRC, Training Course "Evaluating Water Supply and Sanitation Projects"; Guide for Course Moderators, Training Series No.2, Chapters 1-3, pp. 3-34.
HAND-OUTS	:	- UNESCO/UNEP, page 60 - Exercise description.
EXERCISE AIDS	:	
AUDIO-VISUAL MATERIAL	:	
DISCUSSION TOPICS	:	How could we assess the effectiveness of the proposed training?

Annexes: - Exercise description.

TH COURSE ON LOW-COST WATER SUPPLY AND SANITATION

EXERCISE : DEVELOPMENT OF TRAINING CURRICULUM FOR URBAN UPGRADING PROJECT.

DATE :

DATE OF SUBMISSION :

DESCRIPTION : The exercise is preceded by a lecture that deals with human resource development, and programming of training.

The urban upgrading project that has been dealt with in other exercises is taken as a case, for which a training curriculum needs to be developed. Groups of participants (5-8) are requested to develop training curriculums for:
1. locally selected inhabitants for the minor maintenance of public tapstands.
2. project storekeepers (per neighborhood one) to run a store for project tools, materials, equipment, spare parts, etc.

Groups prepare the curriculums in about one session and present and discuss the outcome in class, which will take another session. Report are submitted to the Course Coordinator.

REFERENCE MATERIAL : - Handbook World Bank Module 2.2.
- UNESCO/UNEP, Handbook for the Organization and Design of Courses, Volume 1, July 1977, Table 5: Major Steps in Course Design, page 60.
- IRC, Training Course "Evaluating Water Supply and Sanitation Projects"; Guide for Course Moderators, Training Series No.2, Chapters 1-3, pp. 3-34.

EXERCISE OUTLINE

FOR

COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	**p-5** NETWORK PLANNING; IMPACT OF UNEXPECTED EVENTS.
NUMBER OF SESSIONS	:	1-2
OBJECTIVES	:	To apply the principles of project planning methodologies to a network planning example.
ACHIEVEMENTS	:	To be able to apply the principles of planning methodologies to a network planning example.
DESCRIPTION	:	The exercise has been preceded by a lecture that deals with project monitoring technologies (Lecture Outline P-12), in which network planning as one of the methodologies has been introduced. Participants are handed-out a Network Planning Chart (pp. 234, 235 and 236 of B.Bamberger and H.Hewitt (1986), Monitoring and Evaluating Urban Programs, A Handbook for Program Managers and Researchers, World Bank Technical Paper No.52). Participants are requested to specify what will be the consequences for the existing Chart when the following events occur: 1. The negotiations on land require more time than reasonably was expected. It has taken 8 weeks (node 7). 2. Next to the above event, one of the main land owners wants to see the detailed designs before he agrees to sell. In this way he hopes to influence the future destination of the land (node 3).

EXERCISE OUTLINE CONTINUED:

	3. The delivery of materials for the off-site services is seriously delayed due to clearance problems at the harbour customs. Extra delay; 5 weeks (node 13). 4. The interviews with applicants require more time (= 3 weeks, node 24), while the orientation sessions require less time (= 2 weeks, node 27). Draw and write down the consequences (one session). The results are presented in class and discussed briefly (half session). Results are submitted to the Course Coordinator.
BACKGROUND LITERATURE :	B.Bamberger and H.Hewitt (1986), Monitoring and Evaluating Urban Programs, A Handbook for Program Managers and Researchers, World Bank Technical Paper No.52), Chapter 1 and 2, Annexes G,H and I.
HAND-OUTS :	Exercise description and Chart Network Planning.
EXERCISE AIDS :	
AUDIO-VISUAL MATERIAL :	Overhead sheets.
DISCUSSION TOPICS :	What are the advantages and disadvantages of this planning method?

Annexes: - Exercise description and Chart Network Planning.

TH COURSE ON LOW-COST WATER SUPPLY AND SANITATION

EXERCISE	:	NETWORK PLANNING; IMPACT OF UNEXPECTED EVENTS.
DATE	:	
DATE OF SUBMISSION	:	

DESCRIPTION :

The exercise has been preceded by a lecture that deals with project monitoring technologies (Lecture Outline P-12), in which network planning as one of the methodologies has been introduced.

Participants are handed-out a Network Planning Chart (pp. 234, 235 and 236 of B.Bamberger and H.Hewitt (1986), Monitoring and Evaluating Urban Programs, A Handbook for Program Managers and Researchers, World Bank Technical Paper No.52).

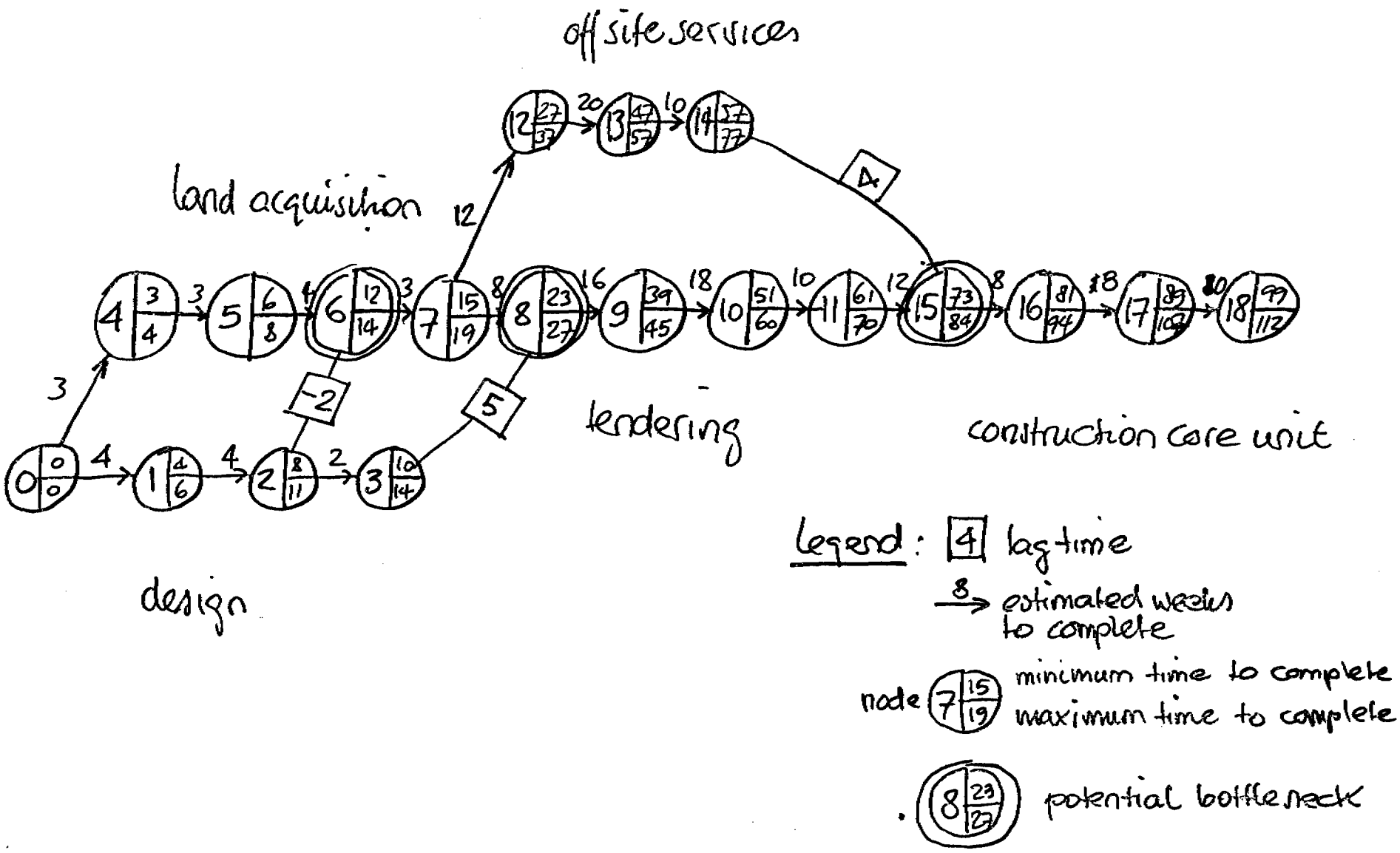
Participants are requested to specify what will be the consequences for the existing Chart when the following events occur:

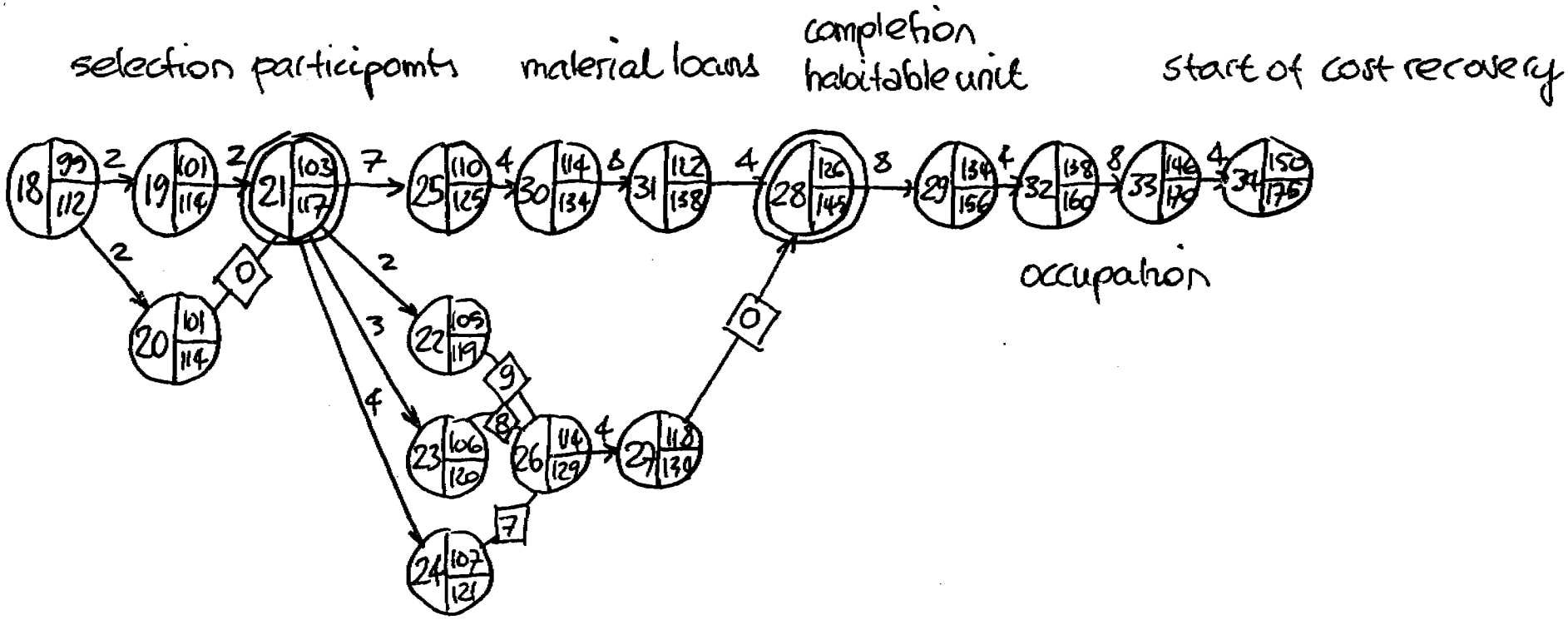
1. The negotiations on land require more time than reasonably was expected. It has taken 8 weeks (node 7).
2. Next to the above event, one of the main land owners wants to see the detailed designs before he agrees to sell. In this way he hopes to influence the future destination of the land (node 3).
3. The delivery of materials for the off-site services is seriously delayed due to clearance problems at the harbour customs. Extra delay; 5 weeks (node 13).
4. The interviews with applicants require more time (= 3 weeks, node 24), while the orientation sessions require less time (= 2 weeks, node 27).

