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UNITED NATIONS DEVELOPMENT PROGRAMME

PROJECT OF THE GOVERNMENT OF

ETHIOPIA

PROJECT DOCUMENT

Title	Project Engineering and Management Services Unit (PEMSU)
Number: DP/ETH/89/009	Duration: 4 years

Project Site: Addis Ababa
Sector: 05
Sub-sector: 0510

Host Country Implementation Agency:	UNDP and cost-sharing financing
Engineering Design and Tool Centre:	UNDP $ 2,120,550

Estimated starting date: March 1991

Government inputs: Birr 5,332,900

Brief description

Development of an institution to stimulate increased domestic sourcing in capital projects and to provide core services in project engineering design and project management services.

Signed Date Name/title

On behalf of the Government
On behalf of the Executive Agency
On behalf of the United Nations Development Programme
UN Official exchange rate at date of last signature $1.00 =

A. CONTEXT

The Ethiopian Industrial Sector

The industrial sector in Ethiopia employs less than 1% of the total workforce, accounts for no more than 6% of the total exports and contributes lower than 11% to the GDP.

Industrial output is dominated by the state. In 1986/7 there were 369 establishments and although evenly split in terms of establishments between the state and the private sector, around 97% of capitalisation and value added was attributable to the state. Overall in recent years there has been little change in these balances.

The Ministry of Industry's ten major corporations, namely;

* textiles
* beverages
* food
* leather and shoe
* sugar
* tobacco and matches
* metal works
* chemicals
* cement
* printing.

and a number of share companies in which the state has a major share dominate the industrial sector of Ethiopia.

They are all import dependant with around 40% of their raw materials and 98% of capital goods imported.

The National 10 year Perspective Plan

The National 10 year Perspective Plan (1984 - 1994), contains five major objectives for industry:

* increase the quantity and quality of basic consumer goods such as foods, textiles and pharmaceuticals, to raise the standard of living of the population
* expand and establish capital and intermediate goods industries supporting agriculture and other sectors of the economy
* strengthen handicrafts and small scale industries
* contribute towards the improvement of balance of the payments position of the country through export promotion and import substitution
* lay the base for a development of heavy industries.

Capital Projects

Implementation of the ambitious Capital Expenditure Programme has been erratic in recent years and overall is running at around 3.4 times the level of Ordinary Capital Expenditure. The trend of higher average levels of foreign components, now approaching 70%, combined with an increasing shortage of foreign exchange has led to a further slowdown in the rate of uptake of new projects.

This trend in higher levels of foreign components in major projects is the result of a combination of the nature of the plant and technology employed, the limitations of the domestic engineering base and the shortage of basic materials for conversion into plant items.

Ordinary Capital Expenditure, that is new investments made for replacement, debottlenecking, minor additions and renovations of existing establishments has been fairly well spread between Corporations in recent years and the highest spenders have been in beverages, textiles and food. The Government's emerging economic and enterprise policies will place greater emphasis on improved business performance in the public sector and one of the expected consequences is a progressive change in emphasis of projects from large new capital projects to more ordinary capital expenditure projects.

Project Implementation Capability

There is more than sufficient evidence to demonstrate that Ethiopian industry already has a considerable, although under-utilised, expertise at varying levels of sophistication, in most stages of the project cycle.

The limitations of foreign currency is one of the key factors which has led to a very low utilisation of installed capacity; estimated by some to be as low as 30% largely through raw materials shortages. Thus there is a large pool of under-utililsed facilities in industry which could be utilised to support the development of indigenous skills and capabilities.

However the current low level of domestic sourcing of projects, averaging for major capital projects including civil works around 30%, is a real constraint on industrial development in a country with severely limited foreign exchange. Increasing the level of domestic sourcing in capital projects is clearly a national priority.

The private sector is already involved, as far as it is permitted, in domestic sourcing and has a major role to play in raising it's level. It is evident that once the private sector's confidence has been re-established it will grasp the business opportunities presented by increased domestic sourcing and this will very quickly lead to job creation since there is less slack to take up here than in the public sector.

The Government's new economic policy initiatives are intended to provide the framework for and create the enabling environment to foster the development of the private sector. It is also understood that international development agencies are planning to provide funding support for enterprise development.

Related Developments

Increased emphasis is now being given to developing the engineering industries skills, capability and capacity base and a wide range of new initiatives to achieve this have already been taken. For example new facilities such as the Spare Parts factory at Akaki have been established, and facilities such as the Engineering Design and Tools Centre are under development. These are all expected to have a major supporting role to ordinary capital projects, help to reduce foreign currency demands and begin to stimulate new employment opportunities.

B. PROJECT JUSTIFICATION

PEMSU and its Origins

In 1983 UNIDO commissioned project preparatory studies into the development of a domestic capability within the Ministry of Industry's National Metalworks Corporation in engineering design, contracting and toolmaking. This resulted in a project to develop a triple function institution comprising:

* Engineering Design Centre (EDC) for the design and manufacture of prototype machinery and equipment which would be suitable for large scale commercial domestic manufacture and for the training of engineers in engineering and design

* Tool Centre (TC) for the design and manufacture of tools, dies, jigs and fixtures and for the training of engineers in tool design and production
* Project Engineering and Contracting Unit (PEMSU) to provide a national contractor to undertake work in the field of plant and utilities embracing systems engineering, inspection, erection supervision and technical document preparation.

During the formulation of the agreed project document DP/ETH/83/024/D/01/37 Engineering, Design and Tool Centre (EDTC), it was decided not to proceed at that time with the PEMSU component. However it was agreed that a space provision would be made in the new EDTC building.

The New PEMSU and its Aims

The original overall aim for PEMSU was to establish a core of domestic expertise in engineering contracting.

However in the light of the changes that have taken place in Ethiopia in recent years, in particular the Government's mixed economy initiatives, the strengthening of the industrial base and the changing patterns of projects and their implementation, the original aim of PEMSU is no longer considered to be appropriate.

Accordingly the overall aim of PEMSU has been redefined as:

to facilitate an increase in the level of domestic sourcing in projects which will result in both job creation and a reduced demand for foreign exchange

and the institution has been renamed to the Project Engineering and Management Services Unit PEMU.

This aim can be achieved through the development of an institutional arrangement based upon:

* strengthening and developing the existing capabilities for project management, general engineering, fabrication and installation
* encouraging project owners using information and promotional activities at all stages of the project cycle to take local sourcing initiatives and to make voluntary commitments to slowly raise their content
* initiating demonstration projects
* providing support and advisory technical services to assist project owners in areas of perceived need
* providing support and advisory technical services to support domestic suppliers, in the public and private sectors to support their successful entry into the market.

The rate of growth of domestic sourcing is at this stage difficult to predict but the general view is that once the principles and practices have been established and confidence developed by suppliers and project owners, the rate of growth could be rapid. Under such circumstances the Consultant does not consider it appropriate to lay, through PEMSU, the foundations for a large institution but rather to create small cells of expertise that can grow in situ or as separate entities in line with demand for their services. Equally at this time it is not possible to define whether this second phase of growth should be within the public or private sector or through forms of partnership or joint venture.

Target Beneficiaries

All parties involved in the domestic sourcing process, that is:

* **domestic suppliers** through increased business activity which if managed well will yield improved business performance

* **project owners** whose projects should be completed at lower foreign currency cost and who will have available to them a local supply chain for future repair and replacement
* the **nation's** economy because the demand for foreign currency for a given project should be reduced by adding value locally which enables either that currency and any accompanying debt service payments to be put into reserves or as will be the situation in Ethiopia for many years, to alternative use
* the **labour market** for which new employment opportunities will emerge will directly benefit from increased levels of local economic activity
* **Corporations** with under-utilised facilities which can be used for domestic sourcing and thereby create the potential for improved business performance.

Since the overwhelming majority of the nation's manufacturing industry and therefore project owners are vested in the Public Sector and notwithstanding the plans under development for its restructuring and the Governments proposals for a mixed economy, the majority of PEMSU's customers will be the emerging various forms of public sector companies and also the major beneficiary of increased domestic sourcing.

The Need for UNDP/UNIDO Assistance

A review of the development of domestic project implementation in Ethiopia demonstrates that a capability exists at all stages of the project cycle. Increasingly project owners, particularly of smaller ones, no longer be see their project as single packages to be subcontracted to a foreign general contractor.

Thus the foundations have been established, a basic technical capability is in place and the physical facilities are available to begin now to raise the level of domestic sourcing in capital projects.

However there are key skills and resources shortages in a number of areas which are unlikely to be overcome in the short term without external assistance.

In addition within the EDTC project, which is currently under implementation, physical and administrative provisions have already been made for PEMSU and will be available in 1991.

Therefore it is considered that it is now an appropriate time to support a PEMSU institutional development project with UNDP/UNIDO resources and that this should take place as an additional component of EDTC.

PEMSU's Activities and Services

The activities and services required to support the development strategy are:

* Design House providing general engineering design services in industrial buildings, mechanical services, structural engineering and electrical services
* Domestic Sourcing Promotions Unit
* Project Management Services Unit providing time and cost control, contracts and inspection services.

It is recommended that these services, with the exception of those of the Domestic Sourcing Promotion Unit, should not, from the outset, be provided free of charge. The aim must be to develop these services into viable businesses within a few years. (This of course will exclude the initial costs of specialist external advisers and for a period capital charges). It is important that market forces are applied as soon as possible to sharpen efficiency and effectiveness and to provide a sound foundation for long term success.

It is also considered essential that action is taken to alleviate the acute materials shortages experienced by project owners as this will have potentially an even greater negative impact upon projects as the levels of domestic

sourcing grow. Some form of Stockholder Services are required but these are outside the scope of this project.

Institutional Arrangements

In order to bring PEMSU into effective operation quickly, special attention needs to be paid to:

* human resources development with an emphasis on the development of useable job skills through coached live on-the-job assignments
* institutional arrangements especially those for its promotional activities, as it is important that they are not seen by all those involved in domestic sourcing as an instrument of either government or of a particular Corporation
* the effects of increased levels of domestic sourcing on the project implementation process

Human Resource Development

Without sufficient attention being paid to the human resources aspects it is unlikely that facility provisions will be successfully brought into productive use within a reasonable time scale.

Success will be greatly dependent upon the staff's level of usable skills and knowledge which have been developed through education and training. Conventionally for industrial development this has been provided by various forms of on-the-job training for workers and of fellowships for management and technical staff.

In the past, the majority of fellowships for developing countries were provided for higher education normally at first or a second degree level. Whilst this helped to raise overall levels of higher education attainment, rarely did such fellowships provide directly usable industrial skills. It was necessary to spend

a further considerable period of time to develop the necessary range and level of applied skills.

The levels of education attainment developing countries have continued to climb in recent years and in countries such as Ethiopia, with its increased output from the University of Addis Ababa, there are resources with technical knowledge which have not developed the necessary applied skills.

Accordingly the nature of fellowships has changed to comprise a small knowledge component to fill identified shortfalls through short courses, and a much larger job experience component.

Further it has become apparent that insufficient fellows are returning with the necessary developed usable skills to enable them to meet the needs of their assigned jobs even to a reasonable standard of performance.

It is therefore considered necessary to change the approach to the training management and technical staff. The Consultant is of the view that the training design process should be carried out in more detail will greater attention to an individual's task needs, by:

* bringing the trainer and training to the individuals work centre
* developing applied skills through extended live work assignments with the direct coaching support.

Developing Domestic Sourcing and its Effects on Projects

During the early stages of a nation's industrial development when very limited capability is available locally, the technology and the facilities are purchased as a "package" usually with operational assistance. This is the quickest and easiest way of bringing a new capital asset into productive use. However the vast majority of projects costs have to be met out of scarce foreign exchange.

Foreign advisers and indigenous experts who have been educated and trained in developed countries, have a somewhat limited interest in and appreciation of, local problems and aspirations and have a strong elitist bias in favour of the latest, most sophisticated technologies developed in the industrialised countries, the most exotic scientific fashions of the day, and adoption of elegant engineering and design solutions which are essentially suited to their own societies. This orientation has a strong influence on the range of possible solutions to practical problems which are seriously considered and therefore too often appropriate technology, that is that level of applied technology which is contingent with the stage of a country's industrial development, whether it is based upon traditional or new skills and knowledge, is rarely considered.

A systematic approach to domestic sourcing involves the exploitation of appropriate technologies since it is these which the nation's resources will first of all be able to manage fully and well. Thus an elitist orientation away from appropriate technology can seriously prejudice the development of domestic sourcing as it places the focus on proprietary equipment and processes which almost by definition employ advanced technologies which are appropriate in developed countries.

As a country's industrial capability develops the local content of projects can be increased without prejudicing their start-up or operation. This participation in itself strengthens the industrial base, increases industrial output, promotes new employment and business opportunities as well as reducing demand for foreign currency.

Domestic sourcing of projects normally starts with inputting general engineering and then over an extended period progresses into proprietary equipment and processes.

As domestic sourcing increases the concept of a project changes from a single "package" to one of an increasing number of work packages. This represents a distinct change in approach from the "top down" to a "bottom up". Thus

what is seen most usually by those with elitist orientations as a difficult challenge to be mastered, the task of unpackaging, disappears.

Progressively the roles and responsibilities of foreign contractors are transferred to the project owners and the convenience and advantage of delegation to a third party is progressively lost as more and more is handled locally by nationals. Such disadvantages are generally accepted to outweigh the overall gains and benefits of increased domestic sourcing.

