

2. 要請書 (マスタープランを含む)



From: Md. Ferdous Hossain
Sr. Asstt. Secretary

Economic Relations Division
Ministry of Finance
Sher-e-Bangla Nagar
Dhaka-1207

D. O No. ERD/JAF-1/23/99/ 2৮৯

Dated 10-10-1999.

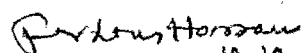
**Subject: Project Type Technical Co-operation Proposal(PTTCP) of
Rural Development Engineering Centre under NRIDP
[Loan No. BD-P44]**

Dear Mr. Ishida,

I am pleased to send herewith a copy of Project Type Technical Co-operation Proposal(PTTCP) of Rural Development Engineering Centre under Northern Rural Infrastructure Development Project (BD-P44) as received from the Local Government Division Ministry of Local Government, Rural Development and Co-operatives for your kind information and necessary action.

With best regards.

Yours sincerely,


10.10.99
(Md. Ferdous Hossain)
Tel: 9119602

Mr. Takeki Ishida
Second Secretary
Embassy of Japan
Gulshan Dhaka.

**Relevant Documents on Request for Project Type Technical Cooperation Project
(PTTCP) for RDEC LGED, Bangladesh**

I. Supplementary Information on Each Expert

i) GIS:

GIS Database Development and Application in LGED and amended TOR
by Mr. Tariqul Islam, Senior GIS Specialist

ii) Physical Planning:

Rural Planning Activities of LGED by Mr. A. H. Shafiqur Rahman, Physical Planning
Consultant, ISP

iii) Design:

Technical Design Unit, ISP, LGED by Mr. Moksed Alam, Road Infrastructure Design
Consultant, ISP

iv) QC:

Quality Control Measures for Rural Infrastructure Development Projects by Mr. A. N. M.
Wahiduddin, Laboratory Consultant, ISP

v) Central Construction Equipment Workshop:

Increasing the Lease Rate of LGED Construction Equipment, draft July 1999 by RDP-21.

vi) Hydraulics & Hydrology Design:

TOR for Computational Hydrology and Hydraulics expert

II. Past Communications

i) Office Memorandum

July 1, 1999 from Mr. W. Rahman to Mr. S. Hassan re Review on TOR for Japanese experts –
Rural Development Engineering Center (RDEC)-

ii) Office Memorandum

June 28, 1999 from Mr. Y. Suzuki to Mr. W. Rahman re Discussion on Project Type Technical
Cooperation Project (PTTCP) for RDEC

iii) Office Memorandum

November 25, 1998 from Mr. Y. Suzuki to Mr. S. Hassan re Japanese Technical Assistance for
RDEC

iv) Office Memorandum

October 25, 1998 from Mr. Y. Suzuki to Mr. S. Hassan re Rationale of Construction Equipment
Central Workshop, CECW

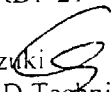
v) Memo No: LGED/PD/RDP-21/COMPU-01/98/870

October 25, 1998 from Mr. W. Rahman to Mr. Herb Wiebe re a hydraulic analytical unit

Office Memorandum

Date: July 18, 1999

To: Mr. Wahidul Rahman
PD-RDP 21

From: Y. Suzuki 
LGED Technical Adviser, JICA Expert

Re: Review on Project Type Technical Cooperation Project (PTTCP) for RDEC

Dear Mr. Rahman,

Up to date, we have discussed many times on PTTCP involving relevant officers in LGED. Particularly, as per your briefing on your discussion with MAFF in Japan on June 8, we were requested to narrow down the scope of and more information on the TOR for each Japanese expert who is expected to work under the PTTCP.

I indicated in my letter of June 28 that since specific tasks common in all TORs are centered on preparation/improvement of guidelines/training materials and conduct training limiting the tasks is not viable. However, as we felt a need to provide more information to MAFF, as per your letter to Mr. Shahidul Hassan of July 1, we requested relevant officers for supplementary information focusing on their current activities, achievements, future plan and requirements for the TA.

Accordingly, they have provided inputs as follows:

GIS:

GIS Database Development and Application in LGED and amended TOR by Mr. Tariqul Islam, Senior GIS Specialist

Physical Planning:

Rural Planning Activities of LGED by Mr. A. H. Shafiqur Rahman, Physical Planning Consultant, ISP

Design:

Technical Design Unit, ISP, LGED by Mr. Moksed Alam, Road Infrastructure Design Consultant, ISP

QC:

Quality Control Measures for Rural Infrastructure Development Projects by Mr. A. N. M. Wahiduddin, Laboratory Consultant, ISP

With regard to the expert for the Central Construction Equipment Workshop, since the workshop has yet to be established, no input was provided. However, a relevant document, Action Plan for Increasing the Lease Rate of LGED Construction Equipment, draft, July 1999 has been made available by RDP-21.

Further, Mr. Herb Wiebe provided a TOR for Computational Hydrology and Hydraulics expert, which could be an addition to above design expert.

In order to ensure freedom to select qualified experts by MAFF, and maintain our communication records, as attached I put relevant documents together.

I will discuss this matter with MAFF when I go back to Japan in this month.

I should appreciate it if you could provide comments on above document.
By copy of this, I am also asking for their comments.

With regards,

Y. Suzuki

c.c. Chief Engineer, LGED
Mr. Saroj Kumar Sarker, Superintending Engineer (Planning), LGED
Mr. A. H. Shafiqur Rahman, Physical Planning Consultant, ISP
Mr. Tariqul Islam, Senior GIS Specialist
Mr. Syed F. Mahmood Islam, Senior Maintenance Specialist, ISP
Mr. Moksed Alam, Road Infrastructure Design Consultant, ISP
Mr. Nurul Islam, PD, SSWRDS
Mr. Herb Wiebe, team leader, SSWRDS
Mr. A. N. M. Wahiduddin, Laboratory Consultant, ISP
Mr. Dick Lundberg, Senior Adviser, ISP
Mr. Abul Quasem, team leader/training specialist, RDP-21

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GIS Database Development and Applications in LGED

by

Md. Zahurul Islam

Assistant Engineer

Local Government Engineering Department

Overview of the Presentation

- ◆ **Rationale of GIS**
- ◆ **GIS Database in LGED**
- ◆ **Application of GIS in Planning**

Rationale of GIS in LGED

- ◆ LGED is implementing 27 rural infrastructure development projects and 4 urban development projects involving a total cost of some US\$ 1400 million. LGED is also involved in implementing the projects of other ministries.
- ◆ LGED is mandated to provide technical support to local bodies for planning and implementation of projects.
- ◆ LGED prepared thana base maps from ILO/UNDP project after compiling information from Satellite imagery, aerial photography, available topographic map and old thana maps.
- ◆ The base maps have a set of up-to-date and relatively accurate information in 1:50,000 scale.
- ◆ To manage, update the thana level database which have been developed from ILO/UNDP project in a cost-effective manner and use the database for planning, GIS, a computer based information technology has been adopted.

GIS Database in LGED

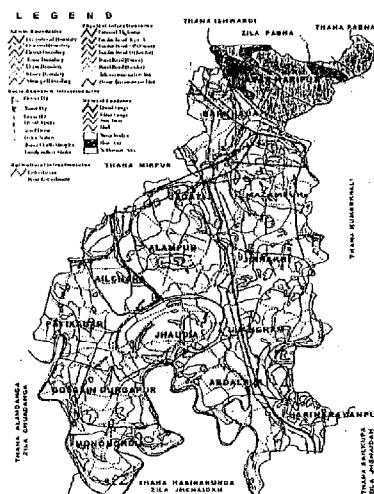
- ◆ Thana Level Database
- ◆ District Level Database
- ◆ Pourashava Level Database

Thana Level Database

- ◆ Maps produced under ILO/UNDP project in 1:50,000 scale have been used as a source map for digitization
- ◆ Information are digitized layer by layer in digitizing co-ordinate system which is finally transformed into real life co-ordinate system i.e., Lambert Conformal Conic (LCC)
- ◆ Unique Identification No. is used during digitization of each layer which formed a field "Type" in the topology of each layer
- ◆ The features are captured as line, point and polygon
- ◆ SML has been developed for quick digitization
- ◆ Completed thana level database in all over Bangladesh

BASE MAP
KUSTIA SADAR THANA
KUSTIA DISTRICT
LOCAL GOVT. ENGINEERING DEPARTMENT

Annex - 1

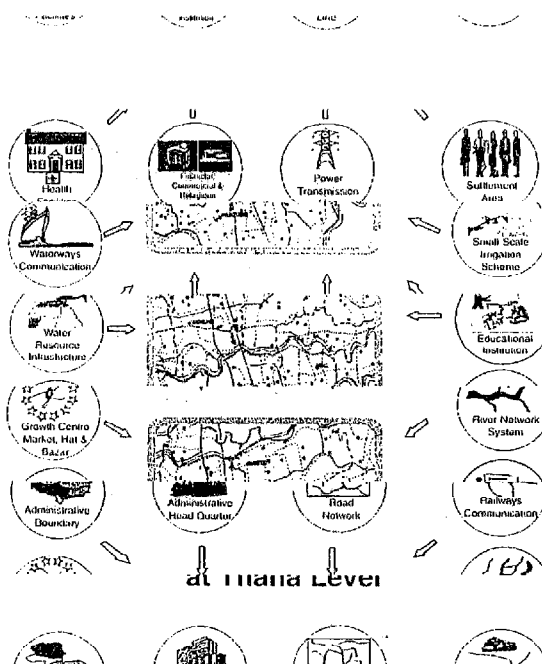


| FNODE_ | TNODE_ | LPOLY_ | RPOLY_ | LENGTH | ADB22505_ | ADB22505_I | TYPE |
|--------|--------|--------|--------|-------------|-----------|------------|------|
| 2 | 4 | 1 | 1 | 591.916200 | 1 | 30 | 30 |
| 6 | 1 | 1 | 1 | 1216.102000 | 2 | 30 | 30 |
| 7 | 6 | 3 | 1 | 926.233900 | | 30 | 30 |
| 5 | 7 | 5 | 1 | 983.001000 | 4 | 30 | 30 |
| 7 | 8 | 5 | 3 | 818.583900 | 5 | 60 | 60 |
| 6 | 8 | 3 | 1 | 1311.479000 | 6 | 40 | 40 |

Different Layers of LGED's Database

- ◆ Features of base maps are captured in 14 different layers.
- ◆ Administrative boundary, road network, railways communication, river network, power transmission line, water ways communication have been captured as line feature.
- ◆ Administrative headquarters, educational institutions, small irrigation schemes, financial, commercial, health facilities and growth centres are captured as point feature.
- ◆ Settlement distribution have captured as polygon features.

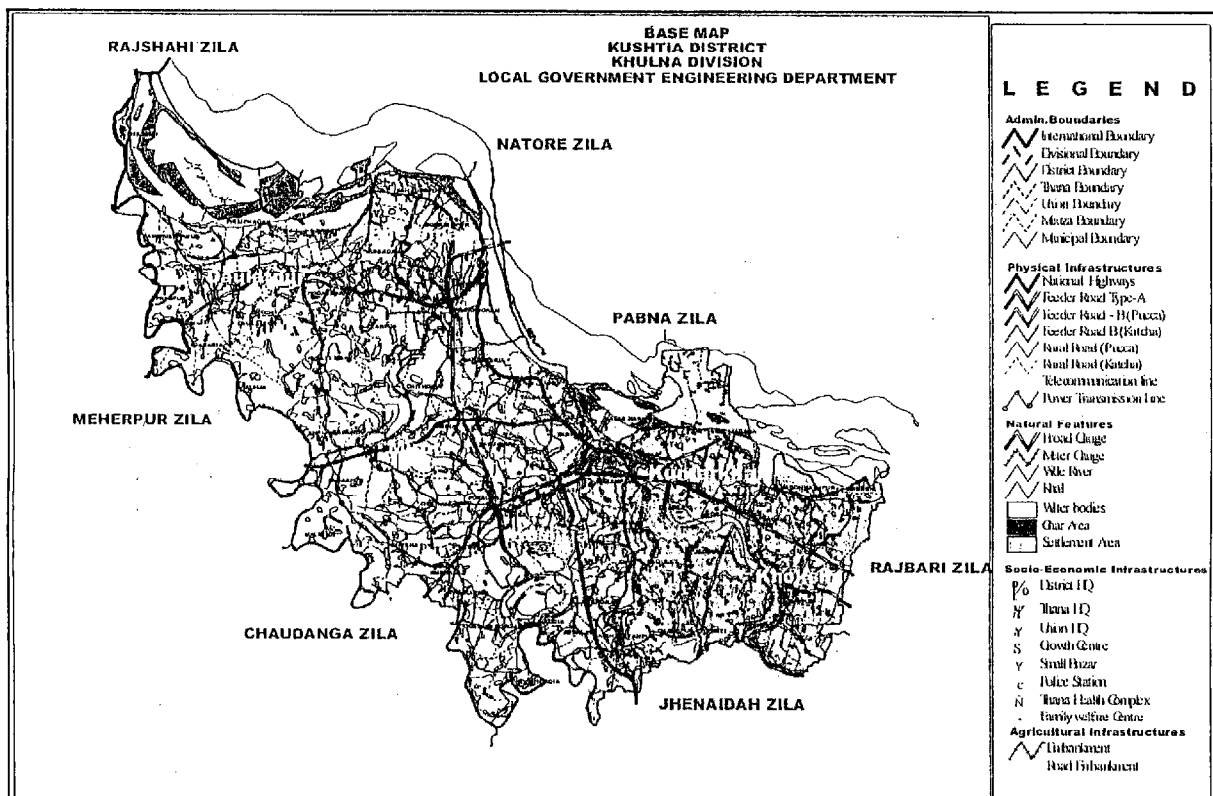
The base map features are being digitally captured in 14 different layers using pc ARC/INFO vector GIS software to create a basic information platform. LGED has created its own symbol library for 1:50,000 scale digital map.