Draw and write down the consequences (one session). The results are presented in class and discussed briefly (half session). Results are submitted to the Course Coordinator.

REFERENCE MATERIAL : B.Bamberger and H.Hewitt (1986), Monitoring and Evaluating Urban Programs, A Handbook for Program Managers and Researchers, World Bank Technical Paper No.52), Chapter 1 and 2, Annexes G,H and I.

LOCAL NETWORK CHART : ANNEX H-4




selection participants
material loans
completion habitable unit
start of cost recovery
occupation
18 99 112
19 101 114
21 103 117
25 110 125
30 114 134
31 112 138
28 126 145
29 134 156
32 138 160
33 146 170
34 150 176
20 101 114
22 105 119
23 106 120
26 114 129
27 118 130
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ANNEX XII

Field-work Questionnaires

Course File

FIELD - WORK

MBEYA WATER SUPPLY AND SANITATION FIELD-WORK

1.0 INTRODUCTION

The fieldwork is regarded as an important integral part of the Centre's training courses. Firstly, it provides an opportunity to the trainees to integrate theory with practice before graduation. Secondly, it is aimed at demonstrating a possible approach to a more participatory approach in planning of water supply and sanitation. Early participation in planning and implementation will later on guarantee a much better co-operation in maintenance and revenue contribution. Thirdly, it is a way of upgrading the skills and competence of practising professionals and sub-professionals.

The Mbeya fieldwork, prepared for the participants of "24th Course on Water Supply and Low-Cost Sanitation (23rd January-15th April, 1989), will be carried out in small groups of 5-6participants. Each group will be assigned one area to work for in order to cover a wide portion of the project area. The main sections of study covers:-

- water supply and
- sanitation

The aspects to be studied in detail includes:-

(a) water quality and quantity
(b) water storage, treatment and usage
(c) excreta disposal
(d) refuse collection
(e) stormwater drainage
(f) health
(g) literacy and education

There are two types of data collection that will be used in this fieldwork. These are:-

- surveys (general at village level)
- questionnaires (at household official level)

The data will be gathered from village or ward officials and sampled household. A first analysis of the collected data will be conducted and discussed among the participants of the course.

The outcome of this analysis will be used to formulate quick proposals which will be discussed with officials and local people of the project area. However, on arrival at Dar es Salaam, the participants are expected to further analyse the collected data and to produce a comprehensive group report and individual report about the field-work. Thereafter, presentations will be done as scheduled in the time-table.

A guideline showing the topics on which data needs to be collected has been developed. This guideline needs to be made operational for survey work and questionnaire. This has been partly the responsibility of the participants of the course, as part of their preparation of the field-work at the Centre. Another part has been a lecture on composing questionnaires, conducting surveys, data analysis and report writing.

Two operational questionnaires have been provided bearing in mind that composing an appropriate questionnaire is a laborious exercise and time for composition by participants will hot be enough. However, the participants are expected to include any additional but relevant information that they may come across during the field interviews.

SITE SURVEY/OBSERVATIONS

NAME AREA: LOCATION MAP(scetch)

(A) INFRASTRUCTURE:

(iii) Drainage — mains-size-Depth/width
laterals-size-Depth/Width

(1.1.1) Shape — Trapezoidal
Rectangular
Semi-circular
Natural fully

(1.1.2) Condition — Lined
Unlined
Materials used for construction
eg stones, concrete etc.

(1.1.3) Disposal site (Rivers, etc)

(1.1.4) Problems:
eg - blockage
- wearing out of lining materials
- erosions
- stagnant H_2O

2 WATER SUPPLY:

2.1 Types

piped
wells
others-in rivers rain H_2O etc.

2.1.1 Piped sources — surface (Rivers, Spring, Dams) Intake types
ground

2.1.1 ground: Means of getting H_2O
- Diesel pump
- Electrical power
- wind mill
- solar energy
- manually/handpump

2.1.2 Treatment processes .....?

2.1.3 Storage systems -Individual -Ground tanks
Elevated tanks;

2.1.4 Distribution -pipes material and size
Domestic points/private/Kiosk
Height/apron/drains

2.2 Wells

Dugwells - location/methods of drawing/condition out H_2O

Shallow" - location/conduction/wastewater management/pumps used

3 WASTE WATER

(3.1) HOUSE HOLD:

- Collection eg septic tanks
- transport
- Disposal-forest, open land etc.
- Treatment sites eg ponds

(3.2) INDUSTRIES

Type of sewage:
Treatment/ponds
Disposal-rivers, open land etc.

4 SANITATION FACILITIES

(4.1) Latrines

- Individual
- Communal
- Condition (sanitary & construction)
- Types
- Location

5 HOUSES

- Condition
- Materials used for construction
  - permanent
  - temporary

- Distinguish roof, walls, doors, windows
- size - of rooms is and outside finishing m^2

6 ROADS

- Tarmac
- Earth
- Whether they are planned
- Road side drainage
- Culverts & bridges
- Dangerous situation

7 SOLID WASTE MANAGEMENT

- Types of waste generated
- Storage - Household, Communal } facilities
- Transportation-Type of means carts trucks/private, municipal
- Treatment - composting
  - Incineration
  - biogas

Disposal - openburning
- burying
- crude dumping
- controlled tipping

Economy of the area

Types of Livestocks
- goats
- cattle
- sheep
- dogs
- chicken

Crops

Cash crops-

food crops

Commercial activities:

- shops
- restaurant
- bars
- markets
- butchers etc.

iv) Industries — soap manufacturing
cement
textile
Diary
SIDO(small scale Industries etc

D SOCIAL:

(i) Religion-
- mosque
- church
- types of religions

(ii) Recreational:
- swimming pools
- play field
- recreation halls and gardens
cinema/music etc.

E Education:

i - schools — primary
sec
institutions
adult education
informal education

F Health:

- Hospitals
- Health centres/community
- dispensaries
- MCH

Course File

QUESTIONNAIRE TO TANESCO MANAGER

1. What is the source of electricity? .....
2. What is the amount of electricity available? .....
3. What is the coverage of electricity supply?.....
4. Is the supply reliable .....
5. Is it supplied continuously or intermittently?.....
   If intermitently; supplytime from.....to.....Nosupply from.....do.....
6. What are the future extension plans? .....
7. Which problems do you face.....What solution have you tried .....

QUESTIONNAIRE TO TP & TC MANAGER

1. What type of communication means available/used?.....
   .....
2. What is the coverage of the communication means?.....
   .....
3. Is it reliable?.....
4. Do the communication facilities satisfy the need?/
   meet the demand? .....
   If not how much more do you need?.....
5. What are your future plans?.....
6. What problems do you face? .....

QUESTIONNAIRE TO MUNICIPAL TRADE OFFICER

1. Which industries are found in the municipal area?.....
2. Which commercial activities are under taken in the municipality?.....

3. What is the income from these commercial activities?

.....

.....

4. What are the prices of building materials such as Iron sheets, cement, sanitary appliances .....

5. What are the problems regarding availability and pricing of the materials? .....

QUESTIONNAIRE TO MUNICIPAL ENGINEER

1. What is the condition of the roads? .....

2. Which roads have:- tarmac
- engineered gravel -
- compacted earth
- rough track

3. What kind of maintanance work is done? How frequently?

.....

.....

4. What is the condition of the drainage systems in the area?

.....

.....

5. Which areas are served by drainage systems? .....

..... which are not? .....

6. What is the arrangement for maintaining the systems? .....

.....

7. What are the future plans for maintenance and extension of drainage systems? .....

.....

8. What is the situation regarding design, construction and maintenance of buildings in this area?

.....

9. What problems do you face? .....

.....

QUESTIONNAIRE TO MUNICIPAL LIVESTOCK OFFICER

1. Which types of livestock are kept in this municipality? .....
   which areas? .....
2. What is the number of each livestock type? .....
   .....
3. What is the income from livestock keeping? .....
4. Which health services for livestock keeping are available? .....
   .....
5. Are grazing areas and water enough? .....
   .....
6. What are the problems .....
7. Are there any regulations? .....

QUESTIONNAIRE TO MUNICIPAL AGRICULTURAL OFFICER

1. Which cash crops are grown here (area) .....
2. Which food crops are grown here? .....
3. What is the production (per hectare)? .....
4. What is the income generated from (1) & (2) above .....
5. Are the agricultural implements equipments available ? .....
   .....
6. What are the problems faced? .....

QUESTIONNAIRE TO MUNICIPAL LAND OFFICER

1. What is the geographical conditions of this area (altitude, latitude, soil type, natural, location, vegitation)? .....
2. What is the climate (rainfall, temperature, wind)? .....
3. What is the population including growth rate? .....
4. What is the population distribution and density in the area?
   .....
5. Is land available for various uses e.g. Industrial, residential, commercial, Institutional, infrastructure, recreational , cemetery
   .....

6. Are disposal sites set aside for waste water & solid wastes?

.....

7. What is the distribution of plot sizes? .....

8. What are the type/design of houses used? .....

9. What are the main problems of land management ? .....

.....

10. What are the main problems faced in Town Planning .....

.....

QUESTIONNAIRE TO MUNICIPAL EDUCATION OFFICER

1. How many schools, institutions are in the area? .....

2. What is the level of literacy in the area? .....

.....

3. How is health education conducted in schools? .....

.....

4. What are the future plans regarding (1) (2) & (3) above .....

.....

5. What are the problems faced? .....

QUESTIONNAIRE TO THE MUNICIPAL COMMUNITY DEVELOPMENT OFFICER

1. What are the house hold sizes in the area? .....

2. Which aspects of culture of the people can affect the water supply and new sanitation technology? .....

3. Which taboos of the people can hinder the introduction of a new technology?.....

4. What is the attitude of people towards self-help projects? .....

.....

5. Is there any arrangement to involve people in planning .....

decision making .....

implimentation .....

of projects which benefit them? .....

If yes what is their response? .....

6. Are people satisfied by the services rendered to them? .....

If not, why? .....

7. What are the plans regarding (2), (3), (4), (5) & (6) .....
.....

8. What other problems are there? .....
.....

QUESTIONNAIRE TO THE MUNICIPAL HEALTH OFFICER AND THE MUNICIPAL PUBLIC HEALTH ENGINEER

1. What are the most prevalent licences in this area? .....
.....

2. Which preventive methods are used? .....

3. How is health education conducted in this area? .....
.....

4. How are health services provision organized

Health centres, Number ..... Capacity ..... Personnel .....
Dispensaries " ..... " ..... " .....
Hospitals " ..... " ..... " .....