Organisational Aspects

An agency which is designed to stimulate and participate in the development of domestic sourcing needs to be carefully located within the nations institutional arrangements. PEMSU is a practical operational function which will support all sectors of industry and their perception of it will have a major impact on their preparedness to respond to its initiates and to take up its services.

Therefore in defining the institutional arrangements for PEMSU, the following criteria/conditions must largely be satisfied:

* independence from, rather than dependence upon, project owners
* allied to most if not all industrial sectors, not just a few
* close to practical operations
* not perceived as an instrument of the government system
* freedom to act.

C. DEVELOPMENT OBJECTIVES

Development Objectives

The development objective of the project is to increase the domestic content of industrial capital projects and thereby reduce the demands upon scarce foreign currency and create domestic employment.

D. IMMEDIATE OBJECTIVES, OUTPUTS AND ACTIVITIES

Overall Immediate Objective

The overall immediate objective of the project is to establish within the Engineering Design and Tool Centre an institutional capability which will provide to project owners and domestic suppliers promotional support and project engineering services to in assist raising the level of domestic sourcing in industrial capital projects.

Detailed Immediate Objectives

Achieving the overall objective requires the establishment of three operational units namely;

* Domestic Sourcing Promotional Unit
* Design House
* Project Management Services Unit

whose objectives have been defined as follows:

Domestic Sourcing Promotional Unit:

* to stimulate further interest amongst project owners and domestic suppliers in the industrial sector in increasing the overall level of domestic sourcing in capital projects which will be achieved by means of;

  - the provision of information and publicity on the providers of domestic sourced goods and services
  - the provision of information and publicity on the purchaser of domestic sourced goods and services
  - the provision of contract strategy advice to project owners
  - executing a small number of demonstration projects.

Design House:

* to create a core of domestic expertise in general engineering and industrial buildings design to support project owners and domestic suppliers in increasing the level of domestic sourcing. Initially these services will include;

  - mechanical services such as pipework and fluids,
  - simple structures
  - electrical distribution and simple control systems
  - industrial buildings

Project Management Services Unit

* to create a core of domestic expertise in project management services to support project owners and domestic suppliers in increasing the level of domestic sourcing. Initially these services will include;

  - time and cost control
  - estimating and quantity surveying

- simple inspection and expediting
- contracts management
- training services in project applied project management techniques in association with a local training institution.

The detailed work plan is shown in Annex 1. - Work Plan

Outputs

Output 1

Output 1 is a fully operational Domestic Sourcing Promotional Unit with an annual capability to:

* prepare and distribute promotional material which include information on the data base, mini case studies and suggested action programmes for project owners and domestic suppliers

* make visits with presentations to at least 10 major project owners

* make visits with presentations to at least 10 domestic suppliers

* implement 2 major seminars.

The principal activities required to develop the unit are defined as follows:

Activity by	To be completed Project Staff	Responsible
Recruit local staff	Phase 1 - month 6. Phase 2 - month 13.	General Manager EDTC/PEMSU and TA Team Leader
Identify and plan specialist consultancy support	Month 4	TA Team Leader/Head of PEMSU
Desig. and implement the unit's operational procedures and systems	Month 3	TA Team Leader/Head of PEMSU

Develop an on-the-job training plan	Month 5	TA Team Leader/Head of PEMSU with assistance of the Training Adviser.
Implement the above on-the-job training plan	on going	TA Team Leader/Head of PEMSU/Head of DSPU.
Plan and implement fellowship for the unit head	Month 10 implement by Month 20	TA Team Leader/Head of PEMSU with assistance of Training Adviser.
Plan, implement and report on into the demand and supply for domestic sourcing	Month 11	TA Team Leader/Head of PEMSU/DSPU team with assistance of Marketing Adviser.
Create a computer based data base on the supply and demand for domestic sourcing	Month 11	TA Team Leader/Head of PEMSU/DSPU team with assistance of Computing Adviser.
Develop and implement an operational plan for a promotion campaign and an advisory service on domestic sourcing to project owners and domestic suppliers which will include during the first year:	Month 11	TA Team Leader/Heads of PEMSU/DSPU team with assistance of Marketing Adviser.
• preparation and distribution of promotional material which include information on the data base, mini case studies and suggested action programmes for project owners and domestic suppliers	Month 24	TA Team Leader/Head of DSPU/DPSU team.
• visits with presentations to at least 10 major project owners	Month 24	TA Team Leader/Head of DSPU/DSPU team.
• visits with presentations to at least 10 domestic suppliers	Month 24	TA Team Leader/Head of DSPU/DSPU team.
• 2 major seminars	Month 24	TA Team Leader/Head of DSPU/DSPU team.
Carry out a bi-annual updating of supply and demand data	Month 18 then every 6 months	DSPU team.
Identify five demonstration projects	Month 12	TA Team Leader of PEMSU
Complete five demonstration projects	Month 48	DSPU team with assistance of TA Team Leader

Output 2

Output 2 is a fully operational Design House with a capability and capacity for around 50 million Bir of capital works per annum.

The principal activities required to develop the unit are defined as follows:

Activity	To be completed by	Responsible Project Staff
Identify suitable project opportunities with foreign contractors for the on-the-job training of staff	Month 6	TA Team Leader/Design Adviser/Head of PEMSU/Head of Design House.
Develop an on-the-job training plan for the training of staff in a foreign contractors design office	Month 12	Design Adviser/Head of Design House with assistance of Training Adviser.
Secure an agreement, ideally with a single contractor, for the on-the-job training of staff	Month 12	Head of PEMSU with assistance of NPC and TA Team Leader.
Identify and plan specialist consultancy support	Month 5	TA Team Leader/Design Adviser.
Recruit local staff	Month 12	Design Adviser/Head of Design House.
Develop and implement the unit's operational procedures and systems	Month 12	Design Adviser/head of Design with assistance of TA Team Leader.
Secure and complete design briefs in at least three of the demonstration projects	Month 12	Design Adviser/Head of Design with assistance of TA Team Leader and Head of PEMSU.
Secure and complete at least five design briefs with domestic sourcing of capital projects.	Agreement by Month 36 then ongoing	Head of Design House with assistance of Head of PEMSU/Design Adviser and TA Team Leader.

Output 3

Output 3 is a fully operational Project Management Services Unit with a capability and capacity to provide project services to support around 22 million bir of capital project work.

The principal activities required to develop the unit are defined as follows:

Activity staff	To be completed	Responsible by Project
Recruit local staff	Month 10	Project Services Adviser/Head of PMSU/Head of PEMSU
Identify and plan specialist consultancy support	Month 8	Project Services Adviser/Head of PMSU with assistance of TA Team Leader and Head of PEMSU.
Develop and implement the unit's operational systems and procedures.	Month 12	Project Services Adviser/Head of PMSU/PMSU team with assistance of TA Team Leader Contract and Inspector Advisers.
Develop and implement an on-the-job training plan	Month 9	Project Services Adviser/Head of PMSU with assistance of Training adviser.
Plan and implement fellowships for the unit head and the inspection engineer	Plan by Month 12 Implemented by Month 20	Project Services Adviser/TA Team Leader/Head of PEMSU with assistance of Training Adviser.
Secure agreement to participate in and complete at least three demonstration projects	Agreement by Month 12. Complete by Month 31	Head of PMSU/Project Services Adviser/TA Team Leader with assistance of Head of PEMSU.
Commence marketing of services to project owners and domestic suppliers	Month 9 and on going	Head of PMSU with advice from Marketing Adviser.
Secure and complete at least three project assignments	Month 36 and implementation on-going	Head of PMSU with assistance of Project Services Adviser and TA Team Leader.

E. INPUTS

Government Inputs

National Staff

By completion of the project a total of 25 staff are envisaged to be employed. This excludes the NPD and the administrative support which will be provided by the staff of the EDTC.

The manning schedule, manpower plan, organisational arrangements and job descriptions are given in Annex 2.

Other National Inputs

Furnished and serviced office accommodation will be provided in the new EDTC building in Addis Ababa in accordance with the design layout given in Annex 3 and the budget provisions given in Annex 7 - Government Inputs.

UNDP/UNIDO inputs

International staff

A team of international specialist staff under the leadership of the Technical Assistance Team Leader and covering the following specialists:

* design engineering
* project services
* contracts
* inspection and expediting
* training
* computer systems

* marketing

will be provided through a consultancy subcontract. This subcontract will provide for 98 man months of effort in Ethiopia together with 6mm home office, backstop and ad hoc consultancy support.

Sub -contracts

Two subcontracts are envisaged covering:

* technical assistance
* design house on-the-job training in an international contractor's design house.

Outline terms of reference for these subcontracts are given in Annex 4. Also included Annex 4 are job descriptions for the team of specialist advisers.

Training

All training will be carried out on-the-job. Training for the design house staff will be carried out in an international contactors office under a special subcontract an all other training will be carried out in Etniopia by the technical assistance team under the leadership of the chief technical adviser.

Annex 5 provides description of the general approach to training to be adopted.

In addition it is proposed to provide for small number of short study tours for selected staff of PEMSU, namely:

* EDTC General Manager
* Head of PEMSU
* Head of Domestic Sourcing Promotions Unit
* Head of Project Management Services Unit

* Inspector Engineer

The suggested duration of the tours is 3 months and it is expected that the majority of the time will be spent in at least three of the less developed countries of the world including India and Phillipines. Their purpose will be to observe, question and study their areas of applied technology in similar environments. Ideally the fellows should take with them a series of operational problems and seek out advice on their resolution by those who have faced similar issues. Consideration should be given to the tour being carried out as a team exercise.

These fellowships will be designed, organised and supervised by the technical assistance subcontractor.

F. RISKS

Two risks have been identified and they are concerned with:

* materials supplies
* identifying a suitable contractor for the training of design staff.

Materials Supplies

Domestic sourcing of capital projects is constrained by the acute materials shortages which are caused by the nation's serious shortfall of foreign currency. It is not expected that this situation will dramatically change for many years and accordingly the natural rate of growth of domestic sourcing will be slow. Additionally the inability of domestic suppliers, because of materials shortages, to provide a rapid response service and the consequential project delays, will adversely affect raising the level and widening the scope of domestic resources.

It may also harden the unfavourable attitudes to domestic sourcing currently to be found in some project owners.

The Consultant has reviewed this aspect and has concluded that stimulator action is required to establish in Ethiopia a stockholding service. This will serve as a buffer for materials shortage problems and thereby enable suppliers to respond more quickly to the short notice demands of project owners.

It is understood that the Government is aware of the problem and is investigating the possibility of commissioning a study in order to define the requirements and a strategy for establishing such an operation as an international joint venture.

Contractor for Design Staff Training

There is some risk that a suitable contractor cannot be found to carry out the training.

The assumption has been made that a forward looking contractor might view the request for training as a business promotion opportunity and therefore be prepared to meet the request at no cost to Ethiopia. It is possible that this is too optimistic an assumption and that contractors will require some kind of management fee to compensate for the minor inconvenience and disruption that will be caused to their operations and to cover administrate costs. Accordingly a budget provision has been made for a management fee.

However it is recognised that UNIDO and the Government may have some difficulty in making such an arrangement and it is therefore proposed that responsibility for organising the subcontract is assigned to the Technical Assistance Contractor.

In the event that even with the provision of a management fee a contractor cannot be found, the suggested fall back position is let a supplementary

contract to the Technical Assistance Contractor to provide the services in Ethiopia using additional specialist resources.

H. PROJECT REVIEWS, REPORTING AND EVALUATION

An inception report will be prepared after 3 months and project progress reports will be prepared twice a year thereafter jointly by the Head of PEMSU and the TA Team Leader and submitted in advance of progress review meetings with the National Project Co-ordinator.

The project will be subject to tripartite review (joint review by representatives of the government, executing agency and UNDP) once every 12 months, the first such meeting to be held within the first 12 months of the start of full implementation. The National Project Co-ordinator shall prepare and submit to the UNDP field office at least three months before each tripartite review a Project Performance Evaluation Report (PPER). Additional PPERs may be requested, if necessary, during the project.

A project terminal report will be prepared for consideration at the terminal tripartite review meeting. It shall be prepared in draft sufficiently in advance to allow review and technical clearance by the executing agency at least four months prior to the terminal tripartite review.

The project shall be subject to evaluation 24 months after the start of full implementation. The organisation, terms of reference and timing will be decided after consultation between the parties involved in the project.

The timing in project reviews is shown in Annex 1 - Work Plan.

I. LEGAL CONTEXT

This Project Document shall be the instrument referred to as such in Article 1 of the Standard Basic Assistance Agreement between the Government of Ethiopia and the United Nations Development Programme, signed by the parties on .... (date).

The Host Country Implementing Agency shall, for the purpose of the Standard Basic Assistance Agreement, refer to the Government Co-operating Agency described in that Agreement.

J. BUDGETS

A budget estimate has been prepared for the UNDP/UNIDO component and this shows a total figure of

2,120,550 $ US

This budget, with supporting calculations, is presented by UNDP/UNIDO budget head in Annex 7.1.