Basic Database Layers/Coverages
at Thana Level

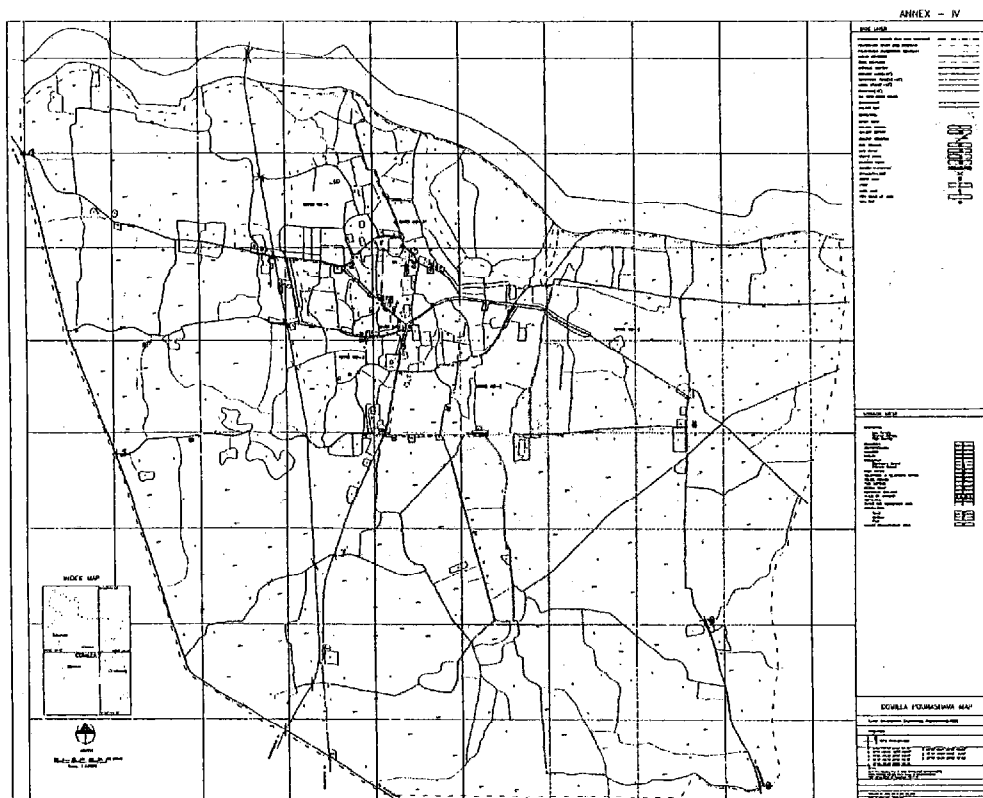
District Level GIS Database

- ◆ Thana level database are used as source for district level database.
- ◆ Since the thana level database are in real life co-ordinate system, all layers of adjacent thanas of a district are joined to develop district level database
- ◆ Scale varies between 1:60,000 to 1: 250,000 depending on no. of thanas under a district.
- ◆ Some features of thana level database e.g. primary school, road below R1 category, deep tubewells, shallow tubewells have been excluded in the district maps.
- ◆ Completed the district level database



Pourashava Database

- ◆ Map from Urban Development Directorate, satellite imagery (blown up in 1:10,000 scale), available topo sheet are used to prepare the preliminary maps.
- ◆ In some cases, DGPS (Differential Global Positioning System) survey is conducted in the pourashava to capture the road network of the pourashava
- ◆ Preliminary maps are verified in the field by ground truthing operation.
- ◆ After completion of the ground truthing, the features are divided into 4 (four) layers e.g. base layer, land use layer, network layer and water use layer.
- ◆ 31 Pourashava database have been completed



Application of GIS Database in Planning

LGED has successfully demonstrated the application of GIS in preparation of macro level database, locational planning of socio-economic infrastructures etc. Besides, there are many fields where GIS can be used as an effective tool for decision making process where LGED's database will play a vital role.

These are as follows:

- ◆ Rural accessibility planning**
- ◆ Integrated rural transport planning**
- ◆ Prioritization and selection of development scheme**
- ◆ Local level disaster management and disaster preparedness**
- ◆ Environmental impact assessment of infrastructure development schemes**

RURAL PLANNING ACTIVITIES OF LGED

The origin of LGED's planning activities can be traced back to the Thana Plan Book prepared by the Government of Pakistan for the 1965-70 period under its Works Programme. The objective was to protect life and property from flood, connecting villages with the inter-regional road network, and to create employment for the rural population. The Plan Book contained planning mapping and implementation instructions concerning drainage, embankment, roads and rural water supply. The emphasis was on devising drainage and flood protection schemes which could be implemented locally by the Thana and Union Councils with technical assistance from the then Water and Power Development Authority, WAPDA. The District Councils were to supplement the Thana & Union Councils to manage projects that were too large for them to handle. For developing roads, the responsibilities were delegated to the appropriate level of local government institutions according to the hierarchy of the road.

LGED's Planning Unit is responsible for preparation of planning tools, manuals, guidelines concerning planning and implementation of infrastructure development projects/activities of LGED. The planning unit has so far prepared the following planning guidelines/ tools :

- Thana Plan Book
- Growth Centre Planning Manual
- Land & Water Use Planning Manual
- Guidelines on Environmental Issues Related to Physical Planning
- Pourashava Plan Book

THANA PLAN BOOK

The Local Government Engineering Bureau which was created out of the Works Programme prepared the Upazila Plan Book in 1990 for the 1990-91 - 1994-95 period to be used as a tool for rural development. The document contains a set of clearly laid-out instructions and guidelines. It reflects the decentralisation policy of the Government where by development of the rural areas where vast majority of the population lives is seen as the key to the national development.

The plan book has four major components - Road, Drainage & Embankment, Irrigation and Land and Water use, in keeping with the government policy, the land and water use plan is aimed at increasing production of food crops, industrial raw material, fisheries, livestock etc. The road plan is meant to facilitate the above through linking the villages with markets, river ports and all-weather road for ensuring supply of inputs and access to buyers. The Draining and Embankment plan is for protecting the crop from water logging and flooding. The irrigation plan is to increase the yield of crops through simple irrigation methods ensuring early return on investment.

The plan look clearly identifies the different sectoral agencies and organizations whose involvement or assistance would be necessary in the planning process. It also identifies participation of the beneficiaries as an essential component in the successful preparation and implementation of a plan.

The Plan Book includes a clear outline regarding the documentation procedure involved in preparing the various sectoral plans - keeping in view the availability of resources at the thana level.

GROWTH CENTRE PLANNING MANUAL

The national human settlement and physical planning policies since the early 70's have advocated a growth centre strategy to remove rural-urban disparities. Accordingly, efforts were made to identify centres where location of investments would bring about socio-economic benefits. The Planning Commission made a selection of 2100 assembly/secondary markets each serving an area of 8 to 30 km radius and attracting 8 to 30 thousand visitors on the market days and designated them as 'growth centres'. These centres needless to say, provide important linkages between the primary and terminal markets. They act as centres of economic, social and cultural activities of the rural areas. They are the venues where people exchange ideas with their neighbours regarding improved methods of production and marketing and also serve as centres of recreation. Improvement of the rural markets therefore assumes great importance in the overall development strategy of the country.

In recent times increasing attention is being focused on the need for creating marketing infrastructure for facilitating easy and quick transfer of products and commodities from the place of production to the place of consumption and from the producers to the consumers. There is a feeling that lack of marketing facilities have been acting as a serious bottleneck in promoting economic growth.

The Local Government Engineering Department being the main organization responsible for developing rural infrastructure, is undertaking development plans and improvement of physical facilities for the growth centres. As part of these efforts, LGED has prepared a Manual for Growth Centre Planning

The manual has been prepared for the use of thana level engineers in making development plans for growth centres and rural markets. It provides detail guidelines in undertaking planning of a growth centre. Starting with the explanation of the planning process involved, it sets forth a sequential procedure as to how to move on from one step to another in preparing the development plan. It shows how the required quantities of physical facilities can be determined using proformas and standards included in the manual.

Moreover, the manual also deals with the maintenance and financial aspects of the growth centres. Both day to day cleaning as well as structural maintenance consideration are explained in detail. The financial aspects are discussed illustrating mechanisms behind the existing system of revenue realization. Prospects of ensuring substantial increase of growth centre income to finance both development and maintenance activities are also dealt with.

The methodology set-out in the manual for preparing the growth centre development plan is as following :

1. DEFINITION OF PLANNING

Planning is both an activity and a process. It is the process of arriving at logical decisions that would solve problems and achieve desired goals through some actions, making best use of available resources within the constraints in effect. *Any decision regarding future course of action cannot be regarded as a result of planning; the result must come through a logical process.* Planners have been described as *artists of rationality* with respect to human environment. This statement highlights the element of *rationale or logic* in planning.

Planning as a forward- looking activity selects from past those elements that are useful in analyzing existing conditions from a vantage point of future - the changes that are thought to be desirable and how they might be brought about. Focusing on the problem of how knowledge might be linked to action. *In this sense planning attempts to link scientific and technical knowledge to actions in public domain.*

TYPES OF PLANNING

The scope and field of planning is varied and virtually limitless. Planning might be done for the development of human settlement, growth and smooth functioning of a corporate body, proper distribution of resources in a region or growth of a nation as a whole. Whatever might be subject, planning is said to be spatial when elements of space is considered, as in urban, city or town planning, rural planning, regional planning etc. Planning in other fields might or might not be spatial, depending on whether the space element is involved or not. However, despite the variety of distinct nomenclature and the differences in the methodology and techniques in each of them, the basic structure of the planning process is almost the same. A city planner/ physical planner and a corporate planner might utilize different techniques and adopt different strategies, but both go through similar, if not identical stages of a process. Different types of planning are :

Economic Planning (National, State, Local Level)

- investment for economic growth
- monetary policy (anti-inflation, pro-growth)
- trade policy (tariffs etc.)
- incomes (redistribution)
- employment (education, job training)
- strategic resources (energy)
- science policy (research & development)
- sectoral policies (agriculture, transportation etc.)

Social Planning (National, State, Local)

- meeting individual and collective needs (health, education, housing, etc.)

Environmental Planning (National, State, Local)

- waste management and anti- pollution
- public land management
- water resources
- resources conservation

- protection of rare species
- protection of fragile and unique environments
- energy (alternative sources of energy)

City/ Town Planning (City/Town Level)

- land use (zoning, public facility location)
- local transport (highways, rapid transit, airports, ports)
- urban redevelopment
- urban design
- conservation of built environment
- community development (neighbourhood planning)

Regional Development Planning

- natural resources development (irrigation, hydro-energy, integrated river basin development)
- regional economic development (inter-regional inequalities, special problem areas,

Technical Design Unit, ISP, LGED

OBJECTIVES

To support LGED in developing its technical capabilities for better planning, design and implementation of projects.

AREAS OF ACTIVITIES

Design Capacity/capabilities enhancement of LGED Engineers through development of

- Manuals
- Standard Design
- Guidelines
- Technical Specifications
- Computer Programmes
- Imparting Training

Design activities of projects

- Having no Consultants
- Large/complicated & could not be handled locally
- Support to Projects Consultants
- Research and development of appropriate and innovative technologies
- Support to field engineers
- Conducting Seminar, Workshop, Training etc. on Technical aspects.

RESPONSIBLE SECTIONS

- ◇ Road Infrastructure Design Section
- ◇ Water Structure Design Section
- ◇ Building Infrastructure Design Section

Development of Manuals

- Road Structure Manual (Part-A)
- Road Structure Manual (Part-B) Volume-1, 2 & 3
- Manual on Prestressed Concrete Bridges (Part-A, B & C)
- Standard Specifications for Feeder Road Type-B & Rural Road Type R1 under LGED
- Road Pavement Design Manual.
- Operation & Maintenance of Small Scale Flood Control & Drainage Schemes
- Small Scale Water Resource Schemes - Draft Design Manual Part-1
- Operation & Maintenance (O & M) Manual for Canal, Embankment & Water structure under the "Canal Digging Programme".
- Bio-gas plant Manual

Research activities undertaken

- ✦ Low-cost-house
- ✦ Low cost RCC Pile
- ✦ Twin-pit Latrine
- ✦ Low cost mud house
- ✦ Single and twin pit Sanitary Septic Tank
- ✦ Low cost light traffic bridge
- ✦ RCC Sheet Piles
- ✦ Replacement of poor foundation soil using wash boring technique

Publications done

- o Brochure for Water Resource Development in LGED
- o Technical Bulletin-10 : Introduction of Rubber Dams in Bangladesh
- o Brochure for Small Scale Water Resources Development Sector Project (SSWRDSP)

SUSTAINABILITY

At Headquarter Level

Following gradual phasing out concept of ISP, 1 Superintending Engineer, 2 Assistant Engineers and 3 Drafts person are taking up the responsibilities.

At Field Level

1. During RESP-I and RESP-II (1986-1996) Field Executive Engineers were provided Design, Planning and Implementation Support through 16 Assistant Specialists, field staff of ISP.

During RESP-III (1996-2000) the support has been replaced by LGED's Design set-up at Six Divisional Headquarters.

2. Field level Engineers (XEN, TE and Design Engineers) are now capable of meeting many of their design needs using the Standard Designs and Manuals. This has enhanced the design capabilities of LGED Engineers.

QUALITY CONTROL MEASURES FOR RURAL INFRASTRUCTURE DEVELOPMENT PROJECTS

A. N. M. Wahiduddin
Laboratory Consultant, ISP

6th July, 1999

Quality Control Measures for Infrastructure Development Projects

*A. N. M. Wahiduddin
Laboratory Consultant
ISP, LGED, Dhaka*

1. Introduction

Quality is usually defined as the ability of a product or service to satisfy a given need and hence "fitness for use". In other words, quality indicates conformity to specified requirements. Quality control is an important requirement for implementation of any construction/reconstruction project for creating durable national assets. Inadequate attention to quality control in design and construction, particularly in connection with durability, can result in failure of engineering structures. Therefore "quality consciousness" is no longer a matter of choice; it is an unavoidable necessity.

To achieve the optimum level of quality for a project, it should be done filtering through following steps :

- develop a plan for the project
- conduct pre-construction meetings to ensure that everyone understands his contract responsibilities and all necessary activities
- establish who does what within the organization
- select people who are qualified for the particular tasks
- train the personnel in their responsibilities.

2. Quality Assurance

It is a term used to connote all the planned and systematic actions necessary for adequate confidence that a product or service will satisfy given quality requirements.

Quality control is a part of the contractor's programme to assure compliance with the quality requirements spelt out in the documents that constitute the contract between the contractor and the owner. The requirement for a comprehensive QC programme should be detailed in the contract documents. To be effective, quality control must be ongoing and proactive, not intermittent or reactive.

Quality assurance or acceptance is the owner's responsibility and it is an important investment. Just as an effective quality control programme pays for the contractor, an effective quality assurance programme also pays for the owner. The lack of an effective quality assurance programme can have significant long-term costs for the owner. LGED has responded to this challenge by the implementing structured, systematic approaches to managing quality, not just to achieve present levels of quality, but to drive for continuous improvement.

3. Objective of QC

The aim of institutionalizing can achieve its goal through following activities :

- To establish accountability as well as to justify the feasibility of investment
- To have technically sound and durable structure
- To reduce maintenance cost
- To have economic and safe structural design.

4. Pre-requisite for QC

The prerequisite for effective quality control of Infrastructure development projects are as follows :

- Standard construction specification for all items of works should be provided for effective quality control. The specification should be clearly stated and methods of construction should also be written as the contractors may have little qualified technical and skilled personnel.
- Well-equipped laboratory for quality control activities should be set up with adequately trained staff
- Periodic appraisal of the quality control data should be prepared, reviewed not only for implementation during construction but also for effective possible improvements in quality control and construction techniques in future.
- To impart training to the site supervision staff and contractors staff continuously before the start of each individual section of the project.
- Provision for the cost of QC should be duly incorporated in the estimate and specifications.

5. Infrastructure Development Activities of LGED

5.1 Rural Infrastructure Development Projects of LGED

LGED is currently responsible for implementation of 44 rural development (RD) projects involving a total cost of Tk. 801383.53 lakh (US\$ 1652 m) under the Rural Development and Institution (RD&I) sector and 4 urban Infrastructure Development Projects under the Physical Planning, Water Supply and Housing (PPWS&H) sector involving a total cost of Tk. 183689.16 lakh (US\$ 379 m).

5.2 Types of Rural Infrastructure Development Activities

The activities covered by LGED through different rural and urban infrastructure development projects as well as GOB fund are as follows :

- Construction of Feeder Roads Type-B
- Construction of Rural Roads
- Construction of bridges and culverts on feeder road type-B and rural roads
- Development of growth centers and rural markets

- Construction of small scale water resources scheme, such as, construction of embankment, re-excavation of khal, construction of small sluice and regulators.
- Construction of roads, foot paths and drains in urban areas.
- Construction of shopping centres, bus and truck terminals in urban areas.
- Construction of primary schools in rural areas.
- Construction of cyclone centres in coastal areas.

6. Standard Tests and Material Specifications

For ensuring the requisite quality of construction as specified, the materials and works shall be subjected to quality control. The testing frequency shall be as mentioned in the specification for different items of work. the necessary important tests required for the items of works are mentioned below. the frequency mentioned in the table is the minimum requirement. The Engineer in charge of the work may increase the frequency if soil character or other materials character changes.