5. Are the services enough? ..... if not how much more is needed? .....

5. What is the birth rate ..... death rate .....

6. How is hospital waste managed (collection, storage & disposal)?
.....

7. What is the condition of the drainage system in this area? stagnant water? .....

8. Which systems are used for disposal of waste water? .....
.....

9. Which problems do you face with regard to waste water management
.....

10. Which type of excreta disposal facilities are used? .....
.....

11. What problems are encountered in their use? .....
.....

12. What is the water table of the area? .....

13. How is solid wastes from the area managed? .....
(collection, storage, disposal) .....

14. What is the solid waste generation rate? .....

15. What other problems do you face regarding the above? .....
.....

QUESTIONNAIRE TO MEDICAL OFFICER AND MCH COORDINATOR

1. How many are the facilities for mothers and children's health care?
.....

2. How are they distributed in the area? .....

3. Are the mothers and children health care services provided with enough .....
- personnel
- facilities

4. What are the future plans regarding (1), (2), & (3) above? .....
.....

5. What are the main problems encountered? .....
.....

QUESTIONNAIRE TO CCM OFFICER

1. How are the people organized in the area? .....

2. How many religious groups are there in the area? .....

3. What is the level of literacy in your area? .....

4. What are the measures taken to help those without education?
.....

5. How many CCM members do you have? .....

6. How willing are the people towards self help projects and other development projects? .....

7. Which behavioural patterns affects/can affect the introduction of a new technology? .....

8. What part do people have in taking care of the water supply facilities provided for them? .....

9. What are the main problems do you face in your area? .....
.....

Course File

HOUSEHOLD QUESTIONNAIRE

Village:
Date:

Name Respondent:

0. Household

01. Name of head of household

02. Number of households in house (no. of people in HH)
Female..... Male .....

03. Number of houses occupied by household

04. Age Groups (years)

	0 - 5		6 - 17		18		TOTAL		
	M	F	M	F	M	F	M	F	M + F
Education									
Occupation									

05. Head of household was born in .....

06. Main occupation of household members.

Agriculture	Livestock	Workers	Private	Total

07.

Income Sources	Quantity Annual Unit Quantity	Unit price	T.sh.Equivalent Annual	Total
Agricultural Crops (1) (2) (3)				
Animals (1) (2) (3)				
Salary				
Private (Income)				
Others				

+ Household = people who are eating together permanently

8 How much do you spend per month on the following:-

(i) food Tshs .....
(ii) clothing Tsh.....
(iii) House rent .....
(iv) Water and electricity .....
(v) Gas or charcoal .....
(vi) Education and health .....
(vii) Mortgage/loan repayment for a house .....
(viii) Transport .....
(ix) Recreational .....

I Water Supply

9 What are the sources of water which you use and for what do you use it for?

Source	Drinking	Other domestic	Cattle	Garden and Agriculture
(-rivers) Surface water				
-ponds well				
-etc. Handpump				
Tap-stands				
House conn.				

I: What is the quality of the water you use and why?

	Good	Average	Bad	Why?
Surface water				
well				
Handpump				
Tapstand				
House conn.				

11. What methods of treatment do you apply for drinking water?
boiling/filters/chlorination/none .....

12. How much water does you household use for domestic purposes (drinking, cooking, washing, cleaning?)
.....

13. How do you store the water in your house

Purpose	Storage
drinking	
other domestic	

14. What is the greatest problem of the water supply in your village? (insufficiency, walking distance, bad quality ....
.....)

15. Does the project improve the water supply situation? yes/no how?

	Comments
Sufficiency Walking distance Quality	

16. What was your involvement during the construction stage?
.....
.....
.....

17.a What are you going to contribute for operation and maintenance after the completion of the project?
.....
.....
.....

b How do you feel about it? .....
.....
.....

5.0 Sullage

5.1 Where do you wash the dishes?
Location: .....

5.2 Is the water drained from there? (observe) no/yes

5.3 Where do you take a bath? Location: .....

5.4 Is there a drainage facility? no/yes

5.5 Where do you wash your clothes? Location.....

5.6 Is there any drainage facility? (observe) no/yes

5.7 Does sullage water (dish washing, bathing and cloth washing) create any nuisance? Yes/No .....
How .....

5.8 If yes, what can be done to improve the situation?
.....

5.9 What are the constraints for improvement?
money .....
materials .....
money ..... Skilled labour .....
labour ..... Any other .....

~~18.~~ Sanitation:

18. What type of latrine does the household use? .....
number:
Private/Communal .....
Location.....
Cost .....

19.a) What is the condition of the latrine(s) (observe) & building material
Superstructure: .....
Floor Slab .....
Substructure .....
Inconveniences: .....

b) What improvement would you like to have for your latrine? .....
.....

20.a) What happens when the pit is full? .....
.....
b) If emptying, frequency....., cost of emptying.....

21. Who cleans the latrine? .....
How? .....
How often? .....

22. Do small children also use the latrine? Yes/No
.....

23. If not, what happens with the children's excreta?
Is water used? Yes/No.....If not, what is used?.....
are hands washed afterwards? .....
Is soap used? .....

24. Have you ever heard of a VIP? .....
If yes, what is the advantage? .....

25. Would you like to construct one? Yes/No .....
What problems do you foresee to do so? labour

26. SOLID WASTER

3.1 How do you store your domestic waste in house?....
.....
How do you dispose your domestic waste? .....
.....

3.2 Does it create any nuisance (flies, rats, vermin, insects)?
inhouse:
outside:

3.3a) Are chicken, pigs, goats people etc. scavanging around the heap?
Yes/No

b) If Yes, what problems do you foresee? .....
.....

3.4 What could be done to improve the nuisance solid waste ?
Inhouse .....
Outside:.....

4 Drainage

4.1 Does your compound experience flooding in the rainy seasen?
Yes/No .....
(observe the topography?)

4.2 Is there any stagnant water around? .....

4.3 If so
It is due to solid waste or what? .....

4.4 Area animals wondering around in the ponds? .....
.....

4.5 What nuisance does the existing drainage situation create?
accessibility:
smell:
insects animals:

4.6 What could be done to improve the situation?
.....
.....

4.7 What might hamper the improvements?
money:
material:
labour:
skills:
any other:

6 House conditions

Make a brief description of the house conditions and materials number of rooms:
size:
walls:
roof:
floors: m^2
ventilation:
finishing:

7. Social

Culture (i) Types of religion.....
(ii) People's beliefs & taboos .....

Health

(i) What common diseases have you experienced.....
.....
(ii) What do you do when you are sick? .....
.....
(iii) Are there any traditional healers in your area?
.....

iv) Do you have clinics for mothers & children? Yes/No

a) If Yes, are you satisfied with the services given?.....

b) If no, where do you send children for clinic?.....
.....

v) Do you get home visit health education? Yes/No

a) If no, where do you get the health education
.....

b) If yes, what are the benefits .....

vi) Where do you get "first aid" for emergency cases?
.....

vii) What problems have you encountered so far? .....

9. General

i) Given the different problems you are facing, which one can you give the first priority for solving?
.....

ii) Are you satisfied with the existing or provided infrastructure? Yes/No
Why .....

iii) Can you afford any beneficial project that you can be given? .....

OFFICIAL QUESTIONNAIRE

General questions

I Water

A) General Information

Type of Source	Distance from the Village(m)	system	No. of domestic points	Uses	Sufficiency (annually)	REMARKS

Any additional comments? .....

.....

.....

b) Water Quality

Type of Source	Treatment		Quality measurements		Protection of source	Cost of Treatment		REMARKS
	Main Source	Domestic level	who	where		main source	Domestic level	

c) Water Storage/Quantity:

Type of Storage		No. of storage facilities		Water Quantity Buckets/capita day	REMARKS
Village level	Household level	Village level	Household level		

2) Problems of the water supply system (specify)

.....

.....

Project by Danida

A) Does the project solve the past water supply problems?

Yes/No .....

If yes in what sense? .....

If, No why? .....

b) What is the attitude of the people towards this new system of water supply

.....

.....

c) Do you think the villagers are involved enough in the project? Yes/No

.....

Explain .....

.....

.....

d) What problems do you encounter in the implementation of this project?

.....

.....

e) What will happen after the completion of the project (in whose hands will it be;technical expertise)? .....

.....

f) Who will bear the operation and maintenance costs? .....

.....

How? .....

.....

.....

II. SANITATION:

a) General information

1) Do you have different types of latrines? Yes/No .....
(name them) .....

2) Are these latrines satisfactory or unsatisfactory, why?
.....
.....

3) What is the attitude of the people towards excreta disposal?
.....
.....

4) Have you introduced any type of Low cost latrines instead of the traditional ones? .....
.....

III. Refuse collection

1) What type of refuse collection and disposal method is being practised in the area? .....
.....

2) Does the existing method of refuse disposal cause any nuisance? What is the nuisance? .....
.....
.....

3) Are there any plans for improvement of refuse collection?

IV. Stormwater drainage

1) Do you have problems with storm water during the rainy season? Yes/No..... If yes, what are the problems
.....
.....

2) What measures have you taken to contain the problems? .....
.....

V. Health

1) What are the common diseases experienced in the area? .....
.....
.....

2) Is there any health education given to villagers? .....
.....
.....

3) Does the villages have a Dispensary/health centre "First Aid Kits? "Yes/No .....
If yes, does the dispensary/health centre give satisfactory services? .....
.....
Are there sufficient staff? .....
.....
.....

4) Are there any traditional healers in the village? Yes/No
.....
If yes, what type of disease do they cure? .....
.....
.....

VI: Literacy and Education

Name of Village	Name of School	P U P I L S NO.							Adult Education Class (No)	Total numbers of Villagers	REMARKS
		1	2	3	4	5	6	7			

ANNEX XIII

Format Course Timetable

..TH COURSE ON LOW-COST WATER SUPPLY AND SANITATION

WEEK NO. ..