A budget estimate has been prepared for the Government component and this shows a total figure of:

5,332,900 Birr

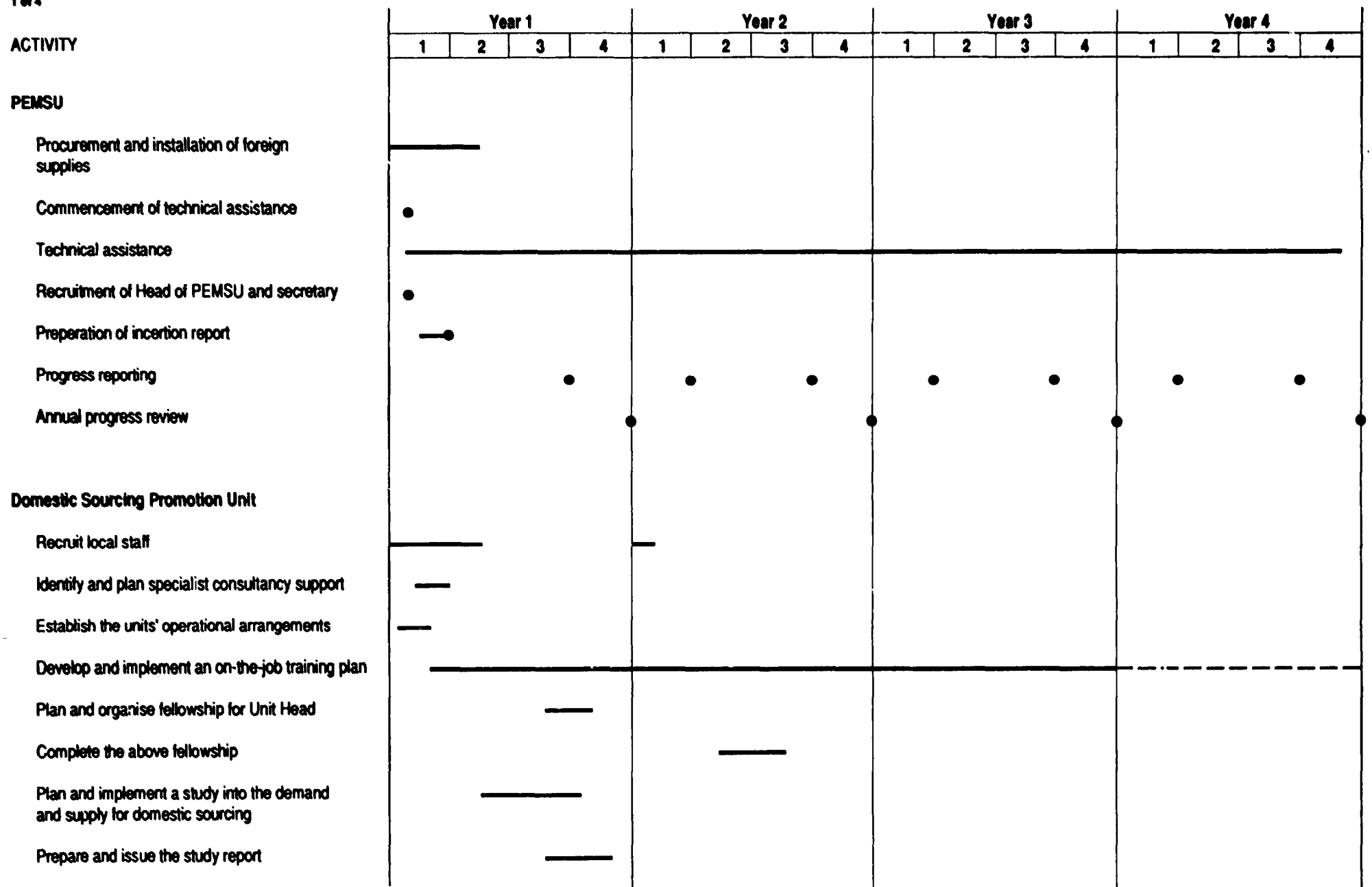
This budget is presented by UNDP/UNIDO budget head in Annex 7.2.

ANNEXES

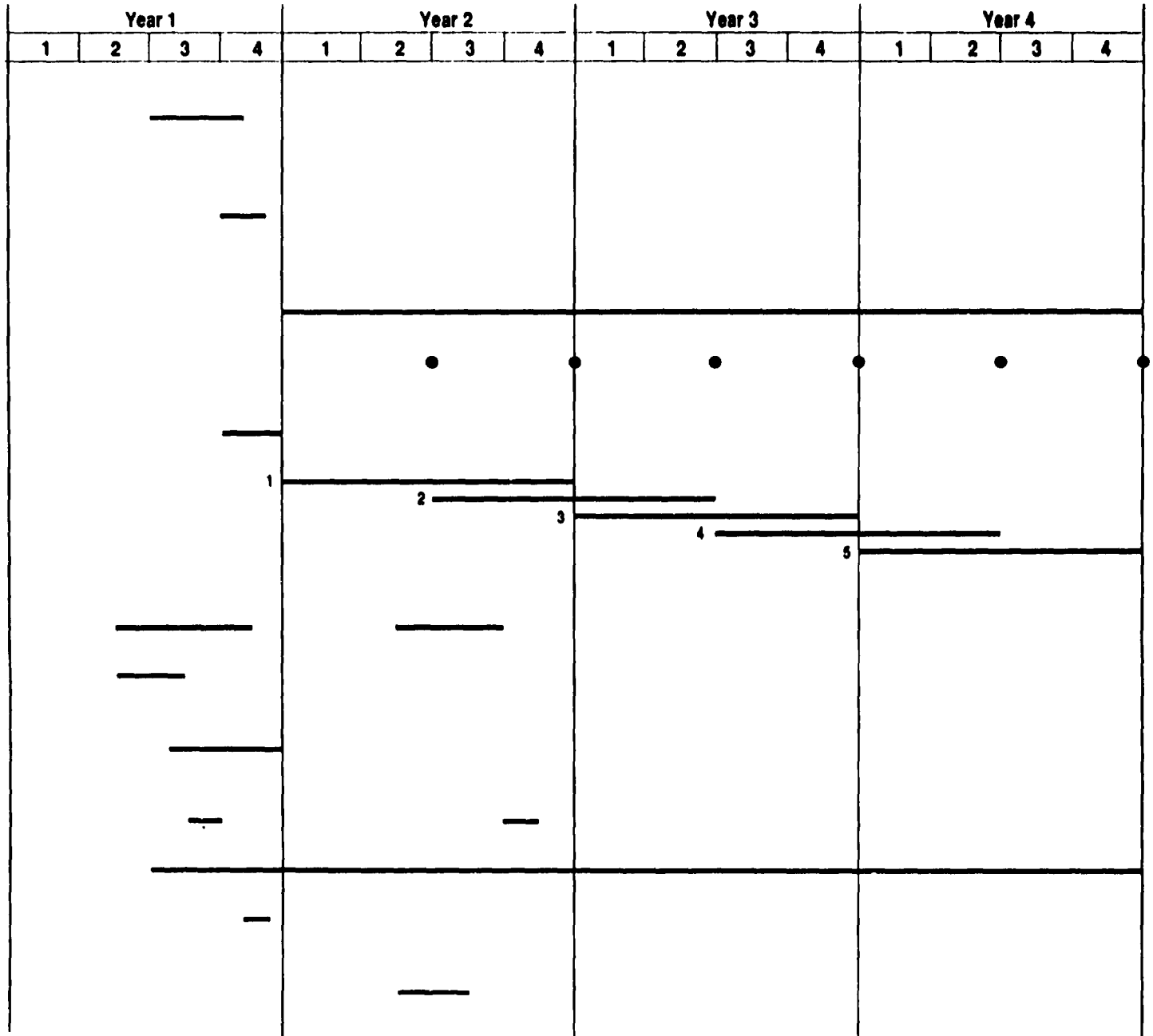
ANNEX 1

WORK PLAN

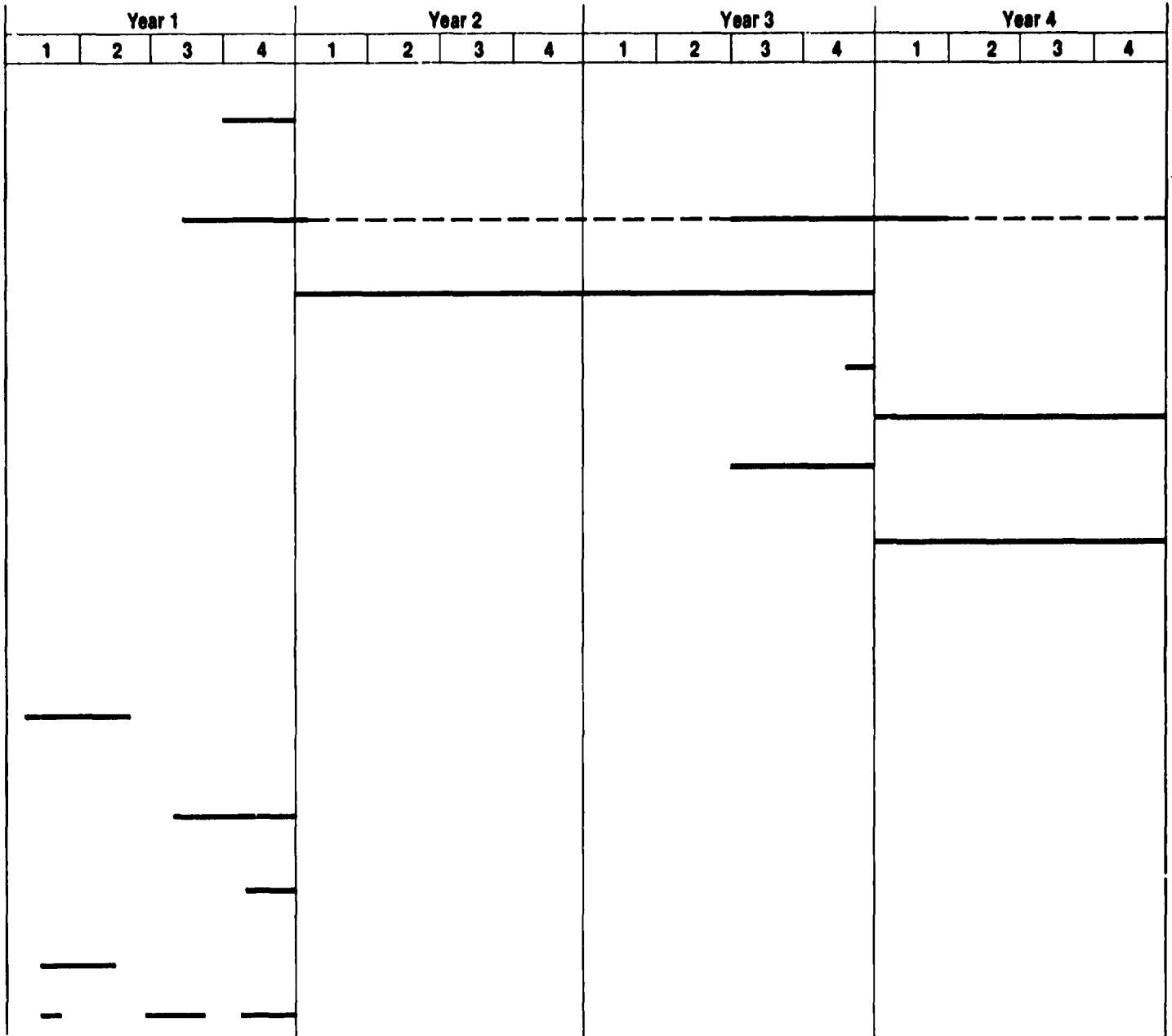
Annex 1 Work Plan



Annex 1 Work Plan



Annex 1 Work Plan



ACTIVITY

Secure agreement to participate in at least three demonstration projects

Prepare and implement marketing plan services to project owners and domestic suppliers

Implement the demonstration projects assignments

Secure at least three project assignments

Commence the above assignments

Develop Training Programme in Project Management in conjunction with local institution

Market and implement above Training Programme

Design House

Identify suitable opportunities with foreign contractors for the on-the-job training of staff