A. Standard tests for Earthwork and sub-grade construction

| Name of the Test | Test Frequency | Standard Value |
|--|--------------------------|----------------|
| Borrow pit selection | | |
| Liquid Limit | - | $\leq 50\%$ |
| Plasticity Index | - | $\leq 20\%$ |
| Soaked (4 days) CBR at 95% compaction (Standard Proctor) | - | $\leq 4\%$ |
| Swelling | - | $\leq 2\%$ |
| Embankment | | |
| Liquid Limit | 1 per Km | $\leq 50\%$ |
| Plastic Index | 1 per Km | $\leq 20\%$ |
| Compaction (standard proctor) | 1 per 500 m ² | $\leq 90\%$ |
| Sub-grade | | |
| Liquid Limit | 1 per Km | $\leq 50\%$ |
| Plasticity Index | 1 per Km | $\leq 20\%$ |
| Compaction (standard proctor) | 1 per 500 m ² | $\leq 95\%$ |
| at about 300 mm below sub-grade | | |
| Soaked (4 day) CBR at 95% compaction | 1 per Km | $\leq 4\%$ |
| at about 300 mm below sub-grade | | |

| Name of the Test | Test Frequency | Standard Value |
|--------------------------------|----------------|----------------|
| Improved Sub-grade | | |
| Liquid Limit | 1 per Km | $\leq 30\%$ |
| Plasticity Index | 1 per Km | $\leq 10\%$ |
| Compaction (standard proctor) | 1 per 100 m | $\leq 98\%$ |
| CBR (soaked) at 98% compaction | 1 per Km | $\leq 8\%$ |
| Name of the Test | Test Frequency | Standard Value |

B. Standard Tests on sub-base and Base Course Materials

• Sub-base Course (Graded Materials)

| | | |
|---------------------------------|-------------|--------------|
| Gradation | 1 per 500 m | |
| Liquid Limit | 1 per Km | $\leq 25\%$ |
| Plasticity Index | 1 per Km | $\leq 6\%$ |
| Compaction (standard proctor) | 1 per 100 m | $\leq 100\%$ |
| CBR (soaked) at 100% compaction | 1 per Km | $\leq 25\%$ |
| Los Angeles Abrasion Value | 1 per 500 m | $\leq 49\%$ |
| or | | |
| Aggregate Impact Value | | $\leq 35\%$ |

• Base Course (Gradation Materials)

| | | |
|---------------------------------|-------------|--------------|
| Gradation | 1 per 500 m | - |
| Liquid Limit | 1 per Km | $\leq 25\%$ |
| Plasticity Index | 1 per Km | $\leq 6\%$ |
| Compaction (standard proctor) | 1 per 100 m | $\leq 100\%$ |
| CBR (soaked) at 100% compaction | 1 per Km | $\leq 65\%$ |
| Los Angeles Abrasion Value | 1 per 500 m | $\leq 40\%$ |
| or | | |
| Aggregate Impact Value | | $\leq 32\%$ |

C. Standard Tests for Asphalt Mixes and Bituminous carpeting

Materials such as bitumen (85/100 penetration grade) coarse and fine aggregates are tested. Combined gradation of fine and coarse aggregates should be well graded.

| Name of the Test | Test Frequency | Standard Value |
|---|----------------|-----------------------------|
| • Coarse Aggregates | | |
| Los Angeles Abrasion Value | 1 per 500 m | $\leq 40\%$ |
| or | | |
| Aggregate Impact Value | | $\leq 30\%$ |
| Water Absorption | 1 per 500 m | $\leq 2\%$ |
| • Bitumen | | |
| Softening Point | 1 per batch | $\leq 45^{\circ}\text{C}$ |
| Flash point test | 1 per batch | $\leq 230^{\circ}\text{C}$ |
| Penetration test for 85/100 grade bitumen | 1 per batch | Min. 85 div Max. 100 div |

D. Standard Tests for Concrete materials and Concrete

| Name of the Test | Test Frequency | Standard Value |
|-----------------------------------|------------------------|----------------|
| Fine Aggregates : FM for Sand : | 1 per 15m ³ | ≤ 1.8 |
| Water absorption of brick chips : | 1 per 15m ³ | $\leq 16\%$ |
| Los Angeles Abrasion | 1 per 15m ³ | $\leq 40\%$ |
| or | | |
| Aggregate Impact Value | | $\leq 30\%$ |
| Initial setting time of cement | 1 per batch | ≤ 45 min |

| | | |
|---|---|---------------------------------------|
| Final setting time of cement | of 200 bags 1 per batch | ≤ 375 min |
| Compressive strength of cement | of 200 bags 1 per batch of 200 bags | |
| 3 days : | | ≥12.4 MN/m ² (1800 psi) |
| 7 days : | | ≥19.3 MN/m ² (2800 psi) |
| Compressive strength of concrete (1:2:4) (For deck slab, wing walls, abutment, girders etc) of casting | 6 Nos. for 15m ³ | ≥21.7 MN/m ² (3000 psi) |

E. Standard Tests for Brick for Brick works

| Name of the Test | Test Frequency | Standard Value |
|----------------------|--------------------------|--|
| Compressive strength | 1 per batch of 10,000 | ≤ 17.5 MN/m ² (2500 psi) |
| Water Absorption | 1 per batch of 10,000 | ≤ 18% |

It is also important to discuss the type of test procedures that will be performed. This discussion should not only cover the expected test results, but establish a complete understanding of the procedure as well as related costs, if the results are not satisfactory as required by the contract. For example, regardless of the type of construction (footings, foundations, floors, walls, or architectural concrete), the final product depends on each member of the team being completely prepared before construction starts. This is the real key – to have a total understanding of the QC that will be enforced, as well as the complete testing programme to be used through out the construction period.

7. Laboratory facilities of LGED

Local Government Engineering Department has established 64 material testing laboratories at all the district head quarters of Bangladesh and the central laboratory at LGED Head Quarter to achieve a good network of laboratories and quality control activities. These laboratories have been classified into three categories depending on the capabilities and facilities are made available in each laboratories. These are central, regional and district laboratories. The location of laboratories are shown in Annexure-1.

The central laboratory which is located at LGED Bhaban has got the maximum facilities of all necessary tests including sub-soil investigation. This laboratory is also equiped with a facility of calibration of compression testing machines and proving rings of different capacities.

The regional laboratories located at the old district head quarters (20 Nos.) have got less testing facilities than the central laboratory. The permeability test of soil,

direct shear test and consolidation test of soil, core drilling equipment for in-situ test of concrete etc. have not been made available with the regional laboratories.

All the remaining 44 district laboratories have been provided with essential testing facilities and those are the minimum requirement for quality control.

The test facilities available in different categories of laboratory are shown in Annexure-2.

8. Management of Quality control activities in Infrastructure Development Project of LGED

In the District the Executive Engineer (EE) is supported by 2 Assistant Engineers and in each Thana, the Thana Engineer is the head of site supervision team who is supported by 3 Sub-Assistant Engineers. The Thana Engineers report to the Executive Engineers who in turn report to the Chief Engineer who is supported by the 3 Additional Chief Engineer (Project) and 3 Superintending Engineer (Design). The job description defining duties and functions for all levels of staff is issued.

The Central Laboratory at LGED Head Quarters is now managed by Institutional support project of LGED and headed by one Laboratory Consultant. He is assisted by one Laboratory Specialist and One Assistant Laboratory Specialist of ISP. One Assistant Engineer from LGED is also working in the Central Laboratory. Other support staff are one Laboratory Technician from ISP, one Laboratory Technician from LGED, One Senior Secretary, one Laboratory Assistant and one Peon from ISP.

The major activities of the Central Laboratory are

- Coordination among all the laboratories
- Staff development
- Research and development
- Normal testing activities

The central laboratory also covers the testing of some materials which are not available in the neighbouring districts in addition to the major activities. The central laboratory also assists the regional Design Engineer/Superintending Engineer in his quality control activities.

Coordination among all Laboratories

Coordination activities of the central laboratory are :

- Maintaining the Data Bank of the laboratories
- Assisting in reviewing the set up of laboratory
- Establishing standards and specification of equipment for all laboratories
- Assisting in procurement of equipment and spare parts for the laboratories to ensure that the quality is maintained

- Assisting in operation and maintenance of laboratory equipment of regional and district laboratories
- Assisting other laboratories in major repairing of the equipment if necessary
- Arranging quarterly discussion/meeting at each division with staff for getting views on ongoing laboratory activities.
- Submitting reporting quarterly on monitoring, evaluation, achievements of the quality control activities.
- Assisting in technical back stopping in regional and district laboratories.

Staff Development

- Through formal and informal training
- Through workshops and seminars
- On the job training

Research and Development

- Identifying action research activities of rural application
- Research activities in respect of testing
- Solving unconventional problems
- Preparation and reviewing of manuals, formats and data sheets required for laboratory activities.

The district laboratories are headed by the concerned Executive Engineer. All the testing activities are run by an Assistant Engineer who is supported by one Lab. Technician and Lab. Helper. Every laboratory is provided with transport to facilitate sampling and testing. The Assistant Engineer (Mech.) at the district also assist the Executive Engineer in procurement, operation and maintenance of the laboratory equipment.

The Executive Engineer designated the Assistant Engineer (Civil) to act as "Quality Assurance Manager" whose duties includes :

- Responsibility for implementation of the "Quality Control"
- continually reviewing the quality test results
- Persuade revisions where shortcomings existed in terms of quality;
- Making improvements where appropriate

There is a charging system for both field and laboratory tests done for the contractors and other customers. Other organization can also have their material tested in these laboratories on payment of testing charges.

The Executive Engineer at districts submitted the monthly progress report on laboratory activities to SE (Admin), LGED Head Quarters by the 5th of the following month with a copy to the Regional Superintending Engineer.

The monthly report on the schemes of project are sent to the SE (Admin), LGED within the stipulated time with a copy to the Regional Superintending Engineer and the respective Project Directors.

9. Implementation of QC before and during construction

Just learning that a specific material or product meets an appropriate standards is not enough. This applies to all gradients whether it be Portland cement and admixtures, or aggregates, in concrete. For example, it is obvious to everyone that it is impossible to evaluate the finishability of concrete in a laboratory. It is extremely important during the design stage itself to specifically check the materials necessary for concrete and determine if they are actually available in the immediate area of the job site. the capabilities of the available ready mixed concrete plants should also be determined. However, LGED has taken following measures for ensuring quality control.

- LGED made it mandatory that all the construction work must be tested before giving approval of further work.
- Deformed bar reinforcement are generally used instead of plain bar reinforcement to maintain proper material specification
- Cost for testing must be included in the estimate
- Regular field checking
- Mix design
- Monitoring

In order to ensure that works are carried out to specifications, it is essential that strict procedures are followed whereby written requests for inspection are submitted by the contractor before execution of each part of the works and written approvals are obtained before works proceed. The Inspection would not only cover the particular part of the works requested for approval (for example pier shutters, reinforcement etc.) but also that the arrangements made for execution of the works in accordance with the approved method statements for plant, labour, materials and temporary works.

10. Guidelines in QC

LGED has published the following manuals to help the Engineers to maintain standard quality control. these have been prepared based on the standards like BSTI, ASTM, AASHTO, BS and ACI.

- Quality Control Manual
- Specification of laboratory equipment
- Frequency of testing in the field
- Draft Guidelines of Management and Operation of Laboratory

The manuals which are under preparation :

- Concrete Mix Design
- Asphalt Concrete Mix Design
- Quality Assurance Plan

11. Quality Control Manual

To facilitate the quality control and testing activities, a manual named Quality Control Manual has been prepared based on ASTM, ASSHTO, BS and BSTI. The aim of this manual is to give information on quality control tests, specification of material testing equipment, sampling and test procedures and testing frequencies. This shall facilitate the personnel who are involved in civil engineering construction as stated below.

- Preparation of specification of materials
- Sub-soil investigation required for designing the foundation of structures
- Quality control tests and procedures
- Preparation of the specification of material testing equipment
- Preparation of the course material for training

12. Training/Staff development

Giving the quality control to the top priority, the Training Unit of LGED organizes regular training course on testing of materials for the Laboratory Technicians, Sub-Assistant Engineers and the Engineers of LGED. This training course involves theoretical and practical studies. On the job training on material testing are also regularly conducted for the engineers and laboratory staff. Moreover contractors are also given training on quality and management of construction works.

To make the training effective and fruitful the courses are categorized into three groups depending upon the job responsibilities. they are given below with relevant topics.

The Laboratory Technicians and Assistant Engineer (Lab) should be given training on -

- Field and Laboratory Testing procedures
- Concrete Mix Design
- Marshall Mix Design
- Sub-Soil Investigation
- Equipment Maintenance
- Documentation on Quality Control Activities

The training courses for the Thana Engineers, Assistant Engineers and Sub-Assistant Engineers should be on -

- Orientation on different Laboratory Tests
- Details on different field tests
- Sampling of Materials for Testing
- Sub-soil Investigation
- Handling of concrete and Bituminous Mixes
- Preservation and Transportation of samples

Training courses for Work Assistants and Contractors should be on -

- Orientation on quality Control activities
- Sampling of materials for testing

13. Study to be taken up

The central laboratory should take up the following studies

- Develop a plan/guide line for Quality Control Assurance in field level construction.
- Study and documentation on the variety on soil characteristics and availability of materials coarse aggregates spread around the country.
- Develop or introduce new technologies in infrastructure construction materials and construction methods.

14. Plans for Increasing the Testing and Quality Control Capability

- Introducing some systems for evaluation of different test results and documentation.
- Review of the existing standards and specifications to make it uniform and practical.
- Introducing in-situ soil testing for foundation design like Pressure-Meter Dutch Cone Penetrometer etc.
- Introducing Pile Integrity Tester to check length, diameter and other physical properties of cast-in-situ piles.

15. Concluding Remarks

Quality control is no more a choice but is a reality to safe guard the national assets. The Engineers responsible for infrastructure development should have sufficient skill, knowledge and training in order to maintain proper quality of the infrastructure. This quality control aspect needs to be considered during design and also during implementation process.

Quality can be achieved using much involvement by cash as well as by skilled or unskilled man power. LGED's view is totally different in this respect. If someone go through this write-up should easily feels that LGED is planning to get a quality work with economical but actual involvement.

Specific Tasks:

Specially the expert will assist the Central Laboratory in carrying out the following activities:

1. Inspect the existing LGED laboratories, and determine additional equipment requirements and improvement in operational procedures and staffing to meet the needs.
2. Improving the existing database/inventory for all laboratory equipment at the central and district laboratories.
3. Define training requirements for LGED laboratories and field supervisions and field supervising staffs. Prepare training materials in light with the existing Quality Control Manual and organize training courses.
4. Reviewing of the existing formats of different tests.
5. To establish mobile testing laboratory in each region for random sampling and testing to check the activities of district laboratories.
6. Monitor and check on a continuous basis, through regular visits in-situ inspections, the performance of laboratories and in-situ testing and advice on remedial actions.
7. To develop a system for repairing and periodic maintenance of laboratory equipment.
8. Develop a system for regular calibration of proving rings as well as calibration and dial adjustment of the compression testing machines.
9. Introducing some systems for evaluation of different test results and documentation.
10. Review of the existing standards and specifications to make it uniform and practical.
11. Introducing in-situ soil testing for foundation design like Pressure-Meter, Dutch Cone Penetrometer etc.
12. Introducing Pile Integrity Tester to check length, diameter and other physical properties of cast-in-situ piles.
13. Provide continuous advisory support to LGED field projects in quality control procedures.
14. Develop a plan/guide line for Quality Control Assurance in field level constructions.
15. Study and documentation on the variety on soil characteristics and availability of materials spread around the country.
16. Develop or introduce new technologies in infrastructure construction materials and construction methods.
17. Arranging quarterly discussion/meeting at each division with staff for getting views on ongoing laboratory activities.
18. Submitting report quarterly on monitoring, evaluation, achievements of the quality control activities.
19. Assist LGED to create a CORE-TEAM comprising with LGED officials that will take the control of Central Laboratory in future.