	TIME:				
DATE:	8.00 - 10.00		10.30 - 12.30		14.00 - 16.00
MONDAY / /		T E A B R E A K		L U N C H B R E A K	
TUESDAY / /					
WEDNESDAY / /					
THURSDAY / /					
FRIDAY / /					
SATURDAY / /					

ANNEX XIV

Timetable 11th Course

TIME TABLE FOR THE 11TH COURSE
ON WATER SUPPLY AND LOW COST
SANITATION

JANUARY 9th - MARCH 3rd, 1984

WEEK ONE

DATE / TIME	8.00 - 10.00	10.30 - 12.30	2.30 - 4.30
MONDAY 9th Jan 1984	Course opening by Proff. Kulaba DCHS	Professional briefings.	Professional briefings.
TUESDAY 10th Jan 1984	Professional briefings	Professional briefing s	Professional briefings
WEDNESDAY 11th Jan 1984	Professional briefings	Professional briefings	Professional briefings
THURSDAY 12th Jan 1984	Course introduction on sanitation S. Mshana	Introduction to water supply and environmental health V.L. Uisso	Introduction to project management and public participation G. Kajuna
FRIDAY 13th Jan 1984	Practicals introduction, sites & field trips by Kajuna G.R.	Practicals-introduction by Kajuna G.R.	Practicals-introduction by G.R. Kajuna
SATURDAY 14th Jan 1984	Field trip- Site visit to Buguruni low-cost sanitation project		

WEEK TWO

DATE / TIME	8 00 - 10.00	10.30 - 12.30	2.30 - 4.30
MONDAY 16th Jan 1984	EH_1 The Environment: The biotic and abiotic environment By Mbagi	WS_1 The hydrological cycle By Sandberg	Practicals
TUESDAY 17th Jan 1984	EH_2 Natural ecosystems By Mbagi	WS_2 Water collection and protection of sources By Mwakipaki	Practicals
WEDNESDAY 18th Jan 1984	EH_3 The mineralisation process and factors By Chillo	WS_3 Water treatment By Mwakipaki	Practicals
THURSDAY 19th Jan 1984	EH_4 The structure of health institutions in Tanzania By D.S. Masamba	CP_4 The Administration and Management of public health and sanitation programmes in Tanzania (case study) By Majollo	Practicals
FRIDAY 20th Jan 1984	EH_5 Transmission of infectious diseases By Dr. Kihamia	WS_4 Water consumption By Mr. Sandberg	Practicals
SATURDAY 21st Jan 1984	Site visit to Utafiti latrines- Manzese		

KEY:

EH - Environmental Health

CP- Community participation

WS- Water Supply

SAN- Sanitation

PM - Project Management

WEEK THREE

DATE / TIME	8.00 - 10.00	10.30 - 12.30	2.30 - 4.30
MONDAY 23rd Jan 1984	EH_6 Transmission of infecti us diseases. By Dr. Kihamia	CP_6 Political economy of health organisation in colonial and post colonial By Dr. C.D. Mauli	Practicals
TUESDAY 24th Jan 1984	EH_7 Transmission of infectious diseases By. Dr. Kihamia	Practicals	Practicals
WEDNESDAY 25th Jan 1984	CP_1 Introduction to Community Development approaches in relation to health and Sanitation aspects. By Nomtuse Mbere	CP_7 Bureaucracy and public participation in Tanzania By Mutangira J.P.B.	CP_2 Introduction to Community Development approaches in relation to health and sanitation aspects By Nomtuse Mbere
THURSDAY 26th Jan 1984	CP_3 Introduction to Community Development approaches in relation to health and Sanitation aspects. By Nomtuse Mbere	PM_7 low cost sanitation as a part of Housing By Mbere/Carlson	WS_7 Rural water programmes in Tanzania. Ingvar Anderson
FRIDAY 27th Jan 1984	CP_8 The rele of women in water supply and sanitation By Hannan Andersson	WS_5 Water Supply distribution system: By Sandberg	PM_8 Manpower development training programmes. Training Social Community workers at a grassroot level. By Nomtuse Mbere
SATURDAY 28th Jan 1984	Site visit to Ruvu Water treatment Plant		

WEEK FOUR

DATE / TIME	8.00 - 10.00	10.30 - 12.30	2.30 - 4.30
MONDAY 30th Jan 1984	SAN_1 Introduction to low cost sanitation By John Pickford	SAN_2 Waterless systems By John Pickford	CP_5 The development of under-development, poverty, poor health and education By Nomtuse Mbere
TUESDAY 31st Jan 1984	SAN_3 Sewage treatment process. By John Pickford	SAN_4 Conventional systems By John Pickford	SAN_{11} Low cost sanitation in developing countries, case studies from Zimbabwe and Botswana By Mbere Nomtuse
WEDNESDAY 1st Feb.1984	EH_8 The need for controlled disposal; sources and characteristics of municipal waste By John Pickford	WS_6 (Part 2) Hygiene, women's role in public health By Hannan Andersson	WS_9 Case study The impact of water projects.
THURSDAY 2nd Feb.1984	EH_9 collection and transportation of domestic refuse. Treatment of Solid waste. By J. Pickford	Practicals	Practicals
FRIDAY 3rd Feb 1984	Introduction to the field trip By Kajuna	Storm water drainage EH_{10} By J. Pickford	Introduction to the field trip By Kajuna G.R.
SATURDAY 4th Feb 1984	Site visit to Temeke		

WEEK FIVE- FIELD TRIP TO WANGING'OMBE - IRINGA REGION

WEEK SIX

DATE / TIME	8.00 - 10.00	10.30 - 12.30	2.30 - 4.30
MONDAY 13th Feb 1984	PM_2 Introduction to Practicals By K. Nimpuno	SAN_6 Tanzanian experiences with low-cost sanitation - The Rural Sanitation Unit (Afya)	Practicals
TUESDAY 14th Feb 1984	SAN_7 Tanzanian experiences with low-cost sanitation-The low cost sanitation unit (Ardhi) By Runyoro	CP_9 Communication techniques for effective public participation in health and sanitation programmes in Tanzania. By Juppenlatz and Kagaruki	Practicals
WEDNESDAY 15th Feb 1984	SAN_8 Tanzanian experience with low cost sanitation. The Primary Schools Health Program By Dr. Wilson	PM_1 Tanzania and the International decade of water supply and sanitation By Mehtha	Practicals
THURSDAY 16th Feb 1984	SAN_5 Tanzanian experiences with low-cost sanitation - Utafiti programme and other research programmes By Proff. Kilama	SAN_9 Goals and components of DSM low cost sanitation project By Runyoro	Practicals
FRIDAY 17th Feb 1984	PM_3 Construction of low cost sanitation projects By K. Nimpuno	PM_4 Ardhi Ministry experience in management of experimental VIP'S By Daniel/Kuhenga/Billenzeze	Practicals
SATURDAY 18th Feb	Site visit to pumping station and sewer outfall - By Majura		

WEEK SEVEN

DATE / TIME	8.00 - 10.00	10.30 - 12.30	2 .30 - 4.30
MONDAY 20th Feb 1984	SAN_{10} Composting and aqua culture By Simbeye	PM_5 Actual construction programmes By K. Nimpuno	Practicals
TUESDAY 21st Feb 1984	PM_6 Financial aspects of sanitation By F. Maganga	PM_1 (Part 2) Tanzania and the International Decade of Water Supply and Sanitation, Role and duties of Dept. of Planning and Housing	Practicals
WEDNESDAY 22nd Feb 1984	[illegible]	WS_6 (Part 1) Water and man, By Peter Hawking	Practicals
THURSDAY 23rd Feb.1984	PM_9 Manapower development training programmes	Practicals	Practicals
FRIDAY 24th Feb 1984	Practicals	Practicals	Practical
SATURDAY 25th Feb 1984	San 12 by Argawal		

WEEK EIGHT

DATE / TIME	8.00 - 10.00	10.30 - 12.30	2.30 - 4.30
MONDAY 27th Feb 1984	PM_{10} Manpower development training programmes - comparative examples	SAN_{13} The Wanging'ombe project-Introduction. By Blakely/Makerere/Kuhenga	Practicals
TUESDAY 28th Feb 1984	SAN_{14} The Morogoro Sanitation Project By S. Mshana	EH_{11} Case Studies on Cholera Campaigns- failures &successes Mtu ni Afya Campaign By Chizenga S.	Practicals
WEDNESDAY 29th Feb 1984	WS_8 Management of Rural water programmes. Rodger Anderson	WS_{10} The Planning of water supply. Rodger Anderson/Peter Hawkins	FINALIZATION OF PRACTICAL AND PRESENTATIONS
THURSDAY 1st March 1984	FINALIZATION OF PRACTICAL AND PRESENTATIONS	FINALIZATION OF PRACTICAL AND PRESENTATIONS	FINALIZATION OF PRACTICAL AND PRESENTATIONS
FRIDAY 2nd March 1984	EVALUATION	EVALUATION	EVALUATION
SATURDAY 3rd March 1984	CLOSING	CLOSING	CLOSING

ANNEX XV

Timetable 16th Course

COURSE TIME-TABLE ON WATER SUPPLY AND LOW-COST SANITATION

23RD JANUARY - 15TH APRIL, 1989

WEEK 1

DATE	TIME 8.00 - 10.00		TIME 10.30 - 12.30		TIME 2.00 - 4.00
MONDAY 23/1/89	REGISTRATION	TEA BREAK	REGISTRATION	LUNCH BREAK	COURSE OPENING & COURSE INFORMATION - Prof. Kulaba
TUESDAY 24/1/89	PROFESSIONAL BRIEFINGS - UISSO		PROFESSIONAL BRIEFINGS - RAJAB		PROFESSIONAL BRIEFINGS - RUGAIGANISA
WEDNESDAY 25/1/89	PROFESSIONAL BRIEFINGS - RAJAB		PROFESSIONAL BRIEFINGS -MAGEMBE/LWAISELAGE		PROFESSIONAL BRIEFINGS - CHAGGU
THURSDAY 26/1/89	INTRODUCTION TO THE LIBRARY & DOCUMENTATION - Librarian		PROFESSIONAL BRIEFINGS - UISSO		BENCH MARK TEST I
FRIDAY 27/1/89	LAND AQUISITION FOR WATER SUPPLY - RINGO		INTERNATIONAL DECADE OF WATER SUPPLY & SANITATION		INTRODUCTION TO LOW-COST SANITATION- Baradyana
SATURDAY 28/1/89	LAND AQUISITION FOR WATER SUPPLY - RINGO		-do-		

WEEK 2

DATE	T I M E				
	8.00 - 10.00		10.30 - 12.30		2.00. - 4.00
MONDAY 30/1/89	ROLE OF WATER IN NATURE - Rutashobya	TEA BREAK	WATER-LAW - Shirima	LUNCH BREAK	CONSUMPTION NEEDS FOR WATER - Chaggu
TUESDAY 31/1/89	SOURCES OF WATER SUPPLY - Rutashobya		PROPERTIES OF DRINKING WATER - Rutashobya		LOW-COST SANITATION OPTIONS -Baradyana
WEDNESDAY 1/2/89	ENVIRONMENTAL HEALTH -Rongo		TANZANIA WATER POLICY -Rutashobya		TANZANIA WATER LAW -Shirima
THURSDAY 2/2/89	CONSTRUCTION OF LOW-COST SANITATION PROJECTS - Baradyana		ENVIRONMENTAL HEALTH - Rongo		INTRODUCTION TO WATER TREATMENT SYSTEMS -Tesheme
FRIDAY 3/2/89	CONSTRUCTION OF LOW-COST SANITATION PROJECTS (Case Study)-Baradyana		E X E R C I S E Wedcana Village		RAPID-SAND FILTERS -Dr. Mashauri
SATURDAY 4/2/89	SITE VISIT TO LOWER RUVU WATER TREATMENT PLANT				