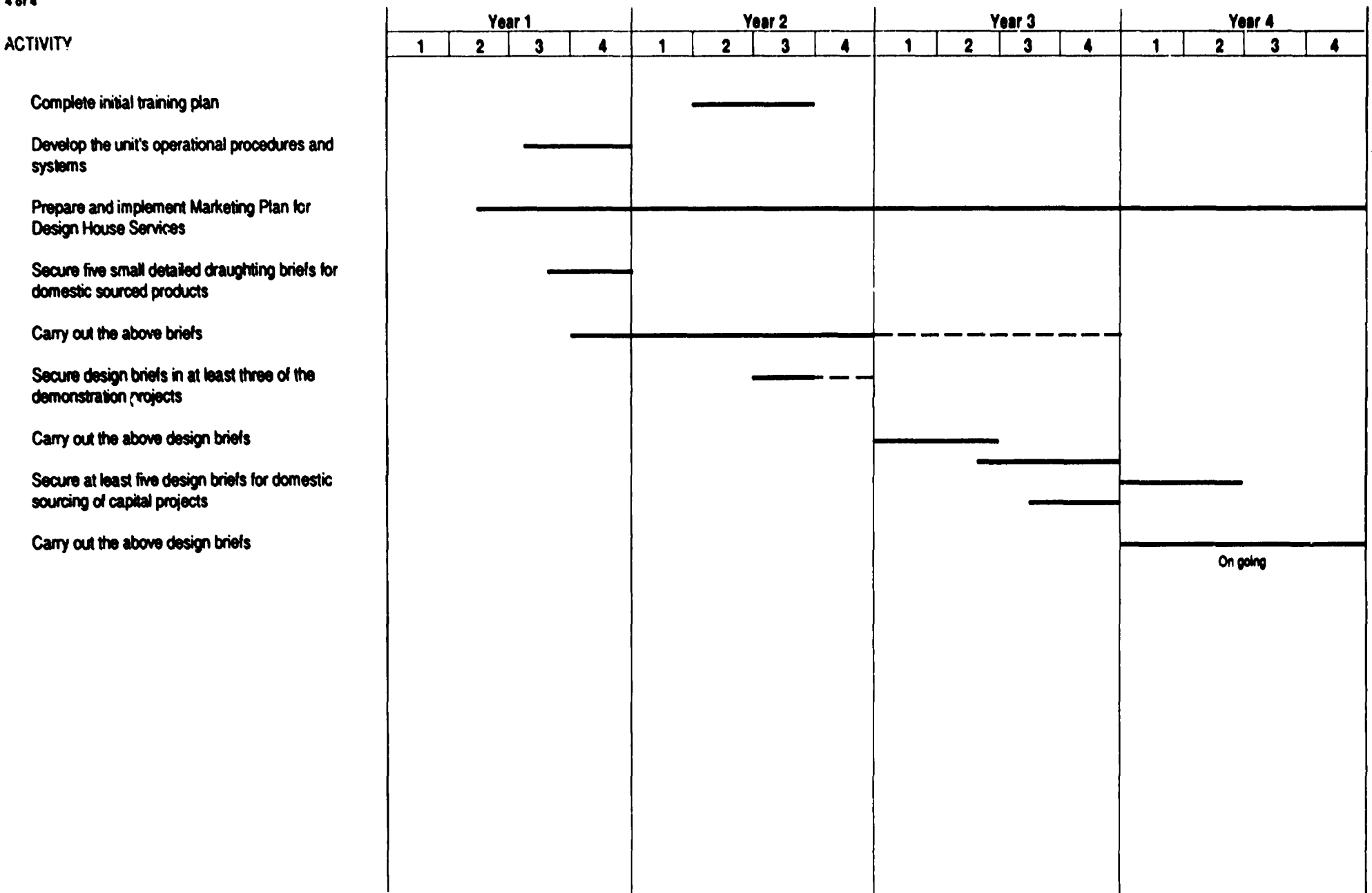
Develop an on-the-job training plan for the training of staff in a foreign contractors design office

Secure an agreement, ideally with a single contractor, for the on-the-job training of staff