LOCAL GOVERNMENT ENGINEERING DEPARTMENT

Third Rural Infrastructure Development Project (RDP-21)

ACTION PLAN FOR INCREASING THE LEASE RATE OF LGED CONSTRUCTION EQUIPMENT

DRAFT, JULY 1999

**hifab**
International

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1. Background

Construction equipment plays a vital role in the road and bridge construction industry. Quality Assurance and timely delivery of the finished product is very much dependent on the performance and availability of good management, quality materials and efficient, suitable and available construction equipment. Building and structures of rural infrastructure has in the past very much been executed with manual labor without using too much mechanized equipment. As demand for higher quality and speedy completion of projects is growing, mechanization of the construction industry increases rapidly.

LGED realized this a number of years ago and has now a growing fleet of construction and transport equipment. The Department will procure additional construction equipment for TRIDP (RDP21). These new equipment will supplement the fleet of equipment already stationed in the districts.

The Loan Agreement between ADB and GOB spells out that LGED shall review its fees for leasing construction equipment to contractors and revise such fees if, during the period of beneficial use of such equipment, such fees are insufficient to replace such equipment

2. Objectives

The objectives is to increase the construction equipment rates to LGED working contractors working on contracts to rates that attract the private business community to invest in this sector and become the entrepreneurs for lease and rental companies of construction equipment in this country.

Establish a policy and uniform guideline for calculating the rental charge and facing out old, out-of-date equipment.

Furthermore, facing out the present inefficient and inadequate fleet of old and obsolete construction equipment owned and leased out by governmental departments and fully privatize the rental equipment sector.

3. LGED Construction Equipment and Hire Charge

3.1 Construction equipment

As mechanization of the construction industry increased and demands for quality assurance grew, LGED gradually build up their stock of construction equipment, constructed workshops and established a mechanical cell within the organization. Each district under the supervision of the XEN has now a fleet of equipment for leasing or renting out to contractors or other governmental bodies. Among others while LGED has a total of 277 road rollers, 178 VT rollers and 64 trucks distributed to 64 districts there is a need to increase the number of this equipment to meet the demand.

Table 1: LGED's fleet of rollers and trucks.

| | Existing | | | Requirement | | | Shortfall in nos. | | | Shortfall in % | | |
|-------------|----------|---------|--------|-------------|---------|--------|----------------------|---------|--------|-------------------|---------------|--------|
| | Road | VT | | Road | VT | | Road | VT | | Road Rollers | VT Rollers | Trucks |
| Division | Rollers | Rollers | Trucks | Rollers | Rollers | Trucks | Rollers | Rollers | Trucks | % | % | % |
| Dhaka | 72 | 62 | 11 | 146 | 110 | 34 | 74 | 48 | 23 | 49% | 56% | 32% |
| Chittagong | 34 | 22 | 7 | 100 | 76 | 22 | 66 | 54 | 15 | 34% | 29% | 32% |
| Khulna | 42 | 14 | 19 | 86 | 66 | 20 | 44 | 52 | 1 | 49% | 21% | 95% |
| Rajshahi | 85 | 56 | 18 | 138 | 104 | 32 | 53 | 48 | 14 | 62% | 54% | 56% |
| Sylet | 29 | 7 | 6 | 34 | 26 | 8 | 5 | 19 | 2 | 85% | 27% | 75% |
| Barisal | 15 | 17 | 3 | 52 | 42 | 12 | 37 | 25 | 9 | 29% | 40% | 25% |
| Grand Total | 277 | 178 | 64 | 556 | 424 | 128 | 279 | 246 | 64 | 50% | 42% | 50% |

In Sum, that LGED have a shortfall of 50 % of compaction equipment keeping in mind a number of these rollers are old, out of date and not in a working condition. It is obvious that LGED with the responsibility for keeping up and expand the rural road infrastructure does not have the equipment needed to meet the demand for road improvement, rehabilitation and maintenance of FRB's and Rural Roads.

To make up for this shortfall it is apparent that the private industry enters this segment of the market. However, for the private industry to do so LGED must increase the lease rate so that the rate becomes attractive for others to invest in this sector. Otherwise, the private sector is prevented from entering the equipment hire market.

3.2 Hire Charge

Comparative hire charge of construction equipment among LGED and other department shows that other department are renting out construction equipment to much lower rate then LGED. These very low rates make it difficult for contractors to provide their own equipment or for commercial plant hire concerns to start operation. Column number six, Table 2.2, shows a proposed daily hire rate based on widely used calculation method. As the table indicates present LGED's rate should be increased upto 500 % to cover cost.

Table 2: Daily hire charge of construction equipment

| Type of Equipment | Hire Charge EGED | Hire Charge RGAH | New EGED use rate | Overhead & Operating labor (8%) | Proposed new EGED rate | EGED increase % |
|----------------------------|---------------------|---------------------|----------------------|---------------------------------------|---------------------------------|-----------------------|
| Road Roller (7 – 10 tons) | 2000 | 1000 | 3132 | 250 | 3380 | 69 |
| Vibr. Roller > 4 tons | 2000 | 500 | 3132 | 250 | 3380 | 69 |
| Pneu. Rollers (7 – 10 Ton) | 2000 | 1000 | 3132 | 250 | 3380 | 69 |
| Road roller (5 – 6 tons) | 1500 | 500 | 2500 | 200 | 2700 | 80 |
| Vibr. Roller (1-3 tons) | 1500 | 500 | 1740 | 140 | 1880 | 25 |
| Trucks – 5 tons (district) | 1000 | 1000 | 4655 | 370 | 5000 | 500 |
| Tractors | 600 | 3000 | 1033 | 80 | 1100 | 83 |
| Concrete mixer (10 cft) | 800 | 500 | 500 | 100 | 600 | 0 |
| Concrete mixer (5 cft) | 400 | 500 | 319 | 25 | 350 | 0 |
| Concrete Vibrator | 200 | - | 200 | 20 | 220 | 10 |
| Plate Compactor | 200 | - | 300 | 24 | 325 | 63 |

3.3 Equipment utilization

Utilization of the equipment is another important factor in determine the lease rate. The lower the utilization the more costly the equipment becomes. Leasing out equipment must therefor be based on strict commercial roles where all conditions for hire equipment is laid down.

Recent survey in Rangpur Zone indicates that some districts have a lot of equipment such as vibrators, tractors, mixers etc. which never gets hired (may be all but some only listed rollers). This should be sold off as it is just tying up capital and earning nothing. Utilization on running construction equipment in running order varies between 30% to 50% in most cases although there are exceptions depending on local management policy.

Non availability of equipment is partly due to breakdowns. Repair and service is often difficult because of the unavailable spare parts. This problem is partly due to non-standard equipment having being supplied from a number of different countries like Europe, USA, Japan, India, China etc. This can lead to long idle periods while parts are obtained or not at all available in the market.

But it is also largely due to the fact that if the Contractor does not use the roller (because he does not have sufficient materials for example) then he is not charged for it. Similarly if the roller is standing because it rains he is not charged.

I would urge that he be charged for it from the time it leaves LGED compound until it is returned unless it is broken down. This will give incentive to plan his materials procurement and to maximize the works. Why should he not take the risk of inclement weather? This is a general problem on progressing the works. Because the contractors only employ their labor and plant on a day to day basis they are very quick to stop if they do not think they will get work done – a shower of rain in the morning, lack of materials, other business etc. If they are being charged plant hire they will be forced to get on with it.

3.4 Costing and Hire charges

Proper book keeping for the equipment is another factor that is important for determine the rate to be charged for the equipment. Unless there are dependable cost records on fuel, lubricants, spare consumption, labor cost etc. realistic running cost is difficult to predict. As far as we can discover there is no actual costing on hire charge done. Cash payments for hire charges are entered in a cashbook and money deposited in an account. Money to pay for spare parts etc. is paid from this account and entered in the cashbook. This account would also pay for driver's salaries (if not on hire and if driver is not on establishment), out side repair costs, welding rods etc. and additional labor if required. This accounts for the Tk. 2000 per day hire charge.

Apparently there is no owner expenses included in the rental charges to contractors. In fact the LGED is subsidizing the contractors and the contractors are in effect being overpaid for their work.

3.5 Management structure

The overall general management of the mechanical section of LGED is headed by an Exec. Engineer posted at the head office in Dhaka. At district level under the supervision of the XEN an Assistant Mechanical Engineer is in charge of the mechanical section. For RDP 21 additional work force has been added to the mechanical section. 5 districts (Rangpur, Lalmonirhat, Kurigram, Gaibandha and Nilphamari) are run by the Asstt. Mechanical Engineer based in Rangpur. Dinajpur, Thakurgaon and Panchagarh come under an Asst. Mechanical Engineer based in Dinajpur.

They are responsible for the maintenance and repair of the rollers but not for their allocation to sites. That comes under the Executive Engineer and depends on the management priorities of the XEN.

It may be more appropriate to bring all management under one roof. Each site requiring a roller would make a requisition to the Mechanical Engineer who would allocate a roller from one of his districts to the site.

3.6 New RDP 21 Equipment.

Calculating the hire charge rate for construction equipment depends on a number of factors. The condition of the equipment, capacity, age, capital cost, running cost, demand and supply etc. LGED have to take those factors into consideration when rates are fixed. For the newly purchased equipment for RDP 21 (Table 3) the rate should be fixed on commercial basis. The equipment is new, reliable and efficient and therefore there should be no argument about the fixing of rates. The leasing rate for these equipment must be based on universal accepted standard for calculating lease rate.

Table 3: New Construction Equipment under RDP-21

| Sl. No. | 3.7 Description | Number | CIF Cost LT | Unit Cost L.T | Total Cost with CDVAT |
|---------|-----------------------------|---------|-------------|---------------|-----------------------|
| 1 | Road Roller 8-10 Ton | 11 nos. | 15.00 | 20.00 | 220.00 |
| 2 | Vibratory Roller 3-3.5 ton | 12 nos. | 15.00 | 20.00 | 240.00 |
| 3 | Pedestrian Vibratory Roller | 16 nos. | 7.00 | 10.00 | 160.00 |
| 4 | Tyre Roller (16 ton) | 3 nos. | 18.00 | 24.00 | 72.00 |
| 5 | Plate Compactor | 13 nos. | 0.65 | 0.80 | 10.40 |
| 6 | Tractor (55 kw) | 12 nos. | 3.50 | 5.00 | 60.00 |
| 7 | Trailer | 11 nos. | 2.10 | 3.00 | 33.00 |
| 8 | Water Tanker | 9 nos. | 1.50 | 2.20 | 19.80 |
| 9 | Concrete Mixture | 13 nos. | 0.70 | 0.92 | 11.96 |
| 10 | Concrete Vibrator | 10 nos. | 0.50 | 0.60 | 6.00 |
| 11 | Bitumen Heater | 16 nos. | 1.50 | 2.00 | 32.00 |
| 12 | Bitumen Distributor | 3 nos. | 9.00 | 13.80 | 41.40 |
| 13 | Bitumen Heater & Decanter | 3 nos. | 22.00 | 31.90 | 95.70 |
| 14 | Truck (5 ton) | 8 nos. | 10.50 | 15.00 | 120.00 |
| 15 | Mechanical Broom | 3 nos. | 1.50 | 2.30 | 6.90 |

4. Universal Calculation of Equipment Costs

Equipment accounts for a large proportion of the total cost of engineering project but is less significant for buildings. When the nature of the work requires major items of equipment such as heavy compaction equipment, bitumen heaters and distributors, tractors, trucks, concrete equipment etc. detailed studies of the associated costs must be made. Costs associated with minor equipment items such as power tools, concrete vibrators, and scaffolding are not normally subject to detailed study, although a cost allowance for each such item needed, based on the time it will be required on the job, is included in the cost estimate. The cost of hand tools, wheelbarrows, waterhose, extension cords, and the like is usually included as a lump sum on the job overhead sheet.

4.1 Operation costs of major equipment

To estimate costs of the major equipment items as realistically as possible, early management decisions must be made concerning the equipment sizes and types required and the manner in which the necessary units will be provided to the project. A scheme sometimes found to be expedient is for the contractor to purchase all new or renovated equipment for the project and sell it at the cessation of construction activities. This procedure has the advantage of ensuring the use of modern and properly functioning equipment and can be economically desirable when the service life of the equipment will be about equal to the duration of the construction period. The difference between the purchase price and the estimated salvage value is figured into the job as a direct cost. To this must be added the costs of move-in, creating, dismantling, move-out, and equipment operation as they apply. Operating costs include expenses such as fuel, oil and grease, repairs and parts, tire repairs and replacement, maintenance labor and supplies, and perhaps operating labor. For purposes of discussion herein, equipment operators' wages will be treated as a labor cost and will not be included as a part of equipment expense.

4.2 Own equipment

The most common procedure for LGED is to lease and rent out his own equipment. Equipment costs under these circumstances are customarily expressed as the sum of ownership expense and operating costs. Ownership expenses are those of a fixed nature and include depreciation, interest on investment including any finance charges, taxes, insurance, and storage. The costs of major overhauls or major modifications are usually considered as restoring or increasing equipment value and are, therefore, capitalized. This merely means that the book value of the units involved are increased by such expenses, which are then reflected in ownership cost rates. Operating costs have previously been defined. Lease agreements for construction equipment normally extend for periods of 1 year or more, whereas renting is usually of shorter term. Equipment costs are computed by applying the lease or rental rates to the time periods that the equipment will be needed on the project. To this figure again be added move-in, operating, and move-out expenses.

4.3 Realistic Equipment Cost

LGED must establish his own realistic equipment costs as well as his rental or lease rates. For estimating as well as other purposes, lease and rental rates, ownership expense, and operating costs are usually expressed in terms of cost per unit of equipment operating time. This will be the basis for the illustrative example given in the following section. Move-in, creation, dismantling, and move-out expenses are entirely independent of equipment operating time or production and must, therefore, be included separately, usually as a field overhead cost.

4.4 Ownership and Operating Costs

When costs are being estimated for major pieces of construction equipment, ownership and operating expenses must be determined, as they most likely will actually occur on the project being priced. Figure 1 illustrates how this is done, using as an example a bottom-dump hauler, a widely used piece

of earth-moving equipment. Heavy construction equipment is commonly assumed to operate 2000 hours per year. Actually, the quantity used in this regard should be a realistic measure of the actual machine usage apt to occur.

Depreciation is equipment expense caused by wear and obsolescence and allows the recovery of the invested capital over the useful life of the equipment. In this example, depreciation expense is computed on the basis of the cost per operating hour, assuming 2000 operating hours per year. This is applying depreciation on a so-called "straight-line" basis.

In Figure 1, it is assumed that the useful life of the hauler will be 10,000 operating hours over a period of 5 years, with no salvage value to be realized at the end of that time. Most heavy construction equipment has a life of only 4 to 8 years, either because it wears out or because it becomes obsolete.

The cost of the tires is deducted from the original acquisition value because the tires have a lesser service life than mechanical part of the equipment. In the computation of tire replacement cost, a new set of tires is assumed to have a life of 5000 operating hours.