WEEK 3

DATE	TIME				
	8.00 - 10.00		10.30 - 12.30		2.00 - 4.00
MONDAY 6/2/89	WASTE WATER DISPOSAL METHODS -Ydego	TEA BREAK		LUNCH BREAK	SOLID-WASTE MANAGEMENT -City Council
TUESDAY 7/2/89	SLOW-SAND FILTERS -Mashauri		OXIDATION/STABILIZATION PONDS -Moyo/Ydego		SOLID WASTE MANAGEMENT INCLUDES(HOSPITAL WASTE) -Exercise Ydego
WEDNESDAY 8/2/89	OXIDATION/STABILIZATION PONDS -Moyo/Ydego		SLOW-SAND FILTERS -Mashauri		GENERAL DISCUSSION ON MUHIMBILI'S SITE VISIT
THURSDAY 9/2/89	SITE VISIT TO MUNIMBILI'S HOSPITAL WASTE TREATMENT SITE - Rongo		MUHIMBILI VISIT -Rongo		Salid waste by -Ydego
FRIDAY 10/2/89	WATER SUPPLIES NEIGH-BOURHOOD LEVEL -Harry		WATER SUPPLIES NEIGHBOUHOOS LEVEL -Exercise -Harry		EXERCISE CONTINUES
SATURDAY 11/2/89	VISIT TO TABATA SOLID WASTE DISPOSAL SITE				

WEEK 4

DATE	T I M E				
	8.00 - 10.00		10.30 - 12.30		2.00 - 4.00
MONDAY 13/2/89	MALARIA VS DESIGN OF SANITATION UNITS - Rongo	TEA BREAK	MALARIA CONTINUED -Rongo	LUNCH BREAK	SITE VISIT MLALAKUWA -Harry & Chaggu
TUESDAY 14/2/89	TRANSMISSION OF D DISEASES -Prof.Kihamia		TRANSMISSION OF DISEASES -Prof.Kihamia		ENVIRONMENTAL HEALTH (POLLUTION) - Ydego
WEDNESDAY 15/2/89	POLITICAL ECONOMY OF HEALTH AND SANITATION IN COLONIAL AND POST COLONIAL TANZANIA -Zacharia		THE STRUCTURE OF HEALTH INSTITUTIONS IN TANZANIA -Rongo		LOW-COST PIT EMPTYING -Jaap
THURSDAY 16/2/89	SOLID WASTE MANAGE-MENT - Harry		WATER LAW -Shirima		BIOLOGICAL INDICATORS OF POLLUTION IN WATER -Ydego
FRIDAY 17/2/89	THE ROLE OF WOMEN IN WATER SUPPLY AND SANITATION- Alice		LOW-COST PIT EMPTYING - Jaap		SITE VISIT DISCUSSION -Harry & Chaggu
SATURDAY 18/2/89	VISIT TO UPPER RUVU WATER TREATMENT PLANT				

WEEK 5

DATE	TIME				
	8.00 - 10.00		10.30 - 12.30		2.00 - 4.00
MONDAY 20/2/89	FINANCIAL ASPECTS OF SANITATION AND WATER SUPPLY -Msimbe/Harry	TEA BREAK	ROLE OF WOMEN IN WATER SUPPLY AND SANITATION -Gumbo	LUNCH BREAK	FIELD-WORK LECTURE -Harry & Chaggu
TUESDAY 21/2/89	LOW-COST SANITATION IN SITE & SERVICES -Kuhenga		THE INFLUENCE OF HOUSING ENVIRONMENT ON PUBLIC HEALTH -Chisanga		QUESTIONNAIRE EXPERIENCE -Harry & Chaggu
WEDNESDAY 22/2/89	SEWAGE TREATMENT PROCESSES Howard/Humphreys		PROJECT MANAGEMENT -Tesheme		QUESTIONNAIRE DEVELOPMENT -Harry & Chaggu
THURSDAY 23/2/89	SEWAGE TREATMENT PROCESSES Howard/Humphreys		COMMUNITY PARTICIPATION IN WSS PROJECTS -Zacharia		QUESTIONNAIRE DEVELOPMENT -Harry & Chaggu
FRIDAY 24/2/89	TRANSMISSION OF DISEASES Prof. Kihamia		QUESTIONNAIRE DISCUSSION - Harry & Chaggu		DISCUSSION ABOUT GYMKHANA SITE VISIT
SATURDAY 25/2/89	VISIT TO GYMKHANA SEWAGE PUMPING STATION AND SEA OUTFALL				

WEEK 6

DATE	TIME				
	8.00 - 10.00	TEA BREAK	10.30 - 12.30	LUNCH BREAK	2.00 - 4.00
MONDAY 27/2/89	DRAINAGE - Harry		DRAINAGE (Exercises) -Harry		MODEL MAKING -Participants
TUESDAY 28/2/89	WATER DISTRIBUTION -Harry		HAND PUMPS		MODEL MAKING -Participants
WEDNESDAY 1/3/89	DEVELOPMENT OF QUESTIONNAIRES FOR FIELD WORK		HAND - PUMPS		MODEL MAKING -Participants
THRUSDAY 2/3/89	TEMEKE VIPs VISIT		-do-		WATER DISTRIBUTION EXERCISE PRESENTATION -Participants
FRIDAY 3/3/89	REPORT WRITING (General)-Chaggu		REPORT WRITING (data presentation) - Harry		FIELDWORK EXPLANATION -Harry & Chaggu
SATURDAY 4/3/89	TRAVELLING TO IRINGA FOR FIELD WORK				

WEEK 7

DATE	8.00 - 10.00	10 30 - 12.30	2.00 - 4.00
6/3/8 MONDAY	COURTESY VISIT	GENERAL SURVEY	GENERAL SURVEY
TUESDAY 7/3/89	HOUSEHOLD SURVEY	HOUSEHOLD SURVEY	HOUSEHOLD SURVEY
WEDNESDAY 8/3/89	HOUSEHOLD SURVEY	HOUSEHOLD SURVEY	HOUSEHOLD SURVEY
THURSDAY 9/3/89	WATER PROJECT	WATER PROJECT	WATER PROJECT
FRIDAY 10/3/89	WATER PROJECT SURVEY	WATER PROJECT SURVEY	WATER PROJECT SURVEY
SATURDAY 11/3/89	O F F I C I A L	Q U E S T I O N N A I R E	

WEEK 8

D A T E	8.00. - 10.00	10.30 - 12.30	2.00 - 4.00
MONDAY 13/3/89	OFFICIAL QUESTIONNAIRE	OFFICIAL QUESTIONNAIRE	OFFICIAL QUESTIONNAIRE
TUESDAY 14/3/89	VISIT THE INTAKE WORKS	VISIT THE INTAKE WORKS	VISIT THE INTAKE WORKS
WEDNESDAY 15/3/89	INTRODUCTION TO BAMBOO PROJECT BY OFFICIALS	BAMBOO PROJECT VISIT	WOOD-STATVE TANKS VISIT
THURSDAY 16/3/89	FORMULATION OF PROPOSALS	FORMULATION OF PROPOSALS	FORMULATION OF PROPOSALS
FRIDAY 17/3/89	EXPOSITION OF IDEAS TO THE LOCAL OFFICIALS & REPRESE-NTATIVE OF THE PEOPLE	CONCLUBING SESSION	GENERAL DISCUSSION WITH PARTICIPANTS
SATURDAY 18/3/89	TRAVELLING BACK	TO DAR ES SALAAM	

WEEK 9

DATE	TIME 8.00 - 10.00	TEA BREAK	10.30 - 12.30	LUNCH BREAK	2.00 - 4.00
MONDAY 20/3/89	DATA ANALYSIS AND REPORT WRITING		DATA ANALYSIS AND REPOR WRITING		DATA ANALYSIS AND REPORT WRITING
TUESDAY 21/3/89	DATA ANALYSIS AND REPORT WRITING		DATA ANALYSIS AND REPORT WRITING		REPORT WRITING
WEDNESDAY 22/3/89	FINALISATION OF REPORT		SUBMISSION OF REPORT		F R E E
THURSDAY 23/3/89	FIELD-WORK REPORT PRESENTATIONS (INDIVIDUAL)		FIELD-WORK REPORT PRESENTATION (INDIVIDUAL)		FIELD-WORK REPORT PRESENTATIONS (INDIVIDUALS)
FRIDAY 24/3/89	FIELD-WORK REPORT PRESENTATIONS (INDIVIDUAL)		FIELD-WORK REPORT PRESENTA-TIONS (INDIVIDUAL)		FIELD-WORK REPORT PRESENTATIONS (INDIVIDUAL)
SATURDAY 25/3/89	FIELD-WORK REPORT PRESENTATIONS (INDIVIDUAL)				

WEEK 10

D A T E	T I M E				
	8.00 - 10.00		10.30 - 12.30		2.00 - 4.00
MONDAY 27/3/89	GROUP PRESENTATIONS	TEA BREAK	GROUP PRESENTATIONS	LUNCH BREAK	GROUP PRESENTATIONS
TUESDAY 28/3/89	GROUP PRESENTATION		GROUP PRESENTATIONS		GROUP PRESENTATIONS
WEDNESDAY 29/3/89	DISCUSSION ON REPORTS		GENERAL DISCUSSION ON REPORTS		GENERAL DISCUSSION ON REPORTS
THURSDAY 30/3/89	LAB-WORK FOR COLIFORM		LAB-WORK FOR COLIFORMS		F R E E
FRIDAY 31/3/89	LOW-COST S-MATERIALS (CHISANGA)		WATER SUPPLY AND SANITATION DECADE		F R E E
SATURDAY 1/4/89	SATURDAY L A B O R A T O R Y		R E S U L T S		

WEEK 11

DATE	8.00 - 10.00	TEA BREAK	10.30 12.30	LUNCH BREAK	2.00 - 4.00
MONDAY 3/4/89	COMPUTER & SANITATION ~~SITE VISIT REPORT WRITING~~		-do- ~~REPORT PRESENTATION~~ AND DISCUSSION		-do- ~~REPORT PRESENTATIONS AND DISUCUSSION~~
TUESDAY 4/4/89	Sites and services - MAGEHBE		WORLD EXPERIENCE PIT LATRINES Prof. Pickford		WORLD BANK MODULE@ ON PROJECT PLANNING
WEDNESDAY 5/4/89	WORLD EXPERIENCE WITH PIT LATRINES Prof.Pickford		HEALTH AND HYGIENE MODULE - WORLD BANK		WATER AND WOMEN By Prof. Pickford
THURSDAY 6/4/89	SANITATION AND WOMEN By. Prof. Pickford		~~baldia, Pakistan - World Bank module~~		GROUP EXERCISE - Prof.Pickford
FRIDAY 7/4/89	Baldia, Pakistan ~~Wells and handpumps -Prof. Pickford~~ World Bank Module		WELLS AND HANDPUMPS - World Bank module		INTRODUCTION TO SITE VISITE - Chaggu
SATURDAY 8/4/89	M A N Z E S E		T O D A Y '		V I S I T