Identify and plan specialist consultancy support

Recruit local staff

Annex 1 Work Plan



ANNEX 2

ORGANISATION AND MANPOWER

2.1 ETDC Organisation

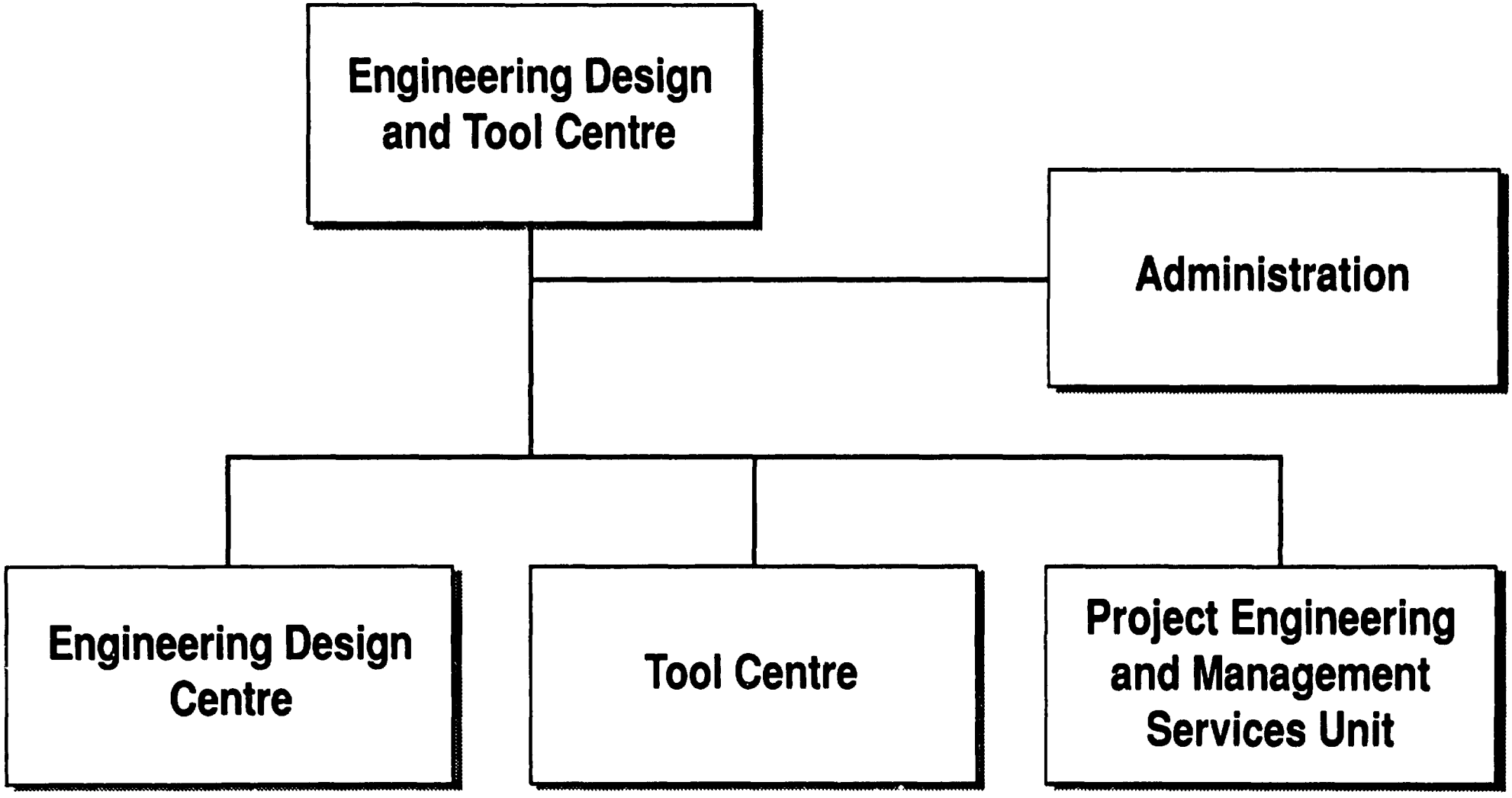
2.2 PEMSU Organisation

2.3 Manning Schedule

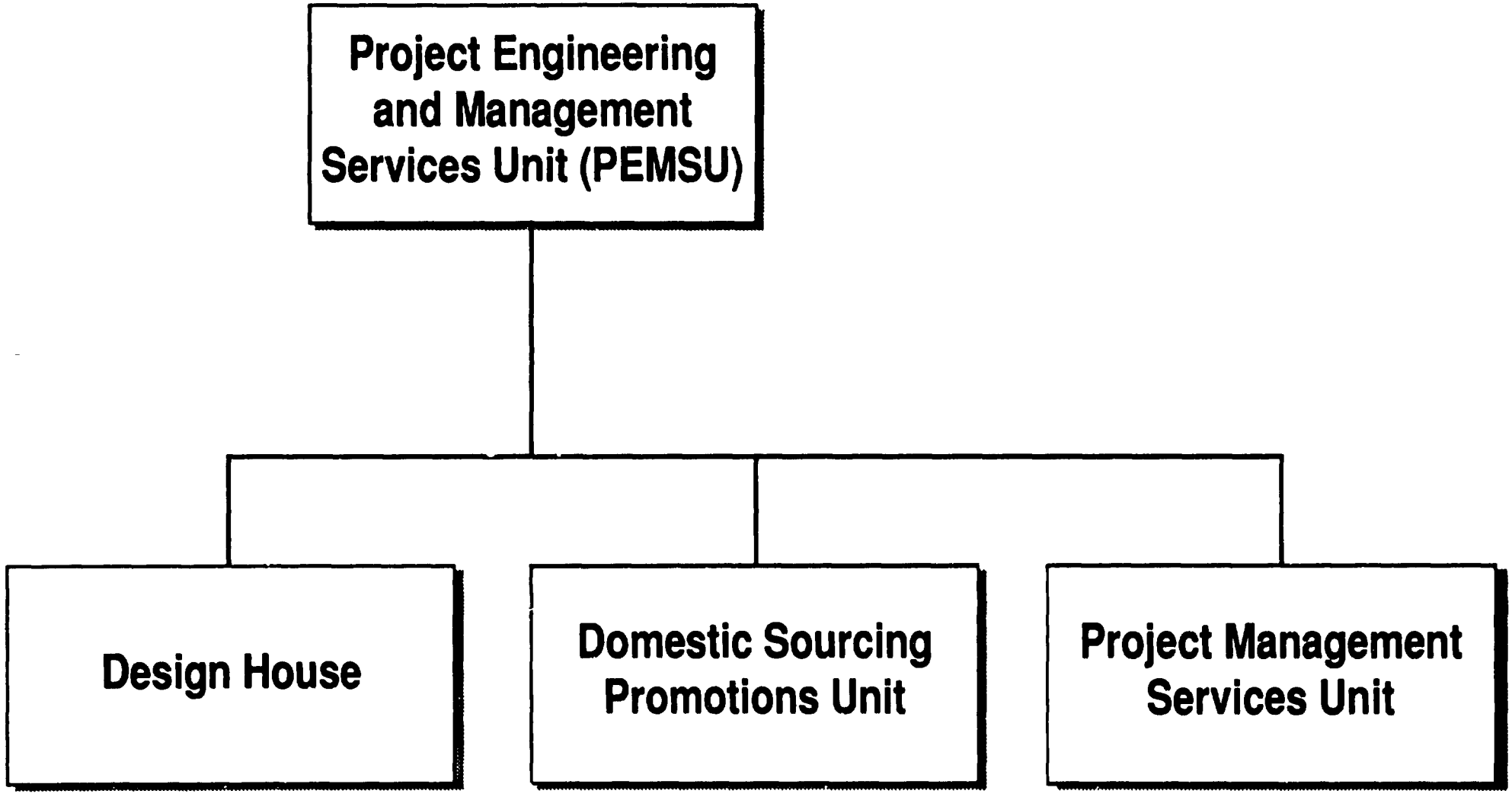
2.4 Marpower Plan

2.5 Job Descriptions for National Staff

Annex 2.1 Organisation Charts - EDTC



Annex 2.2 Organisation Charts - PEMSU



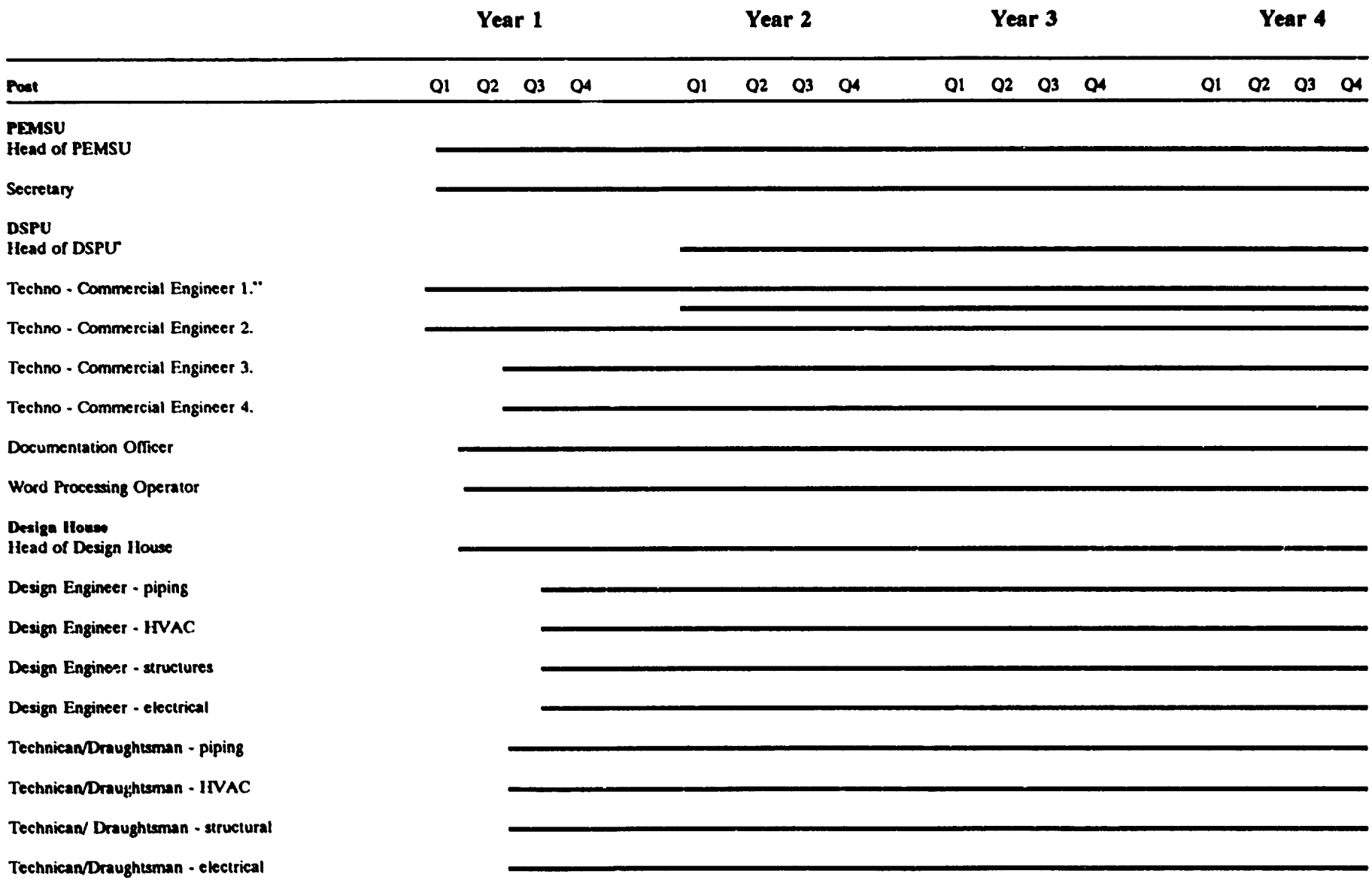
2.3 Manning Schedule - Manning Schedule

	Dates in Post
Head of PEMSU	On commencement
Secretary	On commencement
Head of Design House	Month 3
Design Engineer - pipework	Month 10
Design Engineer - HVAC (heating, ventilating and air conditioning)	Month 10
Design Engineer - structural	Month 10
Design Engineer - electrical	Month 10
Design Technician/Draughtsperson - pipework	Month 6
Design Technician/Draughtsperson - HVAC	Month 6
Design Technician/Draughtsperson - structural	Month 6
Design Technician/Draughtsperson - electrical	Month 6
Head of Domestic Sourcing Promotions Unit	
Techno - Commercial Engineer 1	Month 1/ Month 13*
Techno - Commercial Engineer 2	Month 1
Techno - Commercial Engineer 3	Month 6
Techno - Commercial Engineer 4	Month 6
Documentation Officer	Month 2
Word Processing Operator	Month 3
Head of Project Management Services Unit	Month 6
Project Planner 1 Month 9	
Project Planner 2 Month 20	
Project Planner 3 Month 20	
Cost Control Engineer Month 9	
Contracts Engineer 1	Month 9
Contracts Engineer 2	Month 20
Inspector Engineer Month 9	
Inspector Technician	Month 20

Note. Administration Support is assumed to be provided by EDTC.

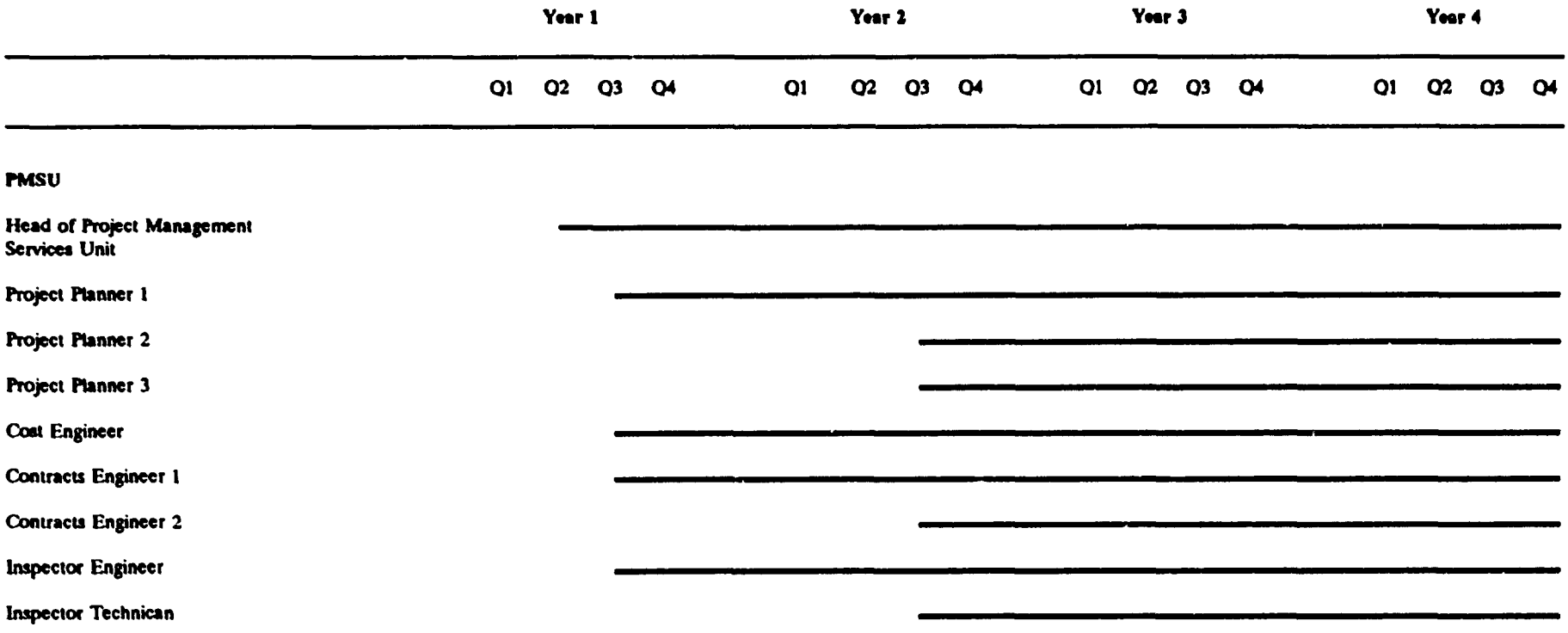
* assumes that during year 1 the role is carried out by the Head of PEMSU after which one of the techno-commercial engineers will be promoted to the Head of DSPU and a replacement then recruited.

2.4 NATIONAL STAFF



* for the first 12 months the post will be held by the Head of PEMSU.
** assumes post holder will be promoted to Head of DSPU after 12 months and a replacement then recruited.

FIGURE 2.4 - NATIONAL STAFF



2.5 Job Description for National Staff

Post	General Manager EDTC and National Project Director
Qualifications	BSc/MSc in mechanical engineering Post graduate diploma in Management
Experience	15 years experience which must include the following • engineering design, project engineering and maintenance in a manufacturing organisation • project engineering and management of major capital project • high level government - industry liaison • high level government-furding agency liaison • management of a corporate entity
Language	Fluency in English
Key Tasks	Management of EDTC and leader of the EDTC management team. Government and funding agency liaison. Preparation of EDTC's corporate policy and mission statement, corporate plan and budgets. Responsible for achievement of EDTC's corporate plan and budget staff development. Representing EDTC on national and international technical bodies/committees. National Project Director for EDTC and its associated projects.
In-post Data	From commencement

2.5 Job Description for National Staff

Post	Head of PEMSU
Qualifications	BSc/MSc in mechanical engineering. Post Graduate diploma in management.
Experience	10 years industrial experience as a practising engineer which must include periods in major projects and manufacturing.
Language	Fluency in English
Key Tasks	Member of the EDTC management team and head of the PEMSU management team. Overall responsible for all PEMSU activities. Setting up and leading, with the assistance of the TA Team leader, the Domestic Sourcing Promotion Unit. Preparation of the unit plans and budgets. Liaison with key clients. Monitoring the unit performance. Staff development.
In-post Data	from commencement

2.5 Job Description for National Staff

Post	Head of Domestic Sourcing Promotions Unit
Qualifications	BSc/Msc in mechanical engineering.
Experience	10 years industrial experience as a practising engineer, including periods in major projects and manufacturing.
Language	Fluency in English
Key Tasks	Member of the PEMSU management team.
	Responsible for all activities of the Domestic Sourcing Promotions Unit.
	Liaison with clients, and leading all promotions activities.
	Preparation of the unit plans and budgets.
	Monitoring of the unit performance.
	Staff development
In-post Data	from month 13*

* this assumes that the Head of PEMSU will assume the role for the first 12 months and then be replaced by internal promotion.

2.5 Job Description for National Staff

Post	Techno-commercial Engineer (4)
Qualifications	Degree in Engineering/Business Management/Economics.
	Certificate/Diploma in Management/Commence.
Experience	3 years general industrial experience.
Language	Fluency in English
Key Tasks	Member of the DSPU team carrying out assigned tasks in market studies, domestic sourcing promotions and advisory services to project owners and domestic suppliers.
	Participation in seminars and presentation.
	Preparation of promotional material.
In-post Data	- post 1 from month 1 and 13* - post 2 from month 1 - post 3 from month 6 - post 4 from month 6

* assumes the initial post holder will be promoted to Head of the Unit after one year

2.5 Job Description for National Staff

Post	Documentation Officer
Qualifications	Graduate in Engineering/Business Studies/Commerce
Experience	3 years commercial experience.
Language	Fluency in English
Key Tasks	Preparation and publication of promotions material.
	Maintenance of data base.
	Organising and participating in promotional seminars.
	Participate in general promotional activities.
In-post Data	From month 2

2.5 Job Description for National Staff

Post	Word Processing Operator
Qualifications	Vocational Training Certificate in Typing/Office Practice.
Experience	2 years experience as a typist/secretary
Language	Fluency in English
Key Tasks	Document preparation for DSPU using word processing and desk top publishing facilities.
In-post Data	from month 3

2.5 Job Description for National Staff

Post	Secretary to Head of PEMSU
Qualifications	Educated to 12th Grade
	Vocational Certificate in Secretarial/Office Studies
Experience	5 years as secretary.
	Bilingual typing ability.
Language	Fluency in English
Key Tasks	Secretarial services to the Head of PEMSU and general support to managers of the three operator units.
	Maintenance of correspondence files.
	Operation of WP facility and maintenance of files.
In-post Data	from commencement.

2.5 Job Description for National Staff

Post	Head of Design House
Qualifications	BSc/MSc in Structural/Mechanical Engineering
Experience	10 years industrial experience including periods in design and major projects.
Language	Fluency in English
Key Tasks	Member of PEMSU management team.
	Responsible for all activities of the Design House.
	Liaison with Heads of Design sections in EDTC.
	Preparation of the Design House plans and budgets.
	Monitoring of the Design House performance.
	Leading the Design House sales/marketing activities.
	Client liaison.
	Leading Design House assignments.
	Staff development.
In-post Data	from month 3

2.5 Job Description for National Staff

Post	Design Engineer - Piping
Qualifications	BSc in Mechanical Engineering
Experience	1 years industrial experience in pipeworks studies
Language	Fluency in English
Key Tasks	Detailed Design and Draughting of piping schemes.
	Supervision of assigned technician.
In-post Data	From month 10

2.5 Job Description for National Staff

Post	Design Engineer - Structural
Qualifications	Bsc in Structural Engineering
Experience	1 years industrial experience in structural studies
Language	Fluency in English
Key Tasks	Detailed Design and Draughting of structural engineering schemes.
	Supervision of assigned technician
In-post Data	From month 10

2.5 Job Description for National Staff

Post	Design Engineer - HVAC
Qualifications	Bsc in Mechanical Engineering
Experience	1 years industrial experience in HVAC studies
Language	Fluency in English
Key Tasks	Detailed Design and Draughting of HVAC schemes
	Supervision of assigned technician
In-post Data	From month 10

2.5 Job Description for National Staff

Post	Design Engineer - Electrical
Qualifications	BSc in Electrical Engineering
Experience	1 years industrial experience in electrical distribution schemes.
Language	Fluency in English
Key Tasks	Detailed Design and Draughting of electrical distribution schemes.
	Supervision of assigned technician
In-post Data	From month 10

2.5 Job Description for National Staff

Post	Technician/Draughtsperson - pipework
Qualifications	Certificate/Diploma in Mechanical Engineering
Experience	2 years industrial draughting experience in piping
Language	Fluency in English
Key Tasks	Preparation of engineering drawings to client specification in accordance with codes of practice and national/international standards.
In-post Data	from month 6

2.5 Job Description for National Staff

Post	Technician/Draughtsperson - Structural
Qualifications	Certificate/Diploma in Structural Engineering
Experience	2 years industrial draughting experience
Language	Fluency in English
Key Tasks	Preparation of engineering drawings to client specification in accordance with codes of practice and national/international standards.
In-post Data	from month 6

2.5 Job Description for National Staff

Post	Technician/Draughtsperson - HVAC
Qualifications	Certificate/Diploma in Mechanical Engineering
Experience	2 years industrial draughting experience in HVAC
Language	Fluency in English
Key Tasks	Preparation of engineering drawings to client specification in accordance with codes of practice and national/international standards.
In-post Data	from month 6

2.5 Job Description for National Staff

Post	Technician/Draughtsperson - Electrical
Qualifications	Certificate/Diploma in Electrical Engineering
Experience	2 years industrial draughting experience in electrical distribution systems
Language	Fluency in English
Key Tasks	Preparation of engineering drawings to client specification in accordance with codes of practice and national/international standards.
In-post Data	from month 6

2.5 Job Description for National Staff

Post	Head of Project Management Services Unit
Qualifications	BSc/Msc in Engineering.
	Certificate/Diploma in Project Management.
Experience	10 years experience in major projects of which five years should be in project management and control.
Language	Fluency in English
Key Tasks	Member of PEMSU management team.
	Responsible for all activities of the PMSU.
	Monitoring of PMSU performance.
	Leading the PMSU sales/marketing activities.
	Client liaison
	Leading the PMSU training activities in association with an local training institute.
	Staff development.
In-post Data	from month 6