Figure 1 Sample for calculating equipment cost.

| ESTIMATE | | | |
|---|--------------------------|------------------------------|------------------|
| Hourly Ownership and Operating Cost for DP-12 Bottom Dump Hauler | | | |
| 1. Depreciation | Purchase price | = \$35,156.00 | |
| | Freight | = 714.00 | |
| | Delivered price | = \$35,870.00 | |
| | Less tires | = 8,510.00 | |
| | Depreciable value | = \$27,360.00 ÷ 10,000 hours | = \$2.74 |
| 2. Interest, taxes, insurance, and storage | | | |
| | \$ 21,522 × 0.13 ÷ 2,000 | | = 1.40 |
| Total hourly ownership cost | | | <u>= \$4.14</u> |
| 3. Tire replacement = \$ 8,510 ÷ 5,000 | | | = \$1.70 |
| 4. Tire repairs (15% of tire replacement cost) = 0.15 (\$1.70) | | | = 0.26 |
| 5. Repairs, parts and labour (35% of depreciation = 0.35 (\$2.74) | | | = 0.96 |
| 6. Fuel, 4 gal. per hour @ \$ 0.38 | | | = 1.52 |
| 7. Oil, lubricants, filters (1/3 of fuel cost) = 1/3 (\$1.52) | | | = 0.51 |
| Total hourly operating cost | | | <u>= \$ 4.95</u> |
| Total estimated hourly ownership and operating cost | | | <u>= \$ 9.09</u> |

Taxes, insurance, storage, and interest on investment are customarily based on the average annual value of the equipment. This example assumes taxes as 2 percent, insurance and storage as 2 percent, and interest as 9 percent, for a total annual cost of 13 percent of the average yearly value. A standard way of computing the average annual value, based on straight-line depreciation, is by the equation.

$$A = \frac{C(n+1) + S(n-1)}{2n}$$

Where A = average annual value
 C = delivered cost
 n = number of years of useful life
 S = salvage value

Figure 1 disclose that for the bottom-dump hauler, the ownership cost is \$4.14 per operating hour and the estimated operating costs will be \$4.95 per operating hour. This price of equipment operating in the field will cost the contractor a total of \$9.09 per working hour, not including operating labor, supervision, or overhead. The sum of the ownership and operating costs per hour is commonly called the "use rate" of the equipment item.

It is important to note that ownership expense goes on whether or not the equipment is working. If the equipment actually works 2000 hours or more per year, the owner recovers this cost. If the equipment works less, the owner does not recover all his annual ownership costs. Operating costs are, of course, incurred only when the equipment is actually being used.

Action Plan for increasing the lease rate of new equipment to contractors

Table 4 Calculated proposed hire rate for LGED- RDP 21 new construction equipment.

| Make | Description of item | Purchase price | Freight | Delivered price | Less tires | Depreciable Value | Interest & Taxes | Tire replacement | Tire repair | Repair parts & labor | Fuel Cost | Oil & lubr. filter | Total hourly ownership cost (Tk/hrs) | Total hourly operating cost (Tk/hrs) | hourly ownership & operating cost (Tk/hrs) | Total Daily Cost |
|------|-----------------------------|----------------|---------|-----------------|------------|-------------------|------------------|------------------|-------------|----------------------|-----------|--------------------|--------------------------------------|--------------------------------------|--|------------------|
| | | | | | | | | | | | | | ownership cost (Tk/hrs) | operating cost (Tk/hrs) | & operating cost (Tk/hrs) | Tk/day |
| | Road Roller 8 - 10 ton | 2000000 | 20000 | 2020000 | 0 | 202 | 79 | 0 | 0 | 71 | 30 | 10 | 281 | 111 | 391 | 3132 |
| | Vibratory Roller 3-3.5 ton | 2000000 | 20000 | 2020000 | 0 | 202 | 79 | 0 | 0 | 71 | 30 | 10 | 281 | 111 | 391 | 3132 |
| | Pedestrian Vibratory roller | 1000000 | 20000 | 1020000 | 0 | 102 | 40 | 0 | 0 | 36 | 30 | 10 | 142 | 76 | 217 | 1740 |
| | Tire roller 16 ton | 2400000 | 20000 | 2420000 | 0 | 242 | 94 | 0 | 0 | 85 | 30 | 10 | 336 | 125 | 461 | 3689 |
| | Plate compactor | 80000 | 20000 | 100000 | 0 | 10 | 4 | 0 | 0 | 4 | 15 | 5 | 14 | 24 | 37 | 299 |
| | Tractor | 500000 | 20000 | 520000 | 91000 | 43 | 20 | 18 | 3 | 15 | 23 | 8 | 63 | 66 | 129 | 1033 |
| | Trailer | 300000 | 20000 | 320000 | 40000 | 28 | 12 | 8 | 1 | 10 | 0 | 0 | 40 | 19 | 59 | 476 |
| | Turret Tanker | 220000 | 20000 | 240000 | 42000 | 20 | 9 | 8 | 1 | 7 | 0 | 0 | 29 | 17 | 46 | 366 |
| | Concrete Mixer | 92000 | 20000 | 112000 | 4000 | 11 | 4 | 1 | 0 | 4 | 15 | 5 | 15 | 25 | 40 | 319 |
| | Concrete Vibrator | 60000 | 20000 | 80000 | 0 | 8 | 3 | 0 | 0 | 3 | 8 | 3 | 11 | 13 | 24 | 191 |
| | Bitumen heater | 200000 | 20000 | 220000 | 0 | 22 | 9 | 0 | 0 | 8 | 15 | 5 | 31 | 28 | 58 | 466 |
| | Bitumen distributor | 1380000 | 20000 | 1400000 | 40000 | 136 | 55 | 8 | 1 | 48 | 15 | 5 | 191 | 77 | 267 | 2139 |
| | Bitumen heater & Decanter | 3190000 | 20000 | 3210000 | 35000 | 318 | 125 | 7 | 1 | 111 | 15 | 5 | 443 | 139 | 582 | 4655 |
| | Truck 5 ton | 1500000 | 20000 | 1520000 | 60000 | 146 | 59 | 12 | 2 | 51 | 225 | 75 | 205 | 365 | 570 | 4561 |
| | Mechanical broom | 230000 | 20000 | 250000 | 0 | 25 | 10 | 0 | 0 | 9 | 15 | 5 | 35 | 29 | 64 | 508 |

- 1 Depreciation (over 10,000 hrs)
- 2 Interest, taxes, insurance, storage (9 %, 2 % & 2 %)
- 3 Tire replacement (price/5000 hrs)
- 4 Tire repairs (15 % of tire replacement cost)
- 5 Repairs, parts and labor (35 % of depreciation)
- 6 Fuel 10 liter per hrs @ 15 thaka.
- 7 Oil, lubricants, filters (1/3 of fuel cost)

Comments to the table :

Rate charge for a Road Roller (8-10 ton) comes to 391 Tk/hrs or 3132 Tk/day.

$$A = [C(n+1) + S(n-1)] / 2n$$

A = average annual value

C = Delivery cost

n = number of years of useful life (5 years)

S = salvage value (0)

5. Action Plan

An action plan for introducing the new rates needs a time frame and this should be fixed as soon as possible. Value evaluation of the existing fleet of construction equipment needs immediately attention and rates fixed accordingly. The value evaluation must take into account cost of replacing the old equipment at market rates with similar new equipment and the actual condition of existing. New hire charges should be introduced for all new contracts where the contractor needs to hire equipment. The new LGED rates should be effective from October 30th 99. Contractors with contractual expire date before that date but with backlog work should be charged new rates from the same date.

- Phase out sub economic rates presently used by departments and overhauls the existing leasing system (hire charge and hire agreement) in line with universal practice for leasing construction equipment.
- Write off, sell outdated and salvage equipment, reduce number of brand of equipment to a minimum and rehabilitate earmarked equipment that will be used under the new rate system.
- Set targets for improvement of equipment utilization, responsibility and overall management of the present fleet of construction equipment.
- Overhaul the structure of mechanical management cell in line with future GOB policy of owning and renting out construction equipment.
- Establish monitoring , reporting and accounting systems that is tracking, utilization, expenditure and income of the equipment
- Join forces with other GOB departments to promote the private sector entering the equipment hire market.
- New rates schedule must be widely circulated among contractors and should be charged on all new contracts.

6. Conclusion

The present rate charged by LGED to contractors is too low and needs to be revised based on the condition and value of the equipment. For newly arrived equipment the rate may well be different from the rate charged on old and obsolete equipment. Calculating the new rate must be based on universal calculation of lease charge for construction equipment.

Action Plan for increasing the lease rate of new equipment to contractors

Hire agreement must be standardized and used when leasing out equipment to contractors. Service and utilization of equipment needs to be streamlined and proper accounting for costing and income must be introduced and audited.

The management setup for construction equipment needs to be addressed so that the utilization of equipment improves and that realistic hire charge takes care of replacement of old equipment. Old and obsolete equipment should be sold off and the private sector should be given a change to enter the rental market as soon as possible.

**DRAFT TERMS OF REFERENCE
FOR
EXPERT OF COMPUTATIONAL HYDROLOGY AND HYDRAULICS**

Duty Station: LGED Head Office, Dhaka

Background:

Recent advances in personal computer technology have changed the nature of water resource engineering design and analysis, particularly in the fields of hydrology and hydraulic design. As a result, many hydraulic problems that were solved using approximate methods or even physical hydraulic models are now being solved using numerical methods. Initially, most traditional engineering programs required a large amount of data to be input manually and were difficult to use. Furthermore, the output from these programs produced large volumes of text, which was difficult to interpret. In recent years, engineering software has become "Windows-based" and can be easily integrated with other programs including EXCEL spreadsheets, drafting programs or GIS software. Many specialized hydrologic software products are now being distributed via the Internet at very low cost by government agencies, universities or private companies. Some representative examples are summarized in Table 1. These programs are very flexible and easy to use, so that alternative designs can be tested rapidly and compared. This computer aided design approach makes it possible to streamline the design process, to optimize structures and to improve the reliability of their operations.

Table 1: Some Examples of Hydrological Software

| Program | Source | Application |
|----------------|----------------------------|---|
| HMS | US Army Corps of Engineers | Estimation of peak flows, flow routing analysis |
| HEC-RAS | US Army Corps of Engineers | Hydraulic analysis through bridges, culverts, regulators and drainage channels. Channel design including scour assessment at bridges. |
| SAMADA | University of Florida | Rainfall-runoff routing, flood frequency analysis, storm water management |
| GS-2 | Nilex Inc | Erosion control, drainage design seepage analysis, geotextile design |
| Culvert-Master | Haestad Methods | Hydraulic design of culverts and regulators |

These types of programs are very different from the complex mathematical models that are used for simulation of hydrological processes in large river basins (such as the Mike-11 models used by the Surface Water Modeling Center). The programs are primarily "design-aid tools" and are typically used on smaller river basins or for individual regulators or bridge crossing designs. Therefore, these "tools" are very appropriate to the kinds of applications being routinely carried out by LGED.

Given the rapid pace of development in this field there is a need to identify, assess and adapt these numerical methods to the specific water resource design problems that are

faced by LGED. There is also a need to develop sound guidelines for using these methods and for training personnel in their use. In this context, it is proposed to provide an expert in computational hydraulics and hydrology to develop this capability within the department.

General Terms:

The expert will work under the supervision of the Team Leader and in consultation with a relevant Superintending Engineer in LGED to develop a strong capability in Computer-Aided Design in water resource engineering. The expert will assess the needs of the department, identify the most appropriate "design-aid tools that are available, adapt these tools to the specific needs of LGED and then take part in training and implementation of these tools in day to day engineering practice.

Specific Tasks:

- a) Review and assess current practices with respect to hydrologic and hydraulic design within LGED. Define areas that should be upgraded.
- b) Define appropriate software (including stand-alone computer programs, spreadsheet applications) that should be available for water resource engineering applications within LGED. A careful review will be made of all available software and computer-based design-aid tools that are relevant to the kinds of work undertaken by LGED
- c) Develop a computational hydraulics group that will identify, install, and adapt the software to LGED's particular needs, and produce written guidelines for using these applications.
- d) Carry out field-testing and verification to improve analytical design methods. This will involve monitoring operation of structures to assess actual and predicted hydraulic and hydrological operations in order to improve design methods and guidelines.
- e) In collaboration with the Human Resource Development Section of LGED, conduct a series of hands-on-training programs to engineers and staff.
- f) Provide ongoing assistance and training to users within the department.

Qualification and Experience:

Masters degree in Civil Engineering from a recognized university with extensive experience in computer-based applications and numerical analysis related to water resources engineering. Excellent knowledge of English is required. Minimum of ten years of working experience is required, preferably including more than three years of working experience in developing countries. Experience in training and/or technology transfer is highly desirable.

Office Memorandum

Date: July 1, 1999

To: Mr. Shahidul Hassan,
Additional Chief Engineer, LGED

Trough: Mr. Y. Suzuki
Technical Adviser, JICA expert

From: Wahidur Rahman
Project Director, RPD-21

**Re: Review on TOR for Japanese experts
-Rural Development Engineering Center (RDEC)-**

I am pleased to inform you of the current status of RDEC. Now that E/N between GoB and Japanese government was signed on June 29, 1999 and invitations for tender of detailed design and supervision of the construction of RDEC building were issued to the short listed local consulting firms, RDEC component under RDP-21 has got started with a few months delay from the initial schedule.

In accordance with the updated schedule, it is envisaged that RDEC building furnished with planned equipment would be available before March 2003.

In line with the construction of RDEC building, it is necessary to follow up requested Project Type Technical Cooperation Project (PTTCP) to be provided to RDEC by Japanese government through JICA.

When I visited to Japan to negotiate the Loan Agreement with OECF, I discussed with relevant officers in the Ministry of Agriculture, Forestry and Fisheries in Tokyo on June 8, 1999 regarding the areas of TA provided in the TOR for 5 proposed experts¹ and the schedule of PTTCP.

They were of opinion that the TA areas assigned to each expert were too wide to be covered by an expert and to be accomplished within 5 year project period. They further suggested that each task needed to be more specific and wanted more information.

In respect of the schedule, they suggested that a contact mission would be fielded in 1999 to discuss the overall aspects around PTTCP.

I feel that while narrowing down of the TA areas is not necessary at this negotiation stage, elaboration on each task is important to make them abreast of our proposal.

Given that Mr. Y. Suzuki is taking home leave from the middle of July, I wish to let him discuss with MAFF in Tokyo.

In this context, I am requesting you to allow me to review and elaborate the TOR for GIS, Rural Planning, Rural Infrastructure Design, and Quality Control experts with relevant officials in LGED with an aim to preparing an addendum to the proposed TOR.

Your continuous cooperation will be appreciated.