WEEK 12

DATE	T I M E				
	8.00 - 10.00		10.30 - 12.30		2.00 - 4.00
MONDAY 10/4/89	MANZESE REPORT WRITING	TEA BREAK	REPORT PRESENTATION	LUNCH BREAK	REPORT PRESENTATION
TUESDAY 11/4/89	WORLD EXPERIENCE OF REFUSE COLLECTION -Prof.Pickford		Computer & water supply		MODULE DISCUSSION Prof. Pickford & Ohaggu
WEDNESDAY 12/4/89	Computer & water supply		BENCH MARK TEST II		F R E E
THURSDAY 13/4/89	COMPOSTING -Prof.Pickford		PREPARATION FOR CENTRE'S 10 YEARS ANNIVERSARY		EXHIBITIONS' PREPARATIONS
FRIDAY 14/4/89	EXHIBITIONS PREPARATION		PREPARATION FOR CENTRE'S 10 YEARS ANNIVERSARY		EXHIBITIONS' PREPARATIONS
SATURDAY 15/4/89	EVALUATION AND COURSE CLOSING CEREMONY				

ANNEX XVI

Timetable 24th Course

WEEK I

TIMETABLE FOR 16TH REGIONAL COURSE ON WATER SUPPLY AND LOW COST SANITATION"

DATE/ TIME	8.00 - 10.00	TEA BREAK	10.30 - 12.30	LUNCH BREAK	2.00 - 4.00
MONDAY 14/7/86	REGISTRATION		REGISTRATION		COURSE OPENING & COURSE INFORMATION BY PROF. KULABA
TUESDAY 15/7/86	PROFESSIONAL BRIEFINGS by Zachariah & Mgogolo		PROFESSIONAL BRIEFINGS by Zacharia & Mgogolo		PROFESSIONAL BRIEFINGS By Victor Chisanga & R.Hussein
WEDNESDAY 16/7/86	PROFESSIONAL BRIEFINGS by Chisanga & Hussein		PROFESSIONAL BRIEFINGS by Magembe/Uisso/ Mwaiselage		professional Briefings by Magembe/Uisso
THURSDAY 17/7/86	INTRODUCTION TO LOW COST SANITATION by Peter		HISTORY OF DIFFERENT SANITATION SYSTEM by Peter		INTRODUCTION TO THE LIBRARY & DOCUMENTATION By Librarian
FRIDAY 18/7/86	CONVENTIONAL SYSTEMS OF SANITATION By Peter		SEWERAGE SYSTEMS By Peter		MALARIA VS DESIGNS OF SANITATION UNITS BY Prof. Kilama or J.N. Minja
SATURDAY 19/7/86	FIELD TRIP - SITE VISIT TO BUGURUNI LOW-COST SANITATION PROJECT				

/efg

WEEK 2

DATE/ TIME	8.00 - 10.00	BREAK	10.30 - 12.30	LUNCH BREAK	2.00 - 4.00
MONDAY 21/7/86	Indonesian expe-rience By JANSEN		Indonesian Exper-ience by JANSEN		Sewage treatment process by Msimbe
TUESDAY 22/7/86	Indonesian ecpe-rience By JANSEN		Development of questionnaires for field work By Participants		Development of questionnaires for field work by Participants
WEDNESDAY 23/7/86	The Hydrological Cycle By Mtoro		Sources of water Supply By Mtoro		Exercises MARC/CHAGGU/HUSSEIN
THURSDAY 24/7/86	Consumption needs for water By Mlagwanda		Water treatment By Mtoro		Exercises MARC /CHAGGU/HUSSEIN
FRIDAY 25/7/86	Drainage By Jansen		Drainage By Jansen		Planning of the field work MARC/CHAGGU/HUSSEIN
SATURDAY 26/7/86	SITE VISIT TO LOWER RUVU WATER TREATMENT PLANT CHAGGU/MASHAURI/HUSSEIN				

WEEK 3

DATE/ TIME	8.00 - 10.00	BREAK	10.30 - 12.30	BREAK	2.00 - 4.00
MONDAY 28/7/86	Construction of Low Cost Sanitation Projects by Baradyana		Construction of Low Cost Sanitation Projects By Baradyana		Effect of pollution on environment and man By Michael (PHE)
TUESDAY 29/7/86	Health and diseases control by Dr. Kihamia		Health and diseases control by Dr. Kihamia		Solid waste management By Jansen
WEDNESDAY 30/7/86	Minor works/public works water construction By Mashauri		(Indian experience By Jansen		Catchment dam digging, drilling & diverting By MASHAURI
THURSDAY 31/7/86	Low Cost Sanitation as a part of housing by Baradyana		BRU - Visit By Baradyana		Communication techniques for effective public participation in health and sanitation programmes (comparison of experiences By Chizenga, Zacharia & Malika.
FRIDAY 1/8/86	Wastermanagement Water By Msimbe		Case studies: effectiveness of oxidation/stabilization ponds in our urban centres by Msimbe		UDSM oxidation ponds visit By Msimbe
SATURDAY 2/8/86	TRAVELLING TO WANGING'OMBE - IRINGA				

WEEK 4

DATE/ TIME	8.00 - 10.00	BREAK	10.30 - 12.30	BREAK	2.00 - 4.00
MONDAY 4/8/86	Data Collection		Data Collection		Data Collection
TUESDAY 5/8/86	Data Collection		Data Collection		Data Collection
WEDNESDAY 6/8/86	Analyse the data + report making on the findings		Analyse the data + report making on the findings		Analyse the data + report making on the findings
THURSDAY 7/8/86	Formulate proposals to be worked out containing technical things + health education aspects	TEA	Formulate proposals to be worked out containing technical things + health education aspects.	LUNCH	Formulate proposals to be worked out containing technical things + health education aspects
FRIDAY 8/8/86	Expose ideas to the local officials & representative of the people		Expose ideas to the local officials & representative of the people		Concluding Session
SATURDAY 9/8/86	T R A V E L L I N G				B A CK TO DAR

WEEK 5

DATE/ TIME	8.00 - 10.00		10.30 - 12.30		2.00 - 4.00
MONDAY 11/8/86	The structure of health Institutions in Tanzania by Ilomo	BREAK	Solid waste Management By Jansen	LUNCH BREAK	Intergrated urban development by Jansen
TUESDAY 12/8/86	Integrated urban development by Jansen		The development of underdevelopment By Zacharia		Political economy of health and sanitation in colonial and post colonial Tanzania By Zacharia.
WEDNESDAY 13/8/86	Transmission of infectious diseases By Dr. Kihamia		Transmission of infectious diseases By Dr Kihamia		
THURSDAY 14/8/86	The Structure of Health institutions in Tanzania By Ilomo		Effect of Pollution on environment By Michael		The Role of women in water supply and sanitation by G. Mesacki
FRIDAY 15/8/86	Low cost sanitation in sites & services areas by Makerere		Financial aspects of sanitation By Msimbe		Malaria vs design of sanitation units By Prof. Kilama/ J.N. Minja
SATURDAY 16/8/86	SITE VISIT TO TEMEKE VIPs - By Peter Howkins				

WEEK 6

DATE/ TIME	8.00 - 10.00		10.30 - 12.30		2.00 - 4.00
MONDAY 18/8/86	Ardhi Ministry's experience in management of experimental VIPs by Makerere	TEA BREAK	Community devept. approaches in relation to health and sanitation aspects - Zacharia	LUNCH BREAK	FINALISATION OF FIELD WORK REPORT
TUESDAY 19/8/86	Sewage treatment processes By Msimbe		Guided discussion on sewage treatment processes & management By Msimbe		EXERCISES
WEDNESDAY 20/8/86	Tanzania and the International Decade of water & Sanitation By Makerere		The influence of housing environment on public health by Chisanga		EXERCISES
THURSDAY 21/8/86	The biotic and abiotic environment By Sambali		Natural ecosystems By Sambali		EXERCISES
FRIDAY 22/8/86	Water Supply and Low cost Sanitation materials (Technology) By Msimbe		Water Supply and low cost sanitation materials (Technology) By Msimbe		FINALISATION OF FIELD WORK REPORT AND SUBMISSION
SATURDAY 23/8/86	SITE VISIT TO PUMPING STATION AND SEWER OUTFALL (GYMKHANA)				

WEEK 7

DATE/ TIME	8.00 - 10.00		10.30 - 12.30		2.00 - 4.00
MONDAY 25/8/86	The Planning of water supply by Mashauri		Maintainance of W/S & sewerage systems - by DSSD		Water Supply by Mashauri
TUESDAY 26/8/86	PRESENTATION	TEA BREAK	PRESENTATION	LUNCH BREAK	PRESENTATION
WEDNESDAY 27/8/86	The Planning & Operation of waste stabilisation ponds in developing countries with a hot climate by Msimbe		Tanzanian experienceo on the use of bamboo & wood-stave pipes in WS By Katakweba		
THURSDAY 28/8/86	Aerial Photography Introduction By Uisso/		Tanzanian experience with low cost sanitation projects by Runyoro		Water supply & Sanitation implementation problems in Tanzania maintenance of w/s & sewerage systems By DSSD
FRIDAY 29/8/86	Aerial Photography By /Uisso		The Planning & Operation of waste stabilisation ponds in developing countries with a hot climate - Msimbe		Maintenance of w/s & sewerage systems By DSSD
SATURDAY 30/8/86	Legal aspects of land acquisition for sanitation and water supply projects - by Ringo				

WEEK 8

DATE/ TIME	8.00 - 10.00		10.30 - 12.30		2.00 - 4.00
Monday 1/9/86	Administration & management of public health & sanitation programme in Tanzania (Case study) by MAJOLLO	TEA BREAK	Administration & Management of public health & sanitation programme in Tanzania (Case study) by Majollo	LUNCH BREAK	Practicals on aerial photography with sanitation By Uisso
TUESDAY 2/9/86	Goals and components of DSM. Low Cost Sanitation project by Njau		Bureaucracy and public participation in Tanzania by Majollo		Mlalakua site visit-appraising individual efforts on water supply provision vs latrines by participants.
WEDNESDAY 3/9/86	Communication techniques for effective public participation in health and sanitation programmes by Chizenga & Malika + Zacharia		Communication techniques for effective public participation in health & sanitation programmes by Chizenga &Malika & Zacharia		
THURSDAY 4/9/86	Manzese site visit comparison with Mlalakua by Participants		Manzese visit by Participants		Preparation of site visit report & submission
FRIDAY 5/9/86	Operation and maintenance services for DSM City sewerage & Sanitation by Mfangavo		Operation & maintenance services for DSM City Sewerage & Sanitation By Mfangavo		Managing and Maintaining rainwater collector systems By Mashauri
SATURDAY 6/9/86	GENERAL DISCUSSION ON SITE VISITS' REPORT AND RECOMMENDATIONS.				

WEEK 9

DATE/ TIME	8.00 - 10.00		10.30 - 12.30		2.00 - 4.00
MONDAY 8/9/86		TEA BREAK	Maintanance of water supply & Sanitation systems By Njau	LUNCH-BREAK	Slides show
TUESDAY 9/9/86	Goals and Components of DSM low cost sanitation (Project experiences) By Njau		Goals and components of DSM low cost sanitation (Project experiences) By Njau		Slides show
WEDNESDAY 10/9/86	Presentations of case studies by participants		Presentations of case studies by Participants		Presentations of case studies by Participants
THURSDAY 11/9/86	Presentations of case studies by Participants		Presentations of case studies by Participants		Bench mark test 2
FRIDAY 12/9/86	Presentations of case studies by Participants		Presentations of case studies by participants		Presentations
SATURDAY 13/9/86	EVALUATION OF THE COURSE AND CLOSING CEREMONY				

ANNEX XVII

Questionnaire for Course Evaluation

CENTRE FOR HOUSING STUDIES
ARCHI INSTITUTE

COURSE EVALUATION
16TH REGIONAL COURSE ON WATER SUPPLY AND LOW COST SANITATION
(From 14th July - 13th Sept. 1986)

1.0 Introduction.

The evaluation of the course is done by the Centre's staff who will write an evaluation report and make recommendations for improvements. Part of the evaluation is done orally, in discussions and interviews with the participants, during the last week of the course. In addition, the questionnaire is used, to be completed by every participant. The questionnaire is composed of five parts.