2.5 Job Description for National Staff

Post	Project Planner
Qualifications	Degree in Engineering
Experience	5 years experience in project planning
Language	Fluency in English
Key Tasks	Preparation and monitoring of project plans.
	Client liaison.
	Advising client on project planning.
	Representing the client at meetings with contractor.
	Promotion of project planning services.
	Assisting in PMSU training activities.
In-post Data	There are three posts with the following in-post dates.
	post 1 - from month 9 post 2 - from month 20 post 3 - from month 20

2.5 Job Description for National Staff

Post	Cost Control Engineer
Qualifications	Degree in Engineering
	Certificate/Diploma in Cost Management/Control
Experience	5 years experience in project cost control
Language	Fluency in English
Key Tasks	Cost monitoring and forecasting for projects.
	Client liaison.
	Advising client on project cost control.
	Representing the client at meetings with contractors.
	Promoting PMSU services.
	Assisting in PMSU training activities.
In-post Data	from month 9

2.5 Job Description for National Staff

Post	Contracts Engineer (2)
Qualifications	Degree in Engineering
	Certificate/Diploma in Contracts
Experience	5 years experience as an industrial contractor engineer.
Language	Fluency in English
Key Tasks	Monitoring contractors performance.
	Advising on the contractural aspect of client problems with contractors.
	Assisting client with contract preparation and contract evaluation.
	Representing the client at meetings with contractors.
	Participating in PMSU training activities.
	Promoting PMSU services.
In-post Data	post 1 from month 9 post 2 from month 20

2.5 Job Description for National Staff

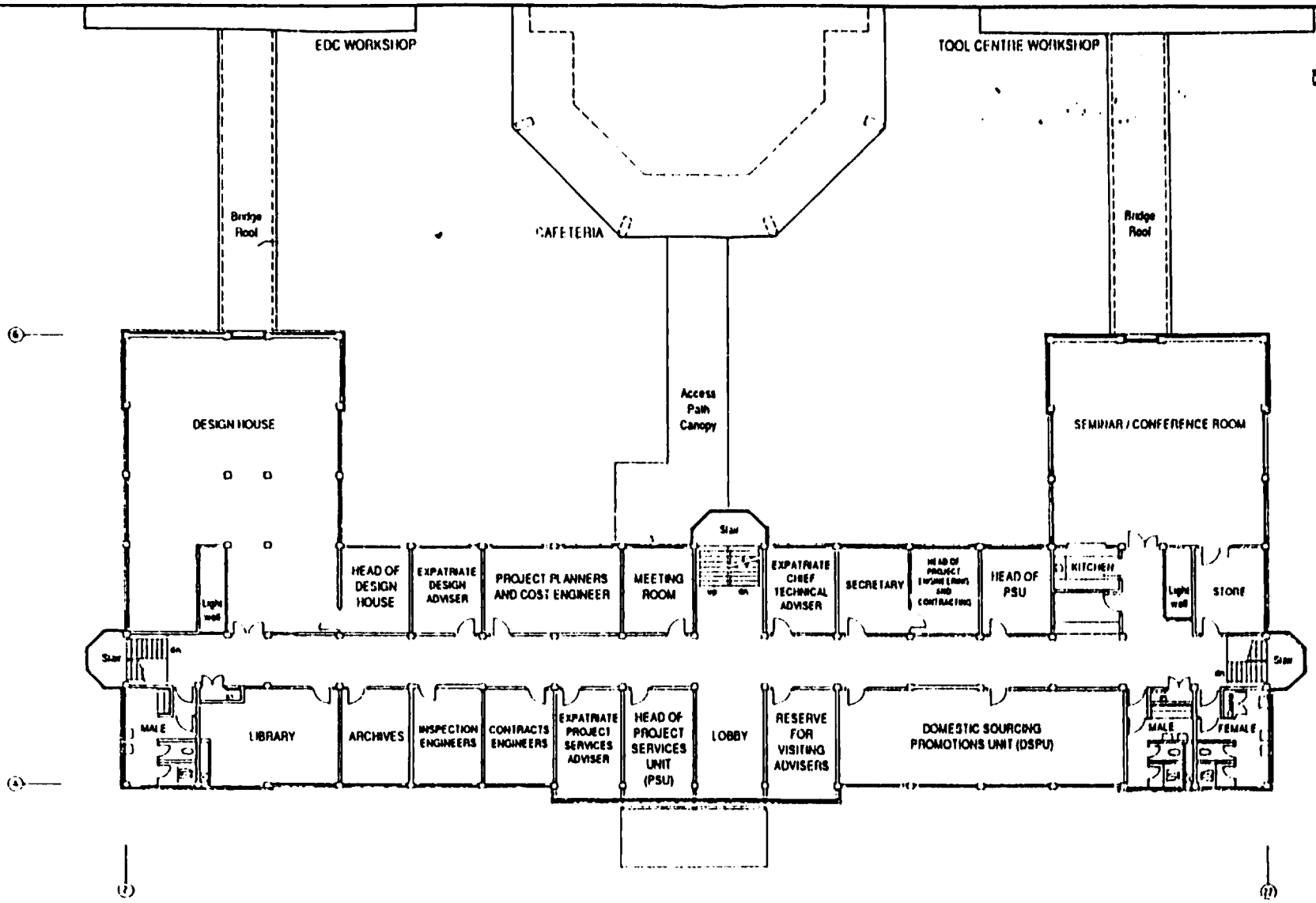
Post	Inspection Engineer
Qualifications	Degree in Mechanical Engineering
Experience	5 years experience in inspection of domestic sourced project components at their manufacturing site and the construction site as appropriate.
Language	Fluency in English
Key Tasks	Carrying out inspections of domestic sourced project components at their manufacturing site and the construction site as appropriate.
	Advising/instructing suppliers on deficiencies and required remedial actions.
	Reporting on subcontractors performance and capability.
	Representing the client at subcontractors meetings.
	Advising client on inspection service requirements.
	Promoting PMSU training.
	Participating in PMSU training activities.
In-post Data	from month 9

2.5 Job Description for National Staff

Post	Inspection Technician
Qualifications	Certificate/Diploma in Engineering
Experience	5 years experience in an operational and supervisory role in engineering component manufacturer.
Language	Fluency in English
Key Tasks	Carrying out routine inspections of domestic sourced component at manufacturing and installation sites as appropriate. Preparing inspection report and in conjunction with the Inspector Engineer advising on remedial action requirement. In conjunction with the Inspector Engineer preparing report on the capability and performance of subcontractors.
In-post Date	from month 20

ANNEX 3

OFFICES MODIFICATIONS



GRAPHIC SCALE 0 10 20 40 60 metres

OFFICE BUILDING

SECOND FLOOR PLAN

PECU OFFICE ACCOMODATION

WS Atkins International Ltd

ENGINEERING DESIGN AND TOOL CENTRE PROJECT, ADDIS ABABA, ETHIOPIA

FOR

GOVERNMENT OF ETHIOPIA and UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION

REFERENCE No

JOB No P 2170

DRAWING No 1

REVISION

ANNEX 4

OUTLINE TERMS OF REFERENCE FOR SUBCONTRACTORS

4.1 Outline Terms of Reference for Technical Assistence Subcontract

4.2 Job Descriptions For International Staff

4.3 Manpower Plan

4.4 Outline Terms of Reference for Design Staff Training Contractor

4.1 Outline Terms of Reference for the Technical Assistance Subcontract

The role of the Technical Assistance Contractor is to provide the necessary range of long and short term specialist advisers to guide, assist and train the staff of PEMSU during its formative years.

Specifically the contractor is required to provide expertise in respect of:

* design engineering - predominately structural engineering but including pipping, HVAC and electrical works
* project management - time and cost control
* contracts
* inspection
* training
* marketing
* computing.

which will be controlled and co-ordinated by a technical assistance team leader.

Additional home office support and back stop support services will be required.

The contractor is required to identify and make pre-contract arrangements with an international design contractor for the provision of on-the-job training services for the training of PEMSU design staff in accordance with the specification given in Annex 4.4.

It has been estimated that a total of 104mm of technical assistance will be required and that the contribution of long term specialist will be:

* technical assistance team leader - 36 months
* design advisers - 30 months
* project management advisers - 21 months

These technical assistance requirements are front end loaded and it is expected that the long term specialist will initially be full time resident in Ethiopia.

Note: It is assumed that this document will be supplemented by appropriate charts and tables from the main text and other appendices.

4.2 Job Description for International Staff

Post	Technical Assistance Team Leader
Qualifications	Chartered Engineer - Graduate in Mechanical Engineering. Diploma/Certificate in Business/Commerce/Marketing
Experience	At least 10 years experience in the design, manufacturer and installation of capital projects. Experience in domestic sourcing and markets/promotional work in developing countries.
Language	Fluency in English
Key Accountabilities	Accountable to the General Manager of EDTC and the Head of PEMSU as appropriate for the: - provision of professional technical assistance services in accordance with the provision of the Technical Assistance Contract - behavour and performance of all members of the Technical Assistance team and for achievement of agreed task objective on time and to budget - delivery of outputs as defined and agreed in the inception report - timely response to request for ad hoc services in accordance with the terms of the contract - identification of a suitable contractor for the training of PEMSU design staff and for quality assurance of these training activities
Key Tasks	Advisor to the General Manager of EDTC/NPO and Head of PEMSU Management of all technical assistance provisions. Participation in PEMSU staff selection. Identification of suitable contractor for the training of design house staff. Specialist advisor to the Domestic Sourcing Promotions Unit (DSPU). Leading the DSPU team during the first phases of their markets and promotions work. Design and implementation of system and procedures for DSPU. Organising and supervision of all training activities. Mechanical engineering support to the Design Advisors and the Design House staff.
Duration/Schedule	36 Man months Months 1 - 24 full time Months 24 - 48 part time

4.2 Job Description for International Staff

Post	Design Adviser
Qualifications	Chartered Engineer, Graduate in Structural Engineering
Experience	10 years operational design experience in capital projects. 3 years experience of developing countries.
Language	Fluency in English
Key Accountabilities	Accountable to the Leader of the Technical Assistance Team, the Head of PESU and the Head of the Design House as appropriate for the: - provision of a professional design advisory service and the achievement of agreed objectives for assigned tasks on time and to budget - delivery of Design House outputs as defined and agreed in the inception report - behaviour and performance of the past holder and any assigned international staff.
Key Tasks	Principal adviser to the Design House. Design and implementation of systems and procedures of the Design House. Advising on staff recruitment. On job coaching of Design House Staff. Initial supervision of the Design House Technical Team.
Duration/Schedule	36 man months Month 6 - 18 full time Month 18 - 24 part time Month 25 - 36 full time Month 36 - 48 part time.

4.2 Job Description for International Staff

Post	Project Management Services Advisor
Qualifications	Chartered Engineer Post Graduate Diploma in Project Management
Experience	10 years operational experience in project management services (time and cost control) in capital projects. 3 years experience of developing countries.
Language	Fluency in English
Key Accountabilities	Accountable to the leader of the Technical Assistance Team, the Head of PEMSU and the Head of PMSU, as appropriate for the: - provision of a professional project advisory service and the achievement of agreed objectives for assigned tasks on tire and to budget - delivery of PMSU outputs as defined and agreed in the inception report - behaviour and performance of the post holder and any assigned international staff.
Key Tasks	Principal adviser to PMSU. Design and implementation of system and procedures for PMSU. Advising on staff recruitment. On job coaching of PMSU staff.
Duration/Schedule	12 man month Month 6 - 12 full time Month 12 - 36 part time

4.2 Job Description for International Staff

Post	Contracts Adviser
Qualifications	Chartered Engineer, Certificate/Diploma in Contracts
Experience	10 years experience as a contracts engineer.
	Some experience of developing countries.
Language	Fluency in English
Key Tasks	Advisor to the Technical Assistance Team Leader on contracts strategy and management.
	Advisor to PMSU on contracts and contract management.
	Preparation of PMSU contracts manual.
	Preparation of PMSU contract strategy manual.
	Training of PEMSU staff in contracts and contract management.
Duration/Schedule	6 man months Months 5 - 7 Months 18 - 20

4.2 Job Description for International Staff

Post	Inspection Adviser
Qualifications	Chartered Engineer, Graduate Mechanical/Structural Engineer
	Certificate/Diploma in inspection
Experience	15 years experience in inspection and expediting for capital projects.
	Experience of developing countries.
Language	Fluency in English
Key Tasks	Advisor to the Technical Assistance Team Leader and PMSU on inspector services.
	Design and implementation of procedures and systems for PMSU inspectors unit, staff training and advise on recruitment.
Duration/Schedule	3 Man months Months 8 - 9 Month 20

4.2 Job Description for International Staff

Post	Marketing Adviser
Qualifications	Degree/Diploma in marketing and business studies
Experience	10 years industrial market research in the engineering industry which should include survey and promotional work.
	Experience of working in developing countries.
Language	Fluency in English
Key Tasks	Advice to TA Team Leader on the marketing of PEMSU services.
	Assistance with the design and implementation of the DPSU market survey and the development of the domestic sourcing promotion strategy.
	Assistance with the training of DPSU staff.
Duration/Schedule	3 man month Month 4 - 5 Month 31