¹ The TORs were prepared based on your inputs in compliance with our request letter dated on October 5, 1998

With regards,

Wahidur-Rahman

c.c Chief Engineer, LGED
Mr. Saroj Kumar Sarker, Superintending Engineer (Planning), LGED
Mr. A. H. Shafiqur Rahman, Physical Planning Consultant, ISP
Mr. Tariqul Islam, Senior GIS Specialist
Mr. Syed F. Mahmood Islam, Senior Maintenance Specialist, ISP
Mr. Moksed Alam, Road Infrastructure Design Consultant, ISP
Mr. Nurul Islam, PD, SSWRDS
Mr. Herb Wiebe, team leader, SSWRDS
Mr. A. N. M. Wahiduddin, Laboratory Consultant, ISP
Mr. Dick Lundberg, Senior Adviser, ISP
Mr. Abul Quasem, team leader/training specialist, RDP-21

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Office Memorandum

Date: 28 June 1999

To: Mr. Wahidul Rahman
PD-RDP 21

From: Y. Suzuki
LGED Technical Adviser, JICA Expert

Re: Discussion on Project Type Technical Cooperation Project (PTTCP) for RDEC

Dear Mr. Rahman,

Following to your discussion on above subject with MAFF officials in Japan on June 8, 1999, I received a fax memo from Mr. Ishido, MAFF, briefing the issues you discussed. He reiterated in the fax what you discussed including 3 items. (translation attached) Please find below my comments and let me know your views and how you want to proceed. Given that drawing up the framework of PTTCP in discussion with MAFF is of crucial importance for the success of the PTTCP, I would recommend that you should call for opinions from relevant officials in LGED, review and finalize our request, and communicate with MAFF if necessary. I am always at your disposal to assist you.

i) Technical areas covered by each expert

MAFF is requesting to narrow down the areas where each expert covers. The areas proposed in the TOR for each expert are general rather than specific, by stressing improvement of the technical level and strengthening technical capacity of LGED staff as well as local government institute. As common in all TORs, specific tasks are centered on preparation/improvement of guidelines/training materials and conduct training. Therefore, I am not sure how to limit the specific tasks described in each TOR.

ii) Technical areas covered by experts

MAFF has limited the areas to the 3 components such as Irrigation and Drainage, Quality Control and Rural Development Planning covered by long term expert plus GIS by a short term expert. This means that they are dropping an expert for Construction Equipment Maintenance. Given that RDEC will include a central workshop for construction equipment maintenance and LGED is intending to establish functional regional workshops in several greater districts, in my view, these plans will face a serious set back unless an appropriate technical assistance is provided once the central workshop is set up.

Further, they are suggesting an expert for irrigation and drainage rather than rural infrastructure design. Given that SSWRDSP is on going covering 37 districts on the western half of the country and a new nation wide similar project is envisaged from year 2002 with appropriate provision of technical assistance, I am of opinion that importance of an expert for irrigation and drainage is less than that for normal infrastructure like rural roads, bridges and culverts.

iii) Schedule

Assuming that the invitation for detailed design on RDEC was already issued to local consulting firms in June 1999, as per attached, overall time frame of RDEC construction project was updated. Due to the delay of the L/A, the starting point of the construction was shifted from September 2000 to April 2001 by 7 months. Under the frame, it is envisaged that the RDEC would be completed in March 2003 taking 24 months construction period.

In this context, I think the proposed schedule by MAFF can match our current schedule.
However, I wonder why a contact mission which was suggested in our previous communication with MAFF was not referred to in the discussion.

c.c Chief Engineer, LGED
 Mr. Shahidul Hassan, Additional Chief Engineer, LGED
 Mr. Zahangir Alam, PD-RDP 22, LGED
 Mr. Dick Lundberg, senior adviser to ISP, LGED
 Mr. Ishida/Yamauchi, Second Secretary, Embassy of Japan
 Mr. Kimura, Deputy Resident Representative, JICA Bangladesh Office
 Mr. Matsuzawa, Resident Representative, OECF Dhaka Office

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**Attachment 1. Fax Memo from MAFF on discussion with Mr. W. Rahman on June 8, 1999
(translation)**

i) Technical areas covered by each expert

As for the TOR for each expert, the technical areas are too wide to be covered by one expert taking into consideration expertise of the incumbent and the total period of the project. In this regard, review on the each TOR is needed to narrow down the technical coverage in order to enable the expert to achieve the tasks within the project period for 5 years.

ii) Technical areas covered by experts

PTTCP will cover 3 areas such as Irrigation and Drainage, Quality Control and Rural Development Planning¹ by long term experts plus GIS by a short term expert. With regard to the Quality Control, the expert will concentrate on road pavement excluding reinforced iron bar and concrete.

iii) Schedule

In year 2000: a preliminary mission to firm up the plan

In year 2001: an appraisal mission to conclude the Record of Discussion

In year 2001-2002: to implement pre-phase of PTTCP

In year 2003-2007: to implement PTTCP

¹ We have requested 5 technical areas such as GIS, Physical Planning, Rural Infrastructure Design, Quality Control, and Construction Equipment Maintenance to be covered by long term experts.

Office Memorandum

date: 25 November 1998

To: Mr. Shahidul Hassan
Superintending Engineer

Through: Mr. Wahidur Rahman
Project Director, RDP-21

From: Y. Suzuki
Technical Adviser to LGED
JICA Expert

**Re: Japanese Technical Assistance for Rural Development Engineering Center
(RDEC)**

Dear Mr. Hassan,

I am pleased to submit attached document of Japanese Technical Assistance for Rural Development Engineering Center (RDEC) to you for your endorsement and official submission. In accordance with the request of the appraisal mission of OECF visited to Bangladesh in November 1998, the document including Terms of Reference for 5 technical fields for which we are requesting Japanese technical assistance was prepared as an Addendum to the official request for the Project Type Technical Cooperation Project which has been already submitted to the Japanese government through EOJ in Bangladesh in October 1998.

Firstly, it should be noted that as I informed you of the reply in my office memorandum dated on 23 November 1998 entitled Information on Technical Assistance from Japan, since MOAFF in Japan who is responsible for following the request for the technical assistance in collaboration with JICA is considering our request as a Project Type Technical Cooperation Project, PTTCP, but not individual experts, the document has been prepared in line with the provisions of PTTCP assuming the invitation of a Japanese technical assistance team with attaching the Schedule of PTTCP.

Secondly, the original TORs for the Japanese technical assistance prepared based on the second questionnaire distributed to 4 officials in LGED on 5 November 1998 was firmed up in order to further clarify their tasks. Moreover, in view of the status of the Japanese experts and their availability, besides minor amendments, below two amendments were made.

i) Since the Japanese expert dispatched under technical assistance works, regardless of its type as PTTCP or individuals, with assigned LGED counterpart(s) to assist them in execution of their tasks and improvement of their technical skills but not works under the supervision of a senior LGED management as a consultant recruited under the project, an amendment was made accordingly.

ii) Since it is difficult to recruit Japanese experts with master degree, in the qualification, the degree was lowered from master to bachelor or above.

I should be grateful if you could critically review attached document and make comments on it. Should you agree with the document, please proceed with forwarding it to relevant authorities of GoB and Mr. Ishida, Second Secretary of Embassy of Japan with a copy of relevant personnel including JICA and OECF so that the document be sent to GoJ for their further consideration.

With best regards,
Y. Suzuki

c.c Chief Engineer, LGED
 Mr. R. Nurul Hasan, Additional CE, LGED
 Mr. M.Hossain Chaudhury, Additional CE, LGED
 Mr. Mr. Ataullah Bhuiyan, Additional CE, LGED
 Mr. Saroj. K. Sarkar, Superintending Engineer, LGED
 Mr. Zahangir Alam, PD-RDP 22
 Mr. Ishida, EOJ in Bangladesh
 Mr. Kimura, JICA Bangladesh Office
 Mr. Matsuzawa, OECF Dhaka Office

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Addendum to the official request for Project Type Technical Cooperation Project from Japan

Japanese Technical Assistance for Rural Development Engineering Center (RDEC)

Background

The Local Government Engineering Department, LGED, one of departments under Local Government Division in the Ministry of Local Government, Rural Development and Cooperatives, LGRD&C can be described as the largest department of the Government of Bangladesh. GoB in terms of size of budget and employees. After it was born in 1982 under the Division as a small organization called Works Program Wing, it was converted to LGED in 1984, then upgraded to LGED in 1992 with ever increase of its role. As at May 1998, LGED is implementing 55 projects financed by GoB as well as multi-lateral and bi-lateral international aid organizations with a budgetary allocation of over US\$ 1 million per day, employing 9,950 persons as core staff under revenue budget, with assistance of another about 4,000 persons employed under development budget.

Besides Rural Infrastructure Development Projects, RIDPs, which remain main projects in LGED, because of LGED's specialized capacity to implement infrastructure development activities and its decentralized organizational set-up at Thana level to take care of the construction activities in remote areas of the country. LGED's role has continuously expanded for many years taking up new projects like small water resources, urban infrastructure development projects and construction/improvement of primary schools. Many of these projects are entrusted to LGED for implementation by other respective government organizations

LGED's prime responsibility lies in two areas; one in implementation of RIDPs and other projects with assistance from the development partners and own government resources and the other in provision of technical support to the Local Government Institutions, LGIs in the rural and the urban areas so that they can be well involved in LGED implemented projects and handle their own projects in planning, implementation and maintenance. Specifically, LGED is involved in the following areas.

i) planning, implementation and monitoring of infrastructure development projects funded by donors and GoB

The type of the infrastructure is as follows.

- markets/growth centers
- feeder road type B. FRB linking growth centers with Thana Head quarters or arterial road systems and rural roads with necessary bridges, culverts and tree plantation.
- small scale water resources schemes
- primary schools, cyclone shelters and river ghats

- infrastructure in urban and semi-urban areas including water supply, drains, houses, sanitary facilities, etc.
- ii) planning, implementation and monitoring of maintenance of rural infrastructure
- iii) provision of technical support to Local Government Institutions at District and Thana level
- iv) preparation of physical planning tools (Thana/Union/Pourashava Plan Books and their corresponding Base Maps), technical/management guidelines and manuals
- v) development of human capacity of LGED, Local Government Institutions and construction works implementers like local contractors/consultants and Labour Contracting Societies, LCSs.

With continuous expansion of the tasks above mentioned, LGED has been developing a variety of technical tools and mechanisms which has facilitated effective job execution of rural infrastructure development together with adjusting institutional organization in accordance with the requirements as an efficient project executing agency. In recognition of the importance to further develop and improve above tools and ensure the mechanisms work well, it is planned to establish the multi-disciplinary RDEC in which all relevant engineering functions in LGED are concentrated under the streamlined organizational structure.

In accordance with the requirements above and in anticipation of the establishment of the Center, it is requested to invite technical assistance in essential engineering fields in order to ensure the solid foundation given to the Center.

Request for Technical Assistance

Among the engineering functions to be concentrated in the Center, it has been identified below 5 fields which require a long term technical assistance.

- GIS and Database Management
- Rural Development Physical Planning
- Design of Rural Infrastructures and Water Resources Schemes
- Quality Control of Rural Infrastructure
- Construction Equipment Repair and Maintenance

It would be preferable to start the technical assistance prior to the completion of the Center building in order to ensure the smooth transfer of the functions from LGED Head Office to the Center without any discontinuation. Since the building will complete at the middle of year 2001, it is recommendable to commence the assistance from one year before the completion with a moderate scale which will be expanded to a full request covering above 5 technical fields at the completion of the building.

In accordance with above arrangement, as per below Schedule of PTTCP, it is requested to start the PTTCP with four experts including a team leader, a coordinator and two technical experts from the middle of year 2000 followed by three other technical experts when the Center has been completed. The initial two experts should be specialized in two of above four fields excluding construction equipment expert, which depends on the availability of the experts.

As per attached Terms of Reference, each expert in above field will work as a team with his/her counterpart(s) assigned by LGED in close consultation with a relevant Superintending Engineer to assist a specific unit in LGED in development and improvement of technical tools and training of LGED engineers in relevant technical field.

Schedule of PTTCP from Japan

| | 1998 | 1999 | | | | 2000 | | | | 2001 | | | |
|----------------------------|------|------|----|----|----|------|----|----|----|------|----|----|----|
| | | 1Q | 2Q | 3Q | 4Q | 1Q | 2Q | 3Q | 4Q | 1Q | 2Q | 3Q | 4Q |
| RDEC construction | | | | | | | | | | | | | |
| Preparation of PTTCP | | | | | | | | | | | | | |
| Implementation of PTTCP | | | | | | | | | | | | | |
| Team Leader | | | | | | | | | | | | | |
| Coordinator | | | | | | | | | | | | | |
| GIS Expert | | | | | | | | | | | | | |
| Physical Planning Expert | | | | | | | | | | | | | |
| Rural Infra. Design Expert | | | | | | | | | | | | | |
| Quality Control Expert | | | | | | | | | | | | | |
| Construction Equip. Expert | | | | | | | | | | | | | |

note:

- i) RDEC, PTTCP stand for Rural Development Engineering Center and Project Type Technical Cooperation Project respectively.
- ii) Preparation of PTTCP includes a contact mission, a preliminary study mission and a mission for signing Record of Discussion.
- iii) PTTCP starts from the middle of 2000 for 5 years with 4 experts and joined by 3 other experts from the 3rd quarter in 2001.

TERMS OF REFERENCE FOR GIS AND DATABASE MANAGEMENT EXPERT

Duty Station: LGED Head Office, Dhaka, assigned to the GIS Unit

Assignment: for five years under Project Type Technical Cooperation Project

Background:

With a modest beginning in an ILO assisted effort, GIS has come to have a special standing in LGED. Notable progress has been achieved when it comes to computer applications in developing micro and macro level database. Thana base maps covering all over the country has been produced. By aggregating the thana maps, now the district base maps have been made available. Union maps have also been produced for about 100 unions. The preparation of pourashava base maps consisting of 4 basic layers are in progress. However as the scale of the map is so small as 1 to 72,000 (1 inch corresponds to 1 mile) there is a need to enlarge the scale, especially for union maps so that sufficient information for rural development planning can be made available.

While the collaboration with some international organizations, e.g. ESRI in USA and ICIMOD in Nepal has enabled advance level GIS training abroad, in the hope that GIS be grown not only as a tool of LGED but also as a national tool, it should be stressed a need for widening applications for capturing data on flooded areas and cropped areas as well as improvement of accuracy.

General Terms:

The expert will work as a team of Japanese experts under the supervision of the team leader and under the consultation with a relevant Superintending Engineer in LGED to assist the GIS Unit with his/her counterpart(s) in the Unit in development and improvement of technical tools and conducting training for LGED engineers.

Firstly the expert will be requested to familiarize him/herself with the progress achieved by the Unit with reviewing the materials produced by the Unit and through field visits. Then, he/she will prepare a strategic workplan on further development and improvement of rural infrastructure planning tools as well as training of LGED staff. Since the tasks of GIS Unit and Physical Planning Unit are closely linked it is important to carry out the tasks by maintaining appropriate linkages between these two Units.

Specific Tasks:

Specifically, the expert will assist the GIS Unit in carrying out below activities.

- a) Prepare guidelines on methodology and structures in respect of effective and comprehensive rural development related database management system
- b) Prepare analytical guidelines on the application of the database for rural infrastructure development planning
- c) Prepare training modules on advanced ARC/Info in Windows NT platform

- d) Organize training on analysis of geographic data for planning, implementation of infrastructure development-programme at thana level.
- e) Develop application tools for infrastructure planning and expand GIS applications in compliance with national needs.
- f) Develop Digital Terrain Modeling (DTM).
- g) Prepare training modules on remote sensing, satellite image interpretation, and mapping using aerial photography.
- h) Organize training on remote sensing, data acquisition from satellite images, automated data management system using GIS.

Qualification and Experiences:

Bachelor degree or above in engineering including GIS & remote sensing, geography from a recognized university with working level of English.

At least 10 years working experience on geographic database management, data acquisition from satellite images having fair knowledge and experience of about 5 years on any GIS software (preferably ARC/Info) and raster GIS (ERDAS and IDRISI).

Possessing Agricultural background preferable.

TERMS OF REFERENCE FOR RURAL DEVELOPMENT PLANNING EXPERT

Duty Station: LGED Head Office, Dhaka, assigned to the Physical Planning Unit
Assignment: for five years under Project Type Technical Cooperation Project

Background:

Supported heavily by ISP this function has been developed in two areas one in rural development and the other in urban development. The rural section develops useful planning tools like Thana/Union-Plan Books, inventory of road networks and growth centers and guidelines on growth center, land/water use, environmental issues.