1. An evaluation of the different subjects of the course
2. An evaluation of the fieldwork, practicals and site visits
3. An evaluation of the working group sessions and exercises
4. An evaluation of the course as a whole
5. An evaluation of the living conditions and other services

2.0 EVALUATION OF SUBJECTS

The course subjects have been numbered as follows

1.	Introduction to Low Cost Sanitation	by Peter(DSSD)
2.	History of different Sanitation system	- " -
3.	Conventional systems of Sanitation	- "-
4.	Sewerage Systems	- " -
5.	Malaria Vs Designs of Sanitation	by Prof. Kilama (NIMR)
6.	Indonesian experience	by Marc Jansen (IHS)
7.	Drainage.	- " -
8.	Solid waste management	-" -
9.	Indian experience	- " -
10.	Intergrated Urban Development	- " -
11.	Sewerage Treatment	by Msimbe (UDSM)
12.	Waste water management	- " -
13.	Case studies: effectiveness of oxidation/ stabilization ponds in our urban centres	- " -
14.	Financial aspects of sanitation	- " -
15.	Guided discussion on sewage treatment processes and management	- " -
16.	Water supply and low cost sanitation materials	- " -

17. The planning & operation of waste stabilization ponds in developing countries with a hot climate by Msimbe (UDSM)
18. The hydrological Cycle by Mtoro (NUWA)
19. Sources of water supply - " -
20. Consumption needs for water - " -
21. Water treatment - " -
22. Construction of low cost sanitation by Baradyana (BRU)
23. Low cost sanitation as part of housing - " -
24. Effects of pollution on environmental by Michael :(ARI)
25. health and diseases control by Dr. Kihamia (MMC)
26. Transmission of infections diseases - " -
27. Minor works/Public works water construction by Dr. Mashauri(UDSM)
28. Catchment dam digging, drilling & diverting - "
29. The planning of water supply - " -
30. Water supply - " -
31. Managing and mainteining rain water catchment - " -
32. Communication techniques for effective public participation in health and sanitation programmes by Chizenga (MMC)
33. The structure of Health Institutions in Tanzania by Ilomo (AFYA)
34. Development of underdevelopment by Zacharia (CHS)
35. Community development approaches in relation to health and sanitation by Zacharia (CHS)
36. Political economy of health and sanitation in colonial and post colonial Tanzania - " -
37. The Role of women in water supply and sanitation by G. Mesacki
38. Low cost sanitation in sites & services areas by Makerere
39. Ardhi ministry's experience in management of experimental VIPS - " -
40. Tanzania and the International Decade of water and sanitation - " -
41. The Influence of housing environment on public health by Chisanga (CHS)
42. Tanzanian experience on the use of Bamboo & woodstave pipes in water supply by Katakweba (MAJI)
43. Aerial photography by Msso (CHS)
44. Tanzanian experience with low cost sanitation by Runyoro
45. Administration & management of public health &sanitation programme in Tanzania (case study) by Majollo
46. Bureaucracy and public participation in Tanzania - " -

47. Operation & maintenance services for DSM city sewerage and sanitation systems by Mfangavo

2.1 Describe the knowledge offered in these subjects
Grades a - completely new. b- Generally new c- Partly new
d- Hardly new e- Not well at all

2.2 Evaluate the relevance of the subject for you
a - Highly relevant b- Quite relevant c- somewhat relevant
d Hardly relevant e- Irrelevant

2.3 Evaluate the time spent on the subjects
a- Too little b- Little c- Enough
d- Much e- Too much

2.4 Evaluate the presentation of the different parts of the subjects
a- Excellent b- Good c- Sufficient d- Inadequate
e Poor

2.5 How clear and intergrated were the practical and theretical problems dealt in the subject.
a- Very clear intergrated b. Quite clear intergrated
c -Some what clear & intergrated d. Not clear intergrated at all

2.6 How do you evaluate the time assigned for discussions
a- Much more time should have been assigned
b- Some more time should have been assigned
c- The time assigned was enough
d- Less time could be enough

2.7 How do you evaluate the guidenee offered by the Centre's staff on the subject
a- Right amount
b- Adequate
c- Inadequate
d- None

2.8 Comment on any or all of the subjects offered in the course
.....
.....
.....
.....

EVALUATION TABLE

Subject no / Question No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	24	25	26	28	28	29
2.1																														
2.2																														
2.3																														
2.4																														
2. 5																														
2.6																														
2.7																														

Use the grades defined under each question to evaluate the subjects in the evaluation table.

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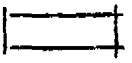
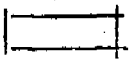
Evaluation table

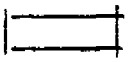
Subject no / Question no	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
2.1																		
2.2																		
2.3																		
2.4																		
2.5																		
2.6																		
2.7																		

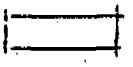
3.0 EVALUATION OF FIELDWORK PRACTICALS & SITE VISITS

3.1 How relevant was the field work to the previous part of the course?

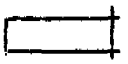
Very relevant 

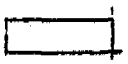
Relevant 

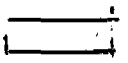
Not so relevant 

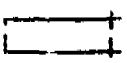
Irrelevant 

3.2 How useful were the field/interviews in view of your future performance in your job?

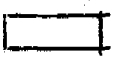
Very useful 

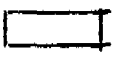
Useful 

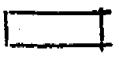
Not so useful 

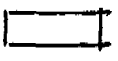
Irrelevant 

3.3 How do you assess the organisation of the Fieldwork

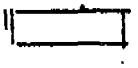
Very well organized 

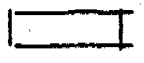
Well organized 

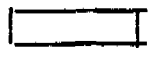
Not so well organised 

Poorly organized 

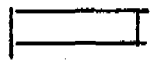
3.4 How do you assess the time allocated to the fieldwork in relation to the whole course programme?

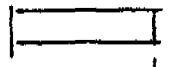
too much time 

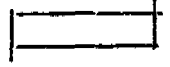
sufficient time 

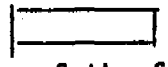
insufficient time 

3.5 How do you value the preparation of the fieldwork in class?

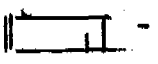
very good 

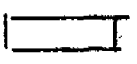
good 

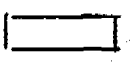
inadequate 

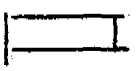
poor 

3.6 How do you value the guidance of the field work by the staff members

very good 

good 

inadeqate 

poor 

3.7 Did the field work give you *insight into* the application of the theoretical knowledge offered before?

very much ☐
sufficient ☐
not much ☐

3.8 Was there enough time to review and discuss the acquired experience?

too much ☐
sufficient ☐
too little ☐

3.9 Was there *enough* time for

a) Data Collection from Political leaders, officers water Engineer & Health officers?

too much ☐
sufficient ☐
too little ☐

b) Data analysis in the field

too much ☐
sufficient ☐
too little ☐

c) Proposal formulation

too much ☐
sufficient ☐
too little ☐

d) Idea exposition to local officials

too much ☐
sufficient ☐
too little ☐

e) Fieldwork report preparation

too much ☐
sufficient ☐
too little ☐

f) field work report presentation

too much ☐

sufficient ☐

too little ☐

3.10 Make any remarks or suggestions for improvement related to

a) Data collection in the field.....

.....

.....

b) Data analysis in the field.....

.....

.....

c) Formulation of proposals .....

.....

.....

d) Idea exposition to local officials & people.....

.....

.....

3.11 How relevant was the site visits to the course

Relevant ☐

Irrelevant ☐

4.0 EVALUATION OF THE WORKING GROUP SESSIONS AND EXERCISES

4.1 Did the course live up to your expectation?

It has been much better than expected ☐

It was above my ecpectations ☐

the course was what I expected ☐

the course was below my expectation ☐

the course has been disappointing ☐

Why?.....

.....

.....

.....

4.2 Did you feel that the course as a whole both practical and theoretical problems were presented in a clear integrated way?

all was very clear and integrated ☐

quite clear and integrated ☐

somewhat clear and integrated ☐

hardly clear and integrated ☐

not clear and integrated ☐

4.3 How do you evaluate the relevance of course contents to the demands arising from circumstances that prevail in the work situation?

highly relevant ☐

of considerable relevance ☐

fair ☐

hardly relevant ☐

irrelevant ☐

4.4 Do you feel that the course has given you new ideas and insight

many ☐

some ☐

few ☐

none ☐

Comments: .....

.....

.....

.....

4.5 Do you feel that a mixture of participants with various skills and backgrounds is beneficial to the course and has been sufficiently exploited in its programme?

very beneficial and well used ☐

generally benefits and use ☐

of some benefits and use ☐

not very beneficial and use ☐

not beneficial and use at all ☐

4.6 What subjects did you miss in the course programme

.....

.....

.....

.....

4.7 How do you evaluate the sequence of the different subjects?

right ☐

wrong ☐

Do you experience the partial mixture of topics as good and attractive or would you rather prefer that topics are treated as blocks, one after the other? I prefer:

mixture ☐

blocks ☐

If you found the sequence wrong, what would you propose as better sequence

.....

.....

.....

.....

4.8 How do you evaluate the relation between different subjects?

fully interrelated ☐

considerably interrelated ☐

somewhat interrelated ☐

hardly interrelated ☐

4.9 Could you indicate particular subjects of the course that were most useful:to you; (write the subject number)

.....

.....

.....

And subjects which were least useful to you:

.....

.....

.....

.....

.....

And new subjects, which should be taught:

.....

.....

.....

.....

4.10 After having completed this course, what do you think would be the most suitable duration for future courses, assuming that ojectives are the same

.....

.....

4.11 The course had several components, notably:
- lectures and discussions
- exercises related to those
- lecture notes and reports
- lectures from guest lecturers

The division of time among these components was:

completely right ☐
more or less right ☐
somewhat wrong ☐
completely wrong ☐

which component should have got more time emphasis:

.....+...
.....
.....

4.12 How do you value the workload, this course has imposed upon you?

too much work ☐
much work ☐
about right ☐
little work ☐
too little work ☐

5.0 GENERAL

5.1 How do you assess the availability and performance of the staff on the following aspects:

	Excellent	Good	Acceptable	Hardly acceptable	poor	V.poor
Organization						
Administrative & Secretarial support						
Overall contacts						

5.2 How do you assess the performance of the outside staff i.e. guest lecturers both local and international

good ☐
acceptable ☐
causing too much problems ☐

5.3 How would you assess the following aspects?

	Excellent	Good	Acceptable	Hardly acceptable	Poor	V. poor
1.Housing condition at CHS domitaries						
2.Social &recreational activities						
3.Contacts with other participants						
4.Contacts with staff						
5.Transport facilities						

Do you have any suggestions for improvements?