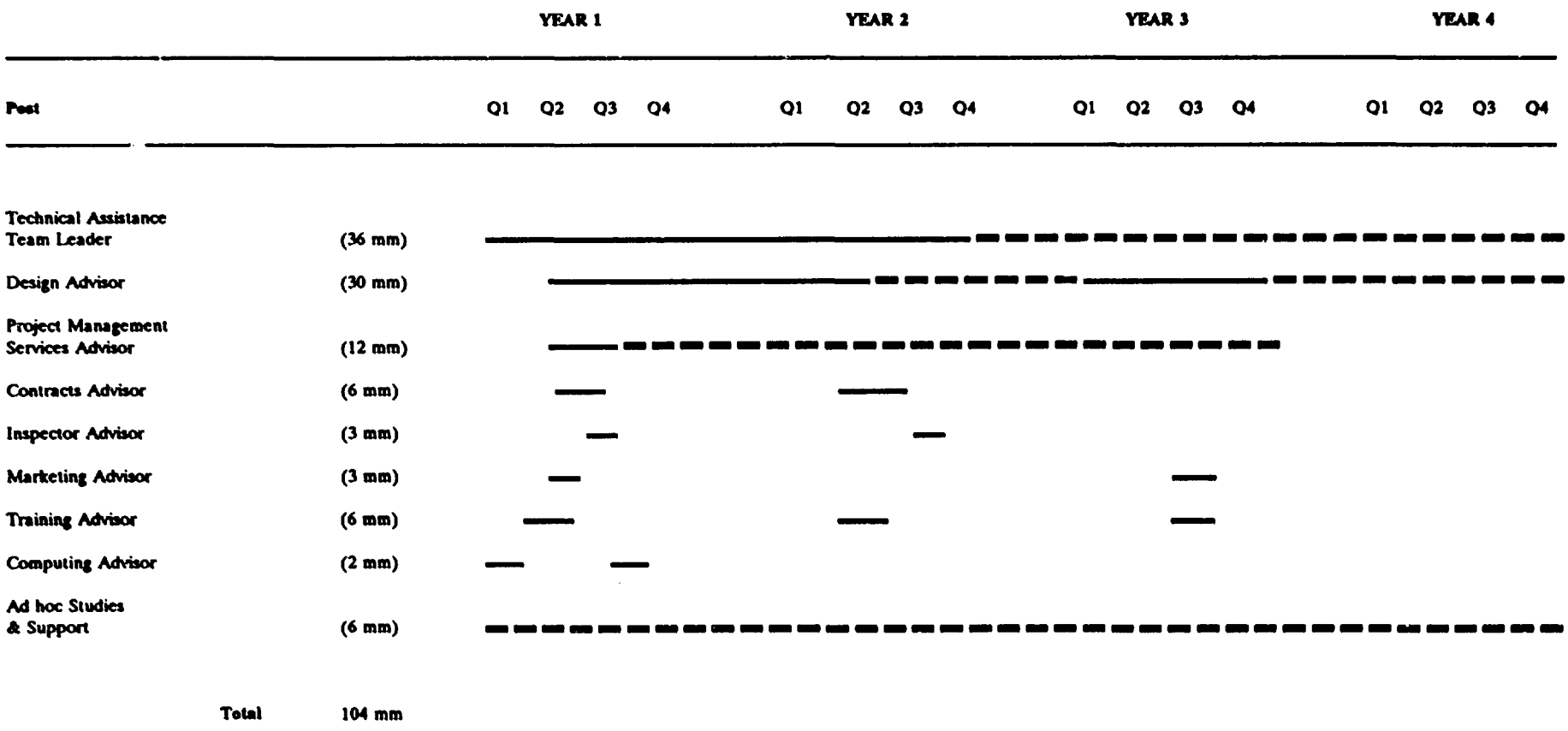
4.2 Job Description for International Staff

Post	Computing Adviser
Qualifications	Degree/Diploma in Mathematics/Business Studies/Computing
Experience	5 years experience in software application on PC's, including databases, wordprocessing and planning/cost control packages.
Language	Fluency in English
Key Tasks	Advice to Technical Assistance Team Leader on computing for PEMSU.
	Development and installation of software for the DSPU data base and PMSU project management system.
	Installation of word processing software.
	Training of PEMSU staff in the use of computers.
Duration/Schedule	2 man month Month 3 Month 10

4.2 Job Description for International Staff

Post	Training Adviser
Qualifications	Degree/Diploma in Training
Experience	10 years industrial experience of which 5 years in a training role. 3 years experience in developing countries.
Language	Fluency in English
Key Tasks	Advice to Technical Assistance Team Leader and PEMSU on staff training. Quality assurance of all PEMSU training. Assistance with the preparation of training plans and programmes.
Duration/Schedule	6 man months Month 5 - 6 Month 17 - 18 Month 30 - 31

4.3 TECHNICAL ASSISTANCE MANPOWER - INTERNATIONAL STAFF



4.4 Outline Terms of Reference for the Design House Staff Training Subcontractors

The role of the training contractor is to provide on-the-job training in a contracting design house for the core team of PEMSU design house staff. It is expected that the contractor will use a current Ethiopia assignment for the majority of the training assignments.

Training will be required as follows:

* Head of Design House.

  - operation and management of a design house
  - management of a design contract
  - checking and quality assurance of design activities
  - detailed design practice in his own discipline - probably structural engineering

* Designer Engineer - Structures

  - detailed design practice in structural engineering
  - work planning and control
  - managing and interpretations of a design house brief
  - working to standards and codes of practice
  - design calculations

* Design Engineer - piping

  - detailed design practice in piping covering utilities and low pressure process lines for simple plant
  - work planning and control
  - managing and interpreting a design brief
  - working to standards and codes of practice
  - design calculations

* Design Engineer - HVAC

  - detailed design practice on HVAC systems for simple and low risk/hazard plant and equipment
  - work planning and control
  - managing and interpreting a design brief
  - working to standards and codes of practice
  - design calculations

* Design Engineer - Electrical

  - detailed design practice on electrical distribution and simple control systems
  - work planning and control
  - managing and interpreting a design brief
  - working to standards and codes of practice
  - design calculations

It is envisaged that this training will in the main be carried out on-the-job through the trainee being given a series of increasingly complex design tasks for the contractor work in Ethiopia, not less than 6, over a period of 6 months.

They will be assigned a tutor to coach, guide and appraise them and their progress is to be formally reviewed, written and verbal, every month.

Where necessary they should participate in in-house relevant training programmes.

Annex 5 The Approach to Training

It is recognised that unless sufficient attention is paid to the human resources aspects of developments, it is unlikely that physical facilities provisions will be successfully put into efficient and effective productive use within a reasonable time scale.

Successful productive use of physical facilities is greatly dependent upon the level of usable skills and knowledge of the employed resources. Skills and knowledge are developed through of education and training. Conventionally for industrial development this has been provided by various forms of on-the-job training for workers and through various forms of fellowships for management and technical staff.

In the past, the majority of fellowships for developing countries were provided for higher education normally at first or a second degree level. Whilst this helped to raise nations overall levels of higher education attainment, rarely did such fellowships provide directly usable industrial skills. It was necessary to spend a further considerable period of time to develop the necessary range and level of applied skills.

The levels of education attainment in Ethiopia continues to climb. The University of Addis Ababa is developing resources with technical knowledge which needs converting into the necessary applied skills. Accordingly the nature of fellowships have changed to comprise a small knowledge component to fill identified shortfalls through short courses and a much larger job experience component.

However it has become apparent that insufficient fellows are returning with the necessary developed usable skills to enable them to meet the needs of their assigned jobs even to a reasonable standard of performance.

It is therefore necessary to make further changes to the approach to the training of management and technical staff. The Consultant is of the view that the training design process should be carried out in more detail, greater attention should be given to an individual's task needs, and the principles of:

* bringing the trainer and training to the individuals work centre
* developing applied skills through extended live work assignments with the direct coaching support

should be applied.

Training Arrangement

Overall approach

It is proposed that training for PEMSU staff will be based upon:

* on-the-job training in PEMSU on real tasks and with coaching support from the technical assistance team
* on-the-job training for core team of the Design House in a design contractors office
* short study tours for a small number of key staff.

On-the-job training

A detailed individual training plan will be prepared in accordance with the systematic approach to training for all staff of PEMSU.

Those involved in training outside PEMSU, namely

* design house core team comprising Head of Design House and the four design engineers
* the selected staff who will be participating in study tours, namely General Manager ETDC Head of PEMSU, Head of DSPU, Head of PMSU and the Inspection Engineer.

will have the appropriate components including in their plans.

The plans will be prepared by the Heads of Units with the support of their assigned technical advisers and the training adviser.

Overall responsibility for implementation of the plans will be vested in the Head of PEMSU and the Heads of Operational Units, but the majority of the technical training will be provided by the technical assistance team. They will normally adopt a coaching role but from time to time more formal activities are envisaged.

All training will be tasked based and learning achieved by "doing" rather than by watching or listening.

Training of design house staff

The core team will receive 6 months on-the-job training in an overseas design contractors office. The remaining staff will be trained in accordance with the procedure given above.

For the training of the core team it will be necessary to let a contract with an international contractor who has a design house and who is involved in an Ethiopian contract.

The outline suggested terms of reference for the subcontractor are given in Annex 4.

It will be the responsibility of the Technical Assistance Contractor to initiate the necessary action to identify a suitable contractor and to organise the training.

Proposals for training should be evaluated by the Technical Asssitance Team Leader and his Training Adviser and it is expected that they and the Head of PEMSU will visit the contractors design office to monitor progress and achievement against the original training plan.

Short study tours

These will be provided for:

* General Manager EDTC
* Head of PEMSU
* Head of DSPU
* Head of PMSU
* Inspector Engineer.

The suggested duration of the tours is 3 months and it is expected that the majority of the time will be spent in at least three less developed countries of the world including India and the Phillipines. Their purpose will be to observe, question and study their areas of applied technology in similar environments. Ideally the fellow should take with them a series of operational problems and seek out advice on their resolution by those who have faced similar issues. Consideration should be given to the tour being carried out a team exercise.

These fellowships will be designed, organised and supervised by the technical assistance contractor.

ANNEX 6 EQUIPMENT

Item No	Description	Number Required	Examples UK Suppliers	Budget Estimate US$ CIF exc Ethiopian Taxes
1.	**Document production Stations** **Hardware (per Station)** IBM Model 502 Computer 1 MB RAM 1 - VGA colour graphics screen and controller 1 - 60 MB Hard Disk and Controller 1 - 3.5inch 1.44MB Floppy drive 1 - 5.25inch 1.2 MB Floppy Drive 1 - set ports inc 2 serial and 1 parallel 1 - set of signal and power cables	2		16,000
	Software (per station) Word Perfect version 5 Lotus Freelance Lotus 1-2-3		Bytes Computing Supplies* Ewell, Surrey Technology Business Computers Ltd* Croydon, Surrey	
2.	**Data base station** **Hardware** IBM Model 70-121 Computer 4 MB RAM 1 - VGA graphics screen and controller 1 - 120 MB Hard Disk and Controller 1 - 3.5inch 1.44MB Floppy drive 1 - 5.25inch 1.2 MB Floppy Drive 1 - set ports inc 2 serial and 1 parallel 1 - set of signal and power cables	1		11,500
	Software Word Perfect version 5 Lotus Freelance Lotus 1-2-3 Foxbase Professional			

* Systems suppliers should be used in preference to hardware suppliers and IBM computers have been selected so that maintenance can be carried out locally.

Item No	Description	Number Required	Examples UK Suppliers	Budget Estimates $ US CIF exc Ethiopian Taxes
3.	**Project Planning and Cost Station** **Hardware (per station)** IBM Model 70-121 Computer 4 MB RAM 1 - VGA colour graphics screen and Controller 1 - 120 MB Hard Disk and Controller 1 - 3.5 inch 1.44MB Floppy Drive 1 - 5.25 inch 1.2 MB Floppy Drive 1 - set ports inc 2 serial and 1 parallel 1 - set of signal and power cables	2		
	Software (per station) Word Perfect version 5 Lotus Freelance Lotus 1-2-3 Pertmaster Advanced		Bytes Computing Supplies* Ewell, Surrey Technology Business Computers Ltd* Croydon, Surrey	25,00
4.	**CAD station**	1		
	Hardware IBM Model 70-121 Computer 1 - Maths co-processor 4 MB RAM 1 - 12"x 12" Graphics tablet with 3 button puck 1 - 16 Colour graphics system with 15"x15 monitor with on board processor and 2MB of RAM with AutoCAD ADI's and EGA drivers. 1 - Hercules screen and controller for second screen 1 - 100 MB Hard Disk and Controller 1 - 3.5inch 1.44MB Floppy drive 1 - 5.25inch 1.2 MB Floppy Drive 1 - set ports inc 2 serial and 1 parallel 1 - set of signal and power cables			24,500

* Systems suppliers should be used in preference to hardware suppliers and IBM computers have been selected so that maintenance can be carried out locally.

Item No	Deecription	Number Required	Examples UK Suppliers	Budget Estimates
	Software AutoCAD revision 10 Word Perfect version 5 Lotus Freelance Lotus 1-2-3			
5.	**Plotting Facility** 1 - A0 plotter compatible with HPGL drivers and suitable for plotting on A5 - A0 film and paper stationary. 1 - Plot station using an IBM AT compatible with the same specification as the machines for document production listed above (hardware & software). 1 - set of signal and power cables	1	Bytes Computing Studies* Ewell, Surrey	22,500
6.	**Backup system** 1 - 120 MB external tape streamer (MCA) 7 - Tape streamer controller boards to be located in each computer and work with the external streamer.	1	Technology Business Computers Ltd* Croydon, Surrey	6,500
7.	**Laser Printing Facilities (each comprising)** 1 - HP laser Jet 2/3 or compatible with 1MB memory. RS 232 interface 1 - set of soft fonts 1 - intelligent serial line switching between 4 computers stations and one printer 1 - set of signal and power cables	2		8,300
8.	**Dot Matrix Printing Facility** 1 - Epson EX1000 or compatible printer with Parallel interface 1 - intelligent Parallel line switching between 4 computers stations and one printer 1 - set of signal and power cables	1		1,600

* Systems suppliers should be used in preference to hardware suppliers and IBM computers have been selected so that maintenance can be carried out locally.