Whereas, the urban section is dealing with developing pourashava base maps, slum upgrading, pourashava planning manuals. Further using AutoCad, drawings for growth centers, primary schools and functional building are undertaken.

However, it is a long way to make these developed tools effectively used by the Thana Development Committee which is an authorized body to plan, implement and maintain rural infrastructure. For instance, in order to improve the thana plan books there is a need to prepare a union plan books which should be the base of the thana book. Given the extreme number of unions in the country most of which are isolated not accessed by car and need for regular upgrading and updating it is necessary to have increasing interventions of LGED HO using its Thana offices with technical and financial support.

General Terms:

The expert will work as a team of Japanese experts under the supervision of the team leader and under the consultation with a relevant Superintending Engineer in LGED to assist the Physical Planning Unit with his/her counterpart(s) in the Unit in development and improvement of technical tools and conducting training for LGED engineers.

Firstly the expert will be requested to familiarize him/herself with the progress achieved by the Unit with reviewing the materials produced by the Unit and through field visits. Then, he/she will prepare a strategic workplan on further development and improvement of rural infrastructure planning tools as well as training of LGED staff. Secondly, during the assignment it should be stressed the importance of frequent field visits in order to recognize the needs of local institutions like district and thana level for their planning tools and ensure these requirements.

Since the tasks of the Unit are closely linked with those of GIS Unit it is important to carry out the tasks by maintaining appropriate linkages between these two Units.

Specific Tasks:

Specifically, the expert will assist the Physical Planning Unit in carrying out below activities.

a) Improve and update the planning tools like Union Plan Book, Thana Plan Book, manuals and guidelines.

- b) Co-ordinate the preparation of Union, Thana and District Base maps in collaboration with GIS Unit.
- c) Make liaison with various institutions both inside and outside the country for the development of planning and mapping tools in LGED.
- d) Organize training courses for LGED officials and staff beneficiary groups.
- e) Develop and institutionalize participatory method in planning and implementation of the schemes.
- f) Develop clear guidelines on scheme selection involving local government institutions, LGIs and stressing environmental/gender issues.
- j) Develop and update the inventory of rural infrastructures including road networks, growth centers, cyclone shelters and primary schools.

Qualification and Experiences:

Bachelor degree or above in engineering of agriculture in rural development from a recognized university with a working level of English and minimum 10 years of working experience. Inclusion of more than 3 years of working experience in developing countries in the relevant areas preferable.

TERMS OF REFERENCE FOR EXPERT OF RURAL INFRASTRUCTURE DESIGN

Duty Station: LGED Head Office, Dhaka, assigned to Rural Infrastructure Design Unit and Water Resources Unit.

Assignment: for five years under Project Type Technical Cooperation Project.

Background:

It is found that in most of the donor funded projects they include technical assistance component whereby consultants who deal with design of infrastructure are recruited. Whereas, for projects undertaken by GoB allocation, Thana Engineers prepare engineering design with the help of the design manuals and their own knowledge based on field investigation. Up to date, according to the need for design standards covering common infrastructure like Feeder Roads Type B, Rural Roads and bridges and culverts, Road Structure Manual has been prepared and used by many projects.

To speed up design process, more standard design on structures, a number of which are constructed under LGED field projects like markets, primary schools cyclone shelters, small scale water control structures, structures related to urban development need to be prepared for universal use by projects. Like the standard on road structures, however these standard are being developed by certain projects focus of which tends to be put on the design for use of the project rather than for use in common. Moreover, there might be several options in the standard to be applied depending on local conditions regarding the modality of contract and material availability. In this regard, it is requested to prepare such standards on various structures useful for projects based on widely collected models and information on local conditions.

General Terms:

The expert will work as a team of Japanese experts under the supervision of the team leader and under the consultation with a relevant Superintending Engineer in LGED to assist both the Rural Infrastructure Design Unit and Water Resources Unit with his/her counterpart(s) in the Units in development and improvement of technical tools and conducting training for LGED engineers.

Firstly the expert will be requested to familiarize him/herself with the progress achieved by the Units with reviewing the materials produced by them and through field visits. Then, he/she will prepare a strategic workplan on further development and improvement of rural infrastructure design tools as well as training of LGED staff. Secondly, during the assignment it should be stressed the importance of frequent field visits in order to recognize the needs of LGED field projects and ensure meeting these requirements.

Specific Tasks:

Specifically, the expert will assist these Units in carrying out below activities.

- a) Develop and update the design standards and manuals on Rural Infrastructures and Water Resource schemes.
- b) Prepare supervision guidelines and O&M manuals.
- c) Organize training programme on Rural Infrastructures, Water Resources Development and irrigation activities.
- d) Design and develop monitoring and evaluation system in identifying suitable indicators and overall supervision
- e) Co-ordinate with all Rural Infrastructures Development and Water Resources Development Projects executed by LGED
- f) Establish computerized database/inventory for hydrology and hydrological data
- g) Advise design on special structures beyond the coverage of the standards.
- h) Develop arithmetic hydraulic analysis models.

Qualification and Experiences:

Bachelor degree or above in civil engineering in rural development from a recognized university with a working level of English and minimum 10 years of working experience. Inclusion of more than 3 years of working experience in developing countries in the relevant areas and having agricultural background preferable.

**TERMS OF REFERENCE
FOR
EXPERT OF QUALITY CONTROL IN RURAL INFRASTRUCTURE**

Duty Station: LGED Head Office, Dhaka, assigned to Central Laboratory of LGED

Assignment: for five years under Project Type Technical Cooperation Project

Background:

LGED has been rightfully moving not only to quantitative but also to qualitative achievements. Owing to the set up of field laboratories attached to all district offices of LGED as well as improvement of the central laboratory at HO, quality of the works being executed in recent years has been improved in comparison to the works done in earlier years. Construction material samples of cement, bricks, reinforcement, bitumen, etc., are tested in the laboratories and quality test during and completion of works are carried out. It became possible to carry out all quality control tests in these laboratories except sophisticated tests like tri-axial compression, tensile test, etc.,

At the center laboratory, in order to upgrade some equipment procured under projects over years and to carry out research work to adopt and develop new technology, as per planned equipment list, new equipment is expected to be provided.

While LGED has developed new technologies such as aggregate sand soil used for road pavement and low cost reinforced concrete pile used for improvement of poor bearing capacity of sub-soil strata, given a variety of soil characteristics spread around the country and materials availability from place to place, there are abundant requirements in research ranging from methodology of sub-soil and slope strengthening and stabilization to development of new construction materials. In order to increase the volume of infrastructure with limited budget, more stress need to be placed on development of cost effective technology ensuring the required strength and durability of the structure which can be constructed even by unskilled labours.

General Terms:

The expert will work as a team of Japanese experts under the supervision of the team leader and under the consultation with a relevant Superintending Engineer in LGED to assist the Central Laboratory with his/her counterpart(s) in development and improvement of technical tools and conducting training for LGED engineers.

Firstly the expert will be requested to familiarize him/herself with the progress achieved by the Laboratory with reviewing the materials produced by them and through field visits. Then, he/she will prepare a strategic workplan on further development and improvement of activities undertaken by the Laboratory.

Secondly, during the assignment it should be stressed the importance of frequent field visits in order to recognize the needs of LGED field projects and ensure meeting these requirements.

Specific Tasks:

Specifically, the expert will assist the Central Laboratory Unit in carrying out below activities.

- a) Inspect the existing LGED laboratories, and determine additional equipment requirements and improvement in operational procedures and staffing to meet the needs.
- b) Define training requirements for LGED laboratories and field supervision staff, prepare training materials and organize training courses.
- c) Monitor and check on a continuous basis, through regular visits and on-site inspections, the performance of laboratories and on-site testing and advise on remedial actions.
- d) Provide continuing advisory support to LGED field projects in quality control procedures.
- e) Establish database/inventory for all laboratory equipment at the Central and district laboratories.
- f) Develop and/or introduce new technologies in infrastructure construction materials and construction methods.

Qualification and Experiences:

Bachelor degree or above in civil engineering from a recognized university with expertises of construction material testing in laboratory and field with a working level of English. Minimum 10 years of working experience required preferably including more than 3 years of working experience in research institutes and developing countries in the relevant areas with agricultural background.

TERMS OF REFERENCE FOR EXPERT OF CONSTRUCTION EQUIPMENT MAINTENANCE

Duty Station: LGED Head Office, Dhaka, assigned to Construction Equipment Central Laboratory of LGED

Assignment: for five years under Project Type Technical Cooperation Project

Background:

Even though there is a heavy involvement of human labour in the earth works of infrastructure development projects, in order to ensure quicker progress required to complete contracted works prior to the flood season and better quality of works, construction equipment such as graders, rollers, compactors, water bowzers, bitumen sprayers, concrete mixers are widely used in LGED field projects. The equipment purchased under donor funded projects is kept under the custody of LGED district offices after termination of the project for use of other projects. A mechanical engineer is posted in greater districts to carry out regular maintenance and ensure the stock of spare parts in liaison with the Mechanical section in HO which is working with sophisticated inventory of the equipment on computer.

Due to the lack of construction equipment workshops at district offices, all repairs are contracted out to private workshops. However unskilled mechanics and poor workmanship common in local workshops make it difficult to maintain the equipment in good shape.

As a matter of fact, there exists a high requirement for the equipment kept in the district offices to be rented out to contractors who do not possess equipment. In this regard, district offices are requested to make common used equipment such as compactors and water bowzers available on the basis of the request order and on the basis of minimum transportation cost. Whereas, it is important that LGED should not discourage some contractors who have purchased equipment by providing cheap leasing equipment. The lease rate, as insisted by ADB, should be reviewed every year to represent all costs including depreciation and considering the re-purchase price.

Given a huge number of main equipment kept under LGED district offices (they amount to 757 including construction machines and vehicles) and unsatisfied technical level seen in local private workshops, it is requested to improve at least the existing district workshops to the extent that they can carry out necessary maintenance and repair in collaboration with private workshops.

In this context, a central workshop is planned to be established in the Rural Development Engineering Center to conduct hands-on training of LGED district mechanical engineers/mechanics and mechanics of private workshops and to undertake maintenance and repairs for the equipment located in the greater Dhaka district as well.

General Terms:

The expert will work as a team of Japanese experts under the supervision of the team leader and under the consultation with a relevant Superintending Engineer in LGED to assist the Construction Equipment Central Workshop with his/her counterpart(s) in providing hands-on training to LGED district mechanical engineers/mechanics and mechanics of private workshops and undertaking maintenance and repairs for the equipment located in the greater Dhaka district as well.

The expert will be requested to familiarize him/herself with the local conditions of construction equipment maintenance in respect of the skills of LGED district mechanical engineers/mechanics and maintenance services available from private through field visits. Then, he/she will prepare a strategic workplan on the functions of the Central workshop and its activities.

Specific Tasks:

Specifically, the expert will assist the Central Laboratory Unit in carrying out below activities.

- a) define the areas of training in construction equipment maintenance specifying trainees and prepare appropriate training materials for each targeted training group.
- b) in collaboration with Human Resource Development Section in LGED, conduct a series of hands-on training of above groups in construction equipment maintenance and repair.
- c) review the existing heavy equipment maintenance system and inventory by district and improve the system if any and update the inventory by checking the equipment on site.
- d) survey maintenance services available from local private workshops and set up region wise, cost effective LGED construction equipment maintenance system.
- e) in accordance with the required regional maintenance system above, set up appropriate regional workshops.
- f) maintain and manage the Central Workshop as effective as possible.
- g) review the current LGED lease rates of construction equipment to contractor to establish reasonable rates which are competitive with the market rates and ensure the sustainability of LGED lease service.
- h) participate in heavy equipment purchasing order by foreign aided projects

Qualification and Experiences:

Bachelor degree or above in mechanical engineering from a recognized university with expertise of construction equipment. Working level of English is imperative. Minimum 10 years of working experience is required preferably including more than 3 years of working experience in developing countries in the relevant areas.

Office Memorandum

date: 25 October 1998

To: Mr. Shahidur Hassan
Superintending Engineer

through: Mr. Wahidul Rahman
Project Director of RDP 21

From: Y. Suzuki
Technical Adviser to LGED
JICA Expert

Re: Rationale of Construction Equipment Central Workshop, CECW

Dear Mr. Hassan,

I am finalizing the Master Plan on the Rural Development Engineering Center including the CECW.

Since the CECW is a new function in LGED and its establishment incurs a lot of investment and recurrent costs, due consideration should be given to endure its sustainability and effective use.

1. It is felt a need for the establishment of the CECW with below functions and staff in view that i) as per attached, there are 757 equipment including construction heavy machines and vehicles in total at field level (out of them, 417 are location identified and the rest not identified) ii) there is a strong demand for LGED to rent them out to contractors and iii) the lack of district workshops let alone a central workshop as well as mechanics of LGED core staff at district level create constraints of repairing works. (The lack of district workshops and competent mechanics of LGED core staff invited difficulties in keeping the equipment under the custody of district offices in good shape. All repairing and most maintenance works are contracted out to local workshops, which must undergo a long contract management process and end up poor quality due to involvement of different workshops depending on the type of repairs.)

• **Functions**

- to keep liaison with all district level workshops
- to upkeep main equipment inventory and maintain spare parts, maintenance and repairing records for each equipment
- to organize training of LGED district mechanics and mechanics in private workshops in construction equipment maintenance and repair
- to undertake repair and maintenance of construction equipment located in Dhaka and in nearby districts
- to co-ordinate equipment transfer between districts
- to advise on maintenance and repair undertaken in districts and participate in procurement procedure of new equipment

• **Staff**

- 1 XEN, 2 AE and 2 supporting staff plus necessary mechanical assistants

2. In order to ensure the functions above, however, there need commitments of LGED to below two points based on its strategy.

(1) Since CECW alone can repair and maintain only small part of equipment of LGED located in and around Dhaka LGED will establish at least regional workshops in greater districts.

(2) In order to maintain trained mechanics in LGED, LGED will assign core staff as mechanics to above regional workshops.

I should appreciate it if I could receive your views on above two points at your earliest convenience.

With best regards,

Y. Suzuki

c.c CE, LGED
Mr. Zahangil Alam, PD RDP 22

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Government of the Peoples Republic of Bangladesh
Local Government Engineering Department
Rural Development Project-21
LGED Bhaban (Level-10), Agargaon
Sher-e-bangla Nagar, Dhaka-1207.

Memo No: LGED/PD/RDP-21/COMPU-01/98/ 870

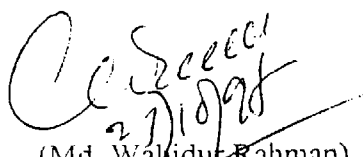
October 25, 1998

To: Mr Herbe Wiebe
Team Leader, SSWRDSP

Sub: A hydraulic analytical unit

According to the office memorandum dated on 30 September, '98 from Mr. Suzuki to the Chief Engineer, copied to you, Mr. K. Sarkar wrote a note to CE as attached asking his view on above subject. As requested by CE, Mr. N. Hassan Addl CE reviewed and expressed no objection to include a hydraulic analytical unit in the center instead of a small scale hydraulic model laboratory. To this regard, I shall appreciate it if you could provide i) equipment with costs and ii) staff to me asap so that Mr. Suzuki can incorporate the cost in the Center Master Plan.

With Regards.