.....

.....

.....

5.4 Comments about the course as a whole (You can use the overleaf space)

/ln

ANNEX XVIII

Evaluation Report 24th Course

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

COURSE EVALUATION REPORT

24TH COURSE ON WATER SUPPLY AND LOW COST SANITATION

23RD JANUARY - 15TH APRIL, 1989

1.0 INTRODUCTION

The evaluation of the Course was done by the Participants who filled the questionnaires which were pre - prepared.
The questionnaires were composed of five parts:

1. An evaluation of the different subjects ofthe Course
2. An evaluation of the field work, practicals and site visits
3. An evaluation of the working group sessions and exercises
4. An evaluation of the Course as a whole
5. An evaluation of the living Conditions and other Services.

2.0 EVALUATION ON COURSE SUBJECTS

2.1 COURSE SUBJECTS

The Course subjects covered were as Following:-

1. Low - Cost Sanitation options by Barnabyana (ERU)
2. Water Quality Management, by Mgana (PHE)
3. Slow - Sand filters, by Dr. Mashauri (UDSM)
4. Rapid - Sand filters, by Dr. Mashauri (UDSM)
5. Consumption needs for water, by Chaggu (CHS)
6. Paper on Tanzanian Water Policy, by Kaseva (PHE)
7. Tanzanian Water Policy, by Rutashobya (Maji - Ubungo)
8. Land Acquisition and Water Law, by Ringo (UDSM)
9. Environmental Health & Malaria Vs design of Sanitation Units, by Rongo (Muhimbili Faculty of Medicine)
10. Report writing, by Chaggu (CHS)
11. Paper Presentation on Oxidation Ponds, by Mayo (UDSM)
12. Role of Water in nature, by Rutashobya (Maji - Ubungo)
13. Solid Waste, by Chaggu (CHS) & Marry (IHS)
14. The structure of health institutions in Tanzania,
15. Water Supplies neighbourhood level, by Marry (IHS)

16. Solid Waste Management, by Harry (IHS)
17. Modelling of Water quality Parameters, by Mwamuzi (UDSM)
18. Wells and Handpumps Module, Harry (IHS)
19. Political Economy, Zacharia (CHS)
20. Indian Water Supply & Sanitation experiences, Harry (IHS)
21. Oxidation/stabilization Ponds, Msimbe (UDSM)
22. The Role Women in water supply and Sanitation, Alice (UDSM)
23. Sewage treatment processes, Msimbe (UDSM)
24. Experiences in Rural & Semi Urban water Supply project in Asia, Harry (IHS)
25. Low-Cost Pit Emptying, Jaap
26. Transmission of diseases Prof. Kihamia (Muhimbili Faculty of Medicine)
27. Drainage, Harry (IHS)
28. Nepal gravity flow, Harry (IHS)
29. Role of Health Education, Swai (DRSD)
30. West African water supply and Sanitation experiences, Harry (IHS)
31. Community Participation, Zacharia (CHS)
32. World Bank Modules on handpumps, Malawi and Luvulezi Water Supply Scheme, Harry (IHS)
33. Rainwater Harvesting, Harry (IHS)
34. Demonstration on pit emptying, Jaap
35. RSF, SSF, Upflow filters, Dr. Cook
36. Influence of Housing on public health, Chisungu (CHS)

2.2 SUBJECTS EVALUATION

2.2.1 Knowledge offered

On responding to the knowledge offered by the above mentioned subjects the participants felt:-

25% - partly new and
75% - generally new

2.2.2 Relevance of the subjects

The relevance of the subjects to the participants were regarded as:-

12.5% - quite relevant and
87.5% - highly relevant

2.2.3 Time spent

The time spent on the subjects was rated as:-

87.5% - enough and

12.5% - little for some subjects

2.2.4 Presentation of subjects

The presentation of the different parts of the subjects was evaluated as:-

25% - excellent and

75% - good

2.2.5 Clear and Intergrated

On the question of how clear and intergrated were the practical and theoretical problems dealt in the subjects, the participants were of the opinion that:-

12.5% - very clear and intergrated

87.5% - quite clear and intergrated

2.2.6 Time for discussions

The time assigned for discussions was evaluated as:-

50% - much more time should have been assigned

25% - some more time should have been assigned

25% - the time was enough

3.5 Class preparation of field-work

The preparation of the field-work in class was valued as:-

37.5% - very good

37.5% - good and

25% - poor

3.6 Guidance of field-work

The guidance of the field-work by the staff members was valued as:-

25% - very good and

75% - good

3.7 Field-work insight

Whether the field-work has given insight into the application of the theoretical knowledge offered before, the participants were of the opinion that:-

50% - very good

50% - sufficient

2.2.7 Guidance offered by Centre's Staff

The guidance offered by the Centre's Staff on the subjects was evaluated as:-

50% - right amount

50% - adequate

2.2.8 Subject Comments

The comments given on the subjects offered in the course are as following:-

- the idea of one lecturer teaching one topic is good
- the treatment of water at domestic level should be given more weight and
- influence of housing on public health as well

3.0 EVALUATION OF FIELDWORK, PRACTICALS AND SITE VISITS

3.1 Relevance of Field - work

The relevance of fieldwork as relative to the theoretical part of the course was rated as:-

75% - very relevant and

25% - relevant

3.2 Field Interviews usefulness

The usefulness of the field interviews in future performance of job was regarded as:-

87.5% - very useful

12.5% - useful

3.3 Organisation of the fieldwork

The organisation of the field - work was assessed as:-

12.5% - very well organised

62.5% - well organised

12.5% - not well organised

3.4 Field - work time

The time allocated to the field-work in relation to the whole course programme was assessed as 100% sufficient

3.8 Time for Review

The time to review and discuss the acquired experience was rated as:-

37.5% - sufficient

62.5% - too little

3.9 Time (enough)

Time for various things was checked whether it was enough or not accordingly:-

a) Data collection from officials was rated as:-

25% - too much and

75% - too little

b) Data analysis was regarded as:-

75% - sufficient and

25% - too little

c) Final project report preparation was rated as:-

87.5% - sufficient and

12.5% - too little

d) Field - work report presentation was valued as:-

100% - sufficient

3.10 Remarks for improvement

The remarks or suggestions for improvement given are as following:-

a) Data collection

- explanation how to handle interviews
- prior information to be given to people

b) Data analysis

- common approach (for all groups) and enough time to be given
- the time given should march with the amount of data collected

c) Report writing

- time was enough
- group report should be encouraged
- field document (report), to be posted to the participants

3.11 Site visits

The site visit have been commended to be highly relevant.

3.12 Visits suggestions

Other places proposed to be worthy visiting includes:-

- Waste Stabilization Ponds
- DSSD
- BRU
- Sea Outfall
- Botswana and Zimbabwe VIPs

4.0 EVALUATION OF THE WORKING GROUP SESSIONS AND EXPERIENCE

4.1 Expectation

When asked whether the course lived up to the course participants' expectation, they said:-

12.5% - much better than expected
37.5% - above their expectation
37.5% - what was expected
12.5% - below expectation

4.2 Relevance of course contents

The relevance of the course contents to the demands arising from circumstances that prevail in the work situation was evaluated as:-

50% - highly relevant and
50% - of considerable relevance

4.3 Course's new ideas

Whether the course has given the participants new ideas and insight, they felt that:-

75% - many and
25% - some

4.4 Subjects missed

In the course programme, the subjects missed were as following:-

50% - none
12.5% - one
12.5% - three and 25% - no comment

4.5 Sequence of subjects

The sequence of different subjects was evaluated as:-

87.5% - right and

12.5% - wrong

4.6 Most useful subjects according to the numbers in section 2.1 were 1,2,3,4,7,8,9,10,11,13,16,18,19,22,24,25, 26,27,29,31,32,35,36,37, and about 37.5% of the participants felt that all were very useful.

However, the least useful subjects were 6,12 and 17.
The new subjects proposed to have been taught included:

- project construction and management
- urban drainage
- underground drainage
- design of plumbing network
- computer programming

4.7 Suitable duration of the course

The suitable duration of the course was regarded to be:-

50% - same 3 months

12.5% - 6 months and

37.5% - 4 months (2 theory and 2 practical research

4.8 Valuation of work - load

The valuation of the work - load imposed on the participant was regarded as:-

37.5% - too much work

12.5% - much work and

50% - average work

5.0 GENERAL

5.1 Availability and performance of staff was rated as:-

organisation:- 62.2% - excellent

37.5% - good

administrative:- 25% - good

25% - acceptable

50% - poor

Secretarial services:- 37.5% - excellent
50% - good
12.5% - acceptable

Overall contacts:- 87.5% - good
12.5% - acceptable

5.2 Outside staff performance

The performance of outside staff was assessed as 100% good.

5.3 CHS in general

The general assessment of the Centre for Housing Studies (CHS) was as following:-

a) Housing condition at CHS dormitories was regarded as
12.5% - excellent
37.5% - good and
50% - acceptable

b) Social and recreational activities were rated as:-
25% - good
12.5% - acceptable
50% - poor and
12.5% - no response

c) Contacts with other participants was:-
62.5% - excellent and
37.5% - good

d) Contacts with staff was:-
12.5% - excellent
75% - good and
12.5% - acceptable

e) Transport facilities were:-
12.5% - excellent
37.5% - good
37.5% - acceptable and
12.5% - poor

The suggestions given regarding 5.3 section were:-

- administration of food provision should be improved
- availability of stationery should be improved
- participants should be given free time and transport to visit certain parts of the city
- there is a poor drainage system at the bathrooms
- dormitory bulbs are not powerful enough for studying and reading.

5.4 Comments about the course as a whole

The general comments about the course as a whole are as listed below:-

- nice course and very educative so keep it up
- late receival of handouts
- poor administrative structure which is mostly caused by the CHB administration
- work done by the course co-ordinator is worthy to be praised; her tiresome job for ensuring that all the academic matters took place well
- the seminar presented more problems which enviched the course very tremendously
- the course has refreshened the participants knowledge
- visiting lectures should be encouraged as they enrich the course very nicely
- course participants should be given opportunity to visit neighbouring countries for field-work.

6.0 CO-ORDINATOR'S COMMENTS

The course participants were very co-operative and as such, contributed very positively to the success of the course. The visiting lecturer from U.K. (Dr. Adrian Coad) was very much impressed by the standard of understanding of the participants. He rated it as a"high standard."

Few problems which arose during the course were mostly of administrative nature. In general the course was a success and all participants had passed.

ANNEX XIX

Format Appraisal Form Participants

TH COURSE ON LOW-COST WATE

(D

APPRAISAL PARTICIPAN

	COURSE ACTIVITIES																				
	EXERCISES:										SITE VISITS:										FI
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	Gr
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SUPPLY AND SANITATION

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up:	Indiv:					