Item No	Description	Number Required	Example UK Suppliers	Budget Estimates $ US CIF exc Ethiopian Taxes
15.	**Basic Inspection Kit** 3 - tapes 3m, 5m and 30m 1 - Folding rule 1 - 6" vernier 1 - 0 to 1" micrometer 1 - set 1" to 4" adjustable micrometer 2 - Straight edges 12" and 24" 1 - Internal and external callipers 1 - Set feeler gauges (inch and mm) 1 - Plumb bob and line 1 - Machine level 1 - 12" level 1 - Tri- square 1 - Adjustable square 1 - set scribers, auto-punch, chalks.	1	RS Components Corby, Northants Buck & Hickman Dagenham, Essex	1000#
16.	**Advanced Inspection Kit** 1 - Dumpy level 1 - Theodolite 1 - Set of dyepenetrant 1 - set thread form gauges 1 - Set of radius gauges 1 - 4'-0" level	1		5000#
17.	**Saloon Car** 1600cc petrol engine four door sedan	2	Nissan Cars	24,000
18.	**Estate Car** 1600cc petrol engine five door	1	Ford Cars Toyota Cars	12,500
19.	**Staff Service Vehicle** 12/15 seater mini bus	1		20,000

expendable item

Item No	Description	Number Required	Example UK Suppliers	Budget Estimates $ US CIF exc Ethiopian Taxes
20.	Supply of consumable items for four years Magnetic media tapes and discs Photocopier/laser printer toner Paper for reports, calculations, letters etc, note books Envelopes continuous computer stationary Photocopier/laser printer paper File covers Assorted adhesive tapes Drawing inks Pencils, leads and rubbers Labels	provision	Sandhurst Market Horsham, Surrey ESSE Business Suppliers Weybridge, Surrey	50,000#
21.	Set of Reference books Selected BSI Civils and structures standards Selected DIN engineering standards Selected reference books	provision	BSI London	16,000#
22.	Set of conference room audio and projection systems 35 mm slide projector Audio system inc. amplifier, microphone and loud speakers	1	Education Supplies Co London Sandhurst Marketing Horsham, Surrey	3,000
			TOTAL	287,500 $ US

expendable item

ANNEX 7

7.1 UNDP/UNIDO Budget Estimate

7.2 Government Budget Estimate

7.3 Budget Estimate for Technical Assistance Subcontract

7.4 Budget Estimate for Design House Staff Training Subcontract

7.5 Budget Estimate for Study Tours

7.6 Budget Estimate for Equipment **(included as Annex 6)**

7.1 Budget For UNDP/UNIDO Contribution

Item	Total	Year 1	Year 2	Year 3	Year 4
15.00 Project Travel	30,000		30,000		
16.00 UNIDO Evaulation Mission	15,000			15,000	
SUBCONTRACTS					
21.01 Technical Assistance	1,630,000	610,000	445,000	400,000	175,000
21.02 Design House Training	87,500		87,500		
29.00 TOTAL SUBCONTRACTS	1,717,500	610,000	532,500	400,000	175,000
TRAINING					
32.00 Study Tours	65,500		65,500		
39.99 TOTAL-TRAINING COMPONENT	65,500		65,500		
EQUIPMENT					
41.00 Expendable Equipment	72,400	29,500	12,900	17,500	12,500
42.00 Non-Expendable Equipment	215,150	98,400	104,250	12,500	
49.99 TOTAL-EQUIPMENT COMPONENT	287,550	127,900	117,150	30,000	12,500
MISCELLANEOUS					
51.00 Sundries	5,000	1,250	1,250	1,250	1,250
59.99 TOTAL MISCELLANEOUS COMPONENT	5,000	1,250	1,250	1,250	1,250
99.99 PROJECT TOTAL	2,120,550	739,150	746,400	446,250	188,750

7.2 Budget Estimate for Government Contribution

(in Birr, ie. 1US$ = 2.07 Birr)

BUL	ITEM		SALARY PER MONTH	TOTAL MM	TOTAL BIRR	YEAR 1 MM	YEAR 1 BIRR	YEAR 2 MM	YEAR 2 BIRR	YEAR 3 MM	YEAR 3 BIRR	YEAR 4 MM	YEAR 4 BIRR
10.0	Personnel Costs												
1.0	EDTC common staff (1/3 of total)		2,000	42	84,000	6	12,000	12	24,000	12	24,000	12	24,000
1.1	Management & staff function		3,500	42	147,000	6	21,000	12	42,000	12	42,000	12	42,000
1.2	Administration & Finance		1,500	42	63,000	6	9,000	12	18,000	12	18,000	12	18,000
1.3	Support Personnel												
		Sub-Total 1.0	7,000	126	294,000	18	42,000	36	84,000	36	84,000	36	84,000
2.0	PEMSU												
2.1	Head of PEMSU		1,500	48	72,000	12	18,000	12	18,000	12	18,000	12	18,000
2.2	Secretary		700	48	33,600	12	8,400	12	8,400	12	8,400	12	8,400
		Sub-Total 2.0	2,200	96	105,600	24	26,400	24	26,400	24	26,400	24	26,400
3.0	DSPU												
3.1	Head of DSPU		1,500	36	54,000	-	-	12	18,000	12	18,000	12	18,000
3.2	Techno-commercial Engineer 1		1,000	48	48,000	12	12,000	12	12,000	12	12,000	12	12,000
3.3	Techno-commercial Engineer 2		1,000	48	48,000	12	12,000	12	12,000	12	12,000	12	12,000
3.4	Techno-commercial Engineer 3		1,000	45	45,000	9	9,000	12	12,000	12	12,000	12	12,000
3.5	Techno-commercial Engineer 4		1,000	45	45,000	9	9,000	12	12,000	12	12,000	12	12,000
3.6	Documentation Officer		800	46	36,000	10	8,000	12	9,600	12	9,600	12	9,600
3.7	Word Processing Operator		800	45	36,000	9	7,200	12	9,600	12	9,600	12	9,600
		Sub-Total 3.0	7,100	313	312,800	61	57,200	84	85,200	84	85,200	84	85,200
4.0	DESIGN HOUSE												
4.1	Head of Design House		1,500	45	67,500	9	13,500	12	18,000	12	18,000	12	18,000
4.2	Design Engineer - Piping		800	38	30,400	2	1,600	12	9,600	12	9,600	12	9,600
4.3	Design Engineer - HVAC		800	38	30,400	2	1,600	12	9,600	12	9,600	12	9,600
4.4	Design Engineer - Structures		800	38	30,400	2	1,600	12	9,600	12	9,600	12	9,600
4.5	Design Engineer - Electrical		800	38	30,400	2	1,600	12	9,600	12	9,600	12	9,600
4.6	Technician/Draughtsman - Piping		600	42	25,200	6	3,600	12	7,200	12	7,200	12	7,200
4.7	Technician/Draughtsman - HVAC		600	42	25,200	6	3,600	12	7,200	12	7,200	12	7,200
4.8	Technician/Draughtsman - Structural		600	42	25,200	6	3,600	12	7,200	12	7,200	12	7,200
4.9	Technician/Draughtsman - Electrical		600	42	25,200	6	3,600	12	7,200	12	7,200	12	7,200
		Sub-Total 4.0	7,100	365	289,900	41	34,300	108	85,200	108	85,200	108	85,200

7.2 Budget Estimate for Government Contribution Cont./

BUL	ITEM	SALARY PER MONTH	TOTAL		YEAR 1		YEAR 2		YEAR 3		YEAR 4	
			MM	BIRR	MM	BIRR	MM	BIRR	MM	BIRR	MM	BIRR
5.0	PROJECT MANAGEMENT SERVICES UNIT											
5.1	Head of Project Management Services Unit	1,500	42	63,000	6	9,000	12	18,000	12	18,000	12	18,000
5.2	Project Planner 1 (Engineer)	1,200	39	46,800	3	3,600	12	14,400	12	14,400	12	14,400
5.3	Project Planner 2	1,200	28	33,600	-	-	4	4,800	12	14,400	12	14,400
5.4	Project Planner 3	1,200	28	33,600	-	-	4	4,800	12	14,400	12	14,400
5.5	Cost Control Engineer	1,200	41	49,200	5	6,000	12	14,400	12	14,400	12	14,400
5.6	Contracts Engineer 1	1,200	41	49,200	5	6,000	12	14,400	12	14,400	12	14,400
5.7	Contracts Engineer 2	1,200	28	33,600	-	-	4	4,800	12	14,400	12	14,400
5.8	Inspection Engineer	1,200	41	49,200	5	6,000	12	14,400	12	14,400	12	14,400
5.9	Inspector Technician	800	28	22,400	-	-	4	3,200	12	9,600	12	9,600
	Sub-Total 5.0	10,700	316	380,600	24	30,600	76	93,200	108	128,400	108	128,400
19.99	TOTAL PERSONNEL COMPONENT 1.0 to 5.0	34,100	1,216	1,382,900	168	190,500	328	374,000	360	409,200	360	409,200
40.0	"EQUIPMENT" COSTS											
	- Building - Office & other facilities provided in EDTC Premises (1/3 of total cost)			2,500,000		2,500,000		-		-		-
	- Office furniture & local equipment			150,000		100,000		20,000		30,000		-
	- Office supplies			250,000		50,000		60,000		70,000		70,000
49.99	TOTAL "EQUIPMENT" COMPONENT			2,900,000		2,650,000		80,000		100,000		70,000
51.00	MISCELLANEOUS											
	- Port clearance and inland transport of UNDP supplied Vehicles & Equipment			50,000		40,000		10,000		-		-
	- Operation and Maintenance			900,000		180,000		240,000		240,000		240,000
	- Sundries			100,000		40,000		20,000		20,000		20,000
59.99	TOTAL MISCELLANEOUS			1,050,000		260,000		270,000		260,000		260,000
99.99	GRAND TOTAL			5,332,900		3,100,500		724,000		769,200		739,200

N.B.

1. The Government Budget is presented above along UNIDO Budget Lines, as far as possible, for ease of cross comparison.
2. Prior years expenditures such as building ... etc. are shown under "Year 1" column.

7.3 Budget Estimate for Technical Assistance Subcontract

Requirement

A total of 104mm of technical assistance in Ethiopia of which:

Technical Assistance Team Leader
Design Adviser
Project Management Services Advisers

will be essentually long term and the remainder short term.

Thus there will be	78mm of long term assistance 20mm of short term assistance
This will be supplemented with	6 man month of home office/back stop support/ad hoc consultancy

Assumptions

Local Provisions

The following element are assumed to be provided in local currency through the implementation agency.

* local accommodation
* local travel
* local subsistence
* office accommodation
* international travel including prepaid excess baggage provisions
* international telex and telecom facilities.

Standard Costs

Professional fees for 1 man month of long term technical assistance = 15,000 $ US.

Professional fees for 1 man month of short term technical assistance = 18,000 $ US.

These rates assume senior experienced staff on accompanied status.

Professional fees for 1 man month of home office/back stop/ad hoc consultancy support = 15,000 $ US.

Lump Sum Provisions

For documentation, report preparation and international communications in the home office - 10,000 US $.

Budget		US $
Professional fees	- long term staff	*1,170,000
	- short term staff	360,000
	- home office/back stop/ ad hoc consultancy support	90,000
Documentation Provision		10,000
	Total	*1,630,000

* includes an element for local subsistence estimated to be 120,000 Birr

7.4 Budget Estimate for Design Home Staff Training Subcontract

Requirement

A team of five will spend 6 months in a Northern European Contractors Design Office.

The head of PEMSU with either the Technical Assistance Team Leader or the Design Adviser will visit the trainees twice during their training for a period of one week. It is considered advisable that a UNDP/UNIDO representative participates in one of these visits, but no financial provision for this have been made.

Assumption

A subsistence rate of 2000 $ per month for trainees

A subsistence rate of 120 $ per day for short term visits

Lump sum per trainee for books etc 1000 $.

Air fares at 1500 $/return trip.

Management fee lump sum 15,000 $.

Costs		US $	
Subsistence - 2000 x 6 x 5	=	60,000	
Books etc provision - 100 x 5	=	5,000	
Air fares - 1500 x 5	=	7,500	
Management fee	=	15,000	
Costs of Supervising Visits (1200 x 20 + 1500 x 4)	=	8,400	*
		95,900	

* include under budget line 15 but excludes cost of UNDP/UNIDO representative participation

7.5 Budget Estimate for Study Tours

Requirement

A team of five will spend 3 months on a tour of at least three has developed countries.

Assumption

Average daily allowance for accommodation and subsistence of 100 $ US.

Lump sum provision per person for the purchase of books, periodicals and technical documents and for photocopying of 1000 $.

Typically three country economy air fare will cost 3000 $ US.

Budget		$ US
Travel Cost 5 x 3000 $	=	15,000
Accommodation Subsistence 91 x 5 x 100	=	45,500
Books etc provision 5 x 1000	=	5,000
Total	=	**65,500**