(Md. Walidur Rahman)
Project Director

cc:

CE
Addl CE-1
SE(Planning)
Mr. Y. Suzuki, JICA Expert¹

Rural Development Engineering Center (REDC)

1. Mr. Suzuki, JICA Technical Adviser, prepared the Master Plan of REDC. To this regard, he sent a set of questionnaires for the additional space and equipment to be required for technical design unit, physical planning unit, GIS and Map library. Those questionnaires have been filled up, which are now presented herewith.
2. In the original proposal of REDC, a small-scale hydraulic model laboratory was included along with other topics. Mr. Suzuki, following the discussion with Mr. Wiebe, proposed a hydraulic analytical unit instead of the laboratory. If this proposal is accepted, staff and equipment requirement may be sorted with the help of Mr. Wiebe.
3. Mr. Suzuki further informed that two Japanese experts will be available for the planning unit through this project followed by provision of a team of JICA experts under Project Type Technical Co-operation Project.
4. If the topics written in para 1 and 3 are approved, Mr Suzuki may be requested to take action according to the proposal.

C.E.

Sd/
Mr. Saroj Kumar Sarkar

**Master Plan
on
Rural Development Engineering Center
Construction Project**

October 1998

**Local Government Engineering Department, LGED
Ministry of Local Government
Rural Development and Cooperatives**

Bangladesh

Abbreviations

| | |
|---------|--|
| ACE | Additional Chief Engineer |
| ADB | Asian Development Bank |
| AE | Assistant Engineer |
| BRDB | Bangladesh Rural Development Board |
| CECW | Construction Equipment Central Workshop |
| EOJ | Embassy of Japan |
| ERD | Economic Relations Division |
| ESRI | |
| FRB | Feeder Road Type-B |
| GIS | Geographical Information System |
| GoB | Government of Bangladesh |
| HRD | Human Resource Development |
| HO | Head Office |
| ICIMOD | International Center for Integrated Mountain Development |
| ILO | International Labour Organization |
| ISP | Institutional Support Project |
| JICA | Japan International Cooperation Agency |
| LCS | Labour Contracting Society |
| LGD | Local Government Division |
| LGEB | Local Government Engineering Bureau |
| LGED | Local Government Engineering Department |
| LGI | Local Government Institution |
| LGRD&C | Local Government Rural Development and Cooperatives |
| MANCAPS | Management Capability Strengthening Project |
| MIS | Management Information System |
| M&E | Management and Evaluation |
| MP | Master Plan |
| NGO | Non-governmental Organization |
| OECD | Overseas Economic Cooperation Fund |
| QC | Quality Control |
| RDEC | Rural Development Engineering Center |
| RESP | Rural Employment Sector Programme |
| RIDP | Rural Infrastructure Development Project |
| RR | Rural Road |
| SE | Superintending Engineer |
| SS | Supporting Staff |
| SIDA | Swedish International Development Cooperation Agency |
| XEN | Executive Engineer |

Glossary

| | |
|------------|--|
| Union | A sub-division of Thana consisting of several villages. There are 4,451 unions in Bangladesh. |
| Thana | A sub-district. There are 460 thanas in Bangladesh. |
| District | Bangladesh is divided into 64 districts. |
| Pourashava | A city or a municipality. There are 4 cities, i.e., Dhaka, Chittagong, Rajshahi and Khulna and about 129 secondary municipalities in Bangladesh. |
| Parishad | Council |
| LGIs | Local Government Institutions |
| Lakh | They are official organizations including District/Thana/Union Councils, 100,000 |
| Taka | currency in Bangladesh. 45 Taka is one US\$ at October 1998 |

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Introduction

Bangladesh is one of the most densely populated countries in the world having a total population of 120 million in an area of 147,579 sq. km. Over 80 percent of the people live in the rural areas. The majority of the rural people remain unemployed for at least some months of the year with as many as 40 percent most of the time. More than half of the rural people are landless or nearly so and another 25 percent find it difficult to ensure subsistence from their cultivable land and need to seek supplementary sources of income. Agriculture remains the largest sector of the economy occupying three-fifths of the employed labour force and producing nearly half of the economy's output. In this regard, the prime needs for rural development in Bangladesh are productive employment and income generating programs in both farm and non-farm sectors along with the development of agriculture and basic infrastructure in the rural areas.

Since the independence from the British colonial rule in 1947 and from Pakistan in 1971, regardless of the governments, Bangladesh has continued its efforts in development of rural areas and alleviation of the rural poor under difficulties of scarce natural resources and frequent attacks of natural disasters. Nevertheless, it is still a long way to go to have nation wide rural infrastructure well developed in view of its magnitude.

The Local Government Engineering Department, LGED under the Local Government Division, LGD, of the Ministry of Local Government Rural Development and Cooperatives has been involved in the rural development from the onset early 1960's in respect of infrastructure development with several changes undergone in organizational structure and nomenclature. Given the current volume of workload shouldered on and a huge and urgent demand for the rural infrastructure development faced by, LGED is requested to be capable of coping with the ever increasing tasks with efficiency.

In recognition of a need for appropriate technical support to LGED implemented projects and Local Government Institutions, along with improvement of human capacity, LGED has made all efforts in developing of effective tools and organizing of practical training courses. Moreover, under a rapid increase of workload per person and no increase of staff under the rigid government regulations, LGED has sought a way of organizational restructure together with introduction of effective management systems. In response, a study called MANCAPS was conducted and it has made a number of proposals.

Hence, time is mature to take a further step, keeping the current momentum, to put the useful proposals on management and institutional development in LGED in place.

In this context, a proposal for the establishment of the Rural Development Engineering Center, RDEC, was submitted for Japanese assistance in 1997 with an aim to accommodate the engineering functions which have been developed by Institutional Support Project, ISP accompanied by a firm management system in line with the proposals of MANCAPS.

In accordance with the project proposal above, the study on the Master Plan of RDEC was conducted in consultation with the relevant engineering sections in LGED Head Office to supplement the proposal with a view to clarifying several aspects around the Center.

Chapter 1 Background of the Master Plan

The proposal of the Center Construction Project dates back to 1994 when a project finding mission of a Japanese consultant visited LGED and formulated a preliminary study report. After a few year dormant period, in accordance with the completion of LGED HO building in January 1997, Mr. Fukuda, ex- adviser to LGED, JICA expert, encouraged LGED to take up this issue. The proposal was prepared and submitted through ERD to EOJ in October 1997. Thereafter it was forwarded to JICA for grant aid. Since the proposal of the Center Construction Project indicated a technical assistance program of Japan to accompany the project, JICA requested the official proposal for the technical assistance, TA, along with the Center construction project. Then the TA proposal for Project Type Technical Cooperation of JICA was prepared accordingly and submitted to JICA through ERD and EOJ in October 1998.

In the course of above period, it appeared a new horizon when the OECF fact finding mission visited in June 1998. Due to the apprehension conceived by LGED about the delay of the appraisal of the proposal under the grant basis on one hand and an interest expressed by the mission in the Center construction project on the other they have agreed to have the Center construction project included in the ADB co-financed RDP-21 as a new component.

In line with above agreement, prior to the arrival of the OECF appraisal mission for the project scheduled in November, 1998, OECF HQ sent LGED a questionnaire on the Center requesting for more information than that provided in the proposal. This has happened because firstly the above mentioned preliminary study which was used as a basis of the proposal failed to illustrate a functional vision of the Center due to the ignorance of the technical assistance project supported by SIDA; Institutional Support Project, ISP the functions and achievements of which should be taken over by the Center. Secondly the project proposal submitted in 1997 was a replication of the preliminary study report in most part and did not take into consideration the proposal and recommendations made under Management Capability Strengthening Project of LGED, MANCAPS, funded by ADB when it came to work on the organization set up of the Center.

In short, since the Center will be built with a significant investment at all, it should be effectively used by accommodating a number of engineering functions including those groomed by ISP under a best suited organizational arrangement in line with MANCAPS proposals.

In this regard, the Master Plan was prepared based on the broad aspects and long term visions which LGED will have to cover and pursue so as to ensure effective and efficient implementation of projects which lead to accelerating of infrastructure development and fast enhancement of well-being of people.

Chapter 2 The Local Government Engineering Department, LGED

2.1 Overview

The Local Government Engineering Department, LGED, one of departments under Local Government Division in the Ministry of Local Government, Rural Development and Cooperatives, LGRD&C can be described as the largest department of the Government of Bangladesh, GoB in terms of size of budget and employees. After it was born in 1982 under the Division as a small organization called Works Program Wing, it was converted to LGED in 1984, then upgraded to LGED in 1992 with ever increase of its role. As at May 1998, LGED is implementing 55 projects financed by GoB as well as multi-lateral and bi-lateral international aid organizations with a budgetary allocation of over US\$ 1 million per day, employing 9,950 persons as core staff under revenue budget, with assistance of another about 4,000 persons employed under development budget.

2.2 Functions

Besides Rural Infrastructure Development Projects, RIDPs, which remain main projects in LGED, because of LGED's specialized capacity to implement infrastructure development activities and its decentralized organizational set-up at Thana level to take care of the construction activities in remote areas of the country, LGED's role has continuously expanded for many years taking up new projects like small water resources, urban infrastructure development projects and construction/improvement of primary schools. Many of these projects are entrusted to LGED for implementation by other respective government organizations

LGED's prime responsibility lies in two areas; one in implementation of RIDPs and other projects with assistance from the development partners and own government resources and the other in provision of technical support to the Local Government Institutions, LGIs in the rural and the urban areas so that they can be well involved in LGED implemented projects and handle their own projects in planning, implementation and maintenance.

Specifically, LGED is involved in the following areas.

i) planning, implementation and monitoring of infrastructure development projects funded by donors and GoB

The type of the infrastructure is as follows.

- markets/growth centers
- feeder road type B, FRB linking growth centers with Thana Head quarters or arterial road systems and rural roads with necessary bridges, culverts and tree plantation.
- small scale water resources schemes
- primary schools, cyclone shelters and river ghats
- infrastructure in urban and semi-urban areas including water supply, drains, houses, sanitary facilities, etc.

- ii) planning, implementation and monitoring of maintenance of rural infrastructure
- iii) provision of technical support to Local Government Institutions at District and Thana level
- iv) preparation of physical planning tools (Thana/Union/Pourashava Plan Books and their corresponding Base Maps), technical/management guidelines and manuals
- v) development of human capacity of LGED staff, Local Government Institutions and construction works implementers like local contractors/consultants and Labour Contracting Societies, LCSs.

As at May 1998, as shown in below Table 1, LGED is undertaking above functions by implementing 55 projects in nation wide with the annual budget at Taka 18,416 million (US\$ 409 million) which does not include annual revenue budget for the staff salaries. This amount is met by GoB and donors with an approximately equal share.

Table 1 Annual Budget of LGED

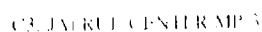
| Projects | no. of Projects | Total Budget mill. Taka | Annual Budget mill. Taka | Remarks |
|-------------------------------------|-----------------|----------------------------|-----------------------------|--|
| Rural Infra. Dev. Projects | 24 | 41,249 | 8,259 | |
| Technical Assistance Projects | 3 | 528 | 157 | |
| Urban Infra. Dev. Projects | 6 | 7,634 | 1,342 | |
| Dev. Projects of other Ministries | 14 | 19,536 | 4,330 | water resources, agriculture and primary schools |
| Infra. Dev. Programme with Food Aid | 6 | 16,089 | 3,348 | |
| Maintenance and others | 2 | 1,221 | 980 | |
| Total | 55 | 86,257 | 18,416 | |

2.3 Organization

LGED consists of the Head Office, HO in Dhaka and field offices located in all 64 Districts and all 460 Thanas in Bangladesh. Because majority of LGED staff (99%) is posted in field offices working for field activities, LGED's uniqueness lies in field oriented and decentralization. As shown in Figure 1, the Chief Engineer is posted in HO assuming overall responsibility of LGED. He is supported by 2 Additional Engineers who are supervising respective Superintending Engineers and project directors. Under the Superintending Engineers and project directors, assigned are executive engineers and assistance engineers with supporting staff.

Since the rigid government regulations do not allow the increase of LGED core staff posts under revenue budget, (LGED core staff amounts to 9,548 in total posting 82 and 9,466 at HO and field offices respectively) there are two other types of staff. One is so

LOCAL GOVERNMENT ENGINEERING DEPARTMENT (LGED)



called project reimbursable staff who have been deputed from the government and paid under the respective project for which they are responsible. All project directors and other officers like executive engineers assigned to the project are included in this category (a total about 400-500 persons). Another type is called technical assistance staff recruited under the project during the life of the project without a return right to other post after termination of the project. Staff who fall under above two types are differentiated from the core staff in terms of budget. The former is called development budget staff and the latter revenue budget staff.

At field level, organizations constitute 3 tiers; the Regional Office headed by a Design Engineer responsible for his respective districts in the region, the District Office headed by an Executive Engineer and the Thana Office headed by a Thana Engineer. There are 6 Regional Offices and 64 and 460 District and Thana Offices respectively corresponding to districts and thanas in the country. On an average, there are 12 and 19 staff assigned to the district and the thana office respectively who are mainly involved in project implementation regarding identification of schemes under the project, contracts management, supervision and monitoring of construction works on the field. At each district office, a laboratory for quality control and a garage for construction machinery is attached. In addition, there are 10 districts where regional training center is provided.

Due to field oriented nature of LGED combined with a rapid increase of the number of projects, it is said that LGED's own organization at Head Office, HO is extremely weak. In order to compensate the shortage of the staff, LGED is heavily depending on the human inputs from projects such as ISP in carrying out several tasks which are essential for LGED to manage the assigned tasks.

The mixture of different types of staff who are working together for projects and specific tasks whatever they are and absence of clear cut designation of authority at each hierarchical structural level and explicit job description for each post combined altogether makes it difficult to understand the current LGED organization by outsiders as well as insiders.

2.4 Five Year Plans

Table 2 below shows the sub-sector wise physical development achieved under the Fourth Five Year Plan (1990-95) in comparison with the target of the Plan and proposed plan for Fifth Five Year Plan (1997-2002).

Under the Five Year Plan, projects implemented by LGED are divided into following five sub-sectors, namely, Rural Development and Institutions (RD&I), Physical Planning, Water Supply and Housing (PPWS&H), Water Resources, Agriculture and Primary Schools. All projects of RD&I are exclusively undertaken by LGED as the executing agency. Whereas, projects under other sub-sectors like PPWS&H, water resources, agriculture and education which fall under jurisdiction of relevant government organizations are implemented by LGED as the implementing agency for parts of the physical infrastructure development components.

Table 2 Infrastructure Development in Last and Current Five Year Plans

| Subsector | Items | unit | Fourth Five Year Plan (1990-1995) | | Fifth FY Plan (1997-2002) |
|-----------------|----------------------------|------|-----------------------------------|--------|---------------------------|
| | | | Target | Achiev | Plan |
| RD&I | Construction of FRB | Km | 4500 | 3709 | 7000 |
| | Rehab. of RR | Km | 2950 | 2574 | 1000 |
| | Bridges/Culvert | M | 46988 | 41985 | 10000 |
| | Growth Centers | Nos | 476 | 277 | 550 |
| | Maintenance of FRA/FRB | Km | 2060 | 1285 | 10000 |
| | Maintenance of RR | Km | 4000 | 4000 | 100000 |
| | Maint. of Bridges/Culverts | M | 25000 | 23800 | 50000 |
| | Tree Plantation | M | 2212 | 1514 | 10000 |
| | Functional Buildings | Nos | | | 10 |
| | SSWRSS - embankment | Km | | | 600 |
| | - Khal/Canal | Km | | | 3000 |
| | - Regulators | Nos | | | 250 |
| PPWS&H | Const. of Roads/Footpaths | Km | 416 | 368 | 4500 |
| | Const. of Drains | Km | 468 | 349 | 4000 |
| | Const. of Bridges/Culverts | Nos | 698 | 261 | 4000 |
| | Const. of Dustbins | Nos | | | 1500 |
| | Const. of Bio-bas Plants | Nos | | | 200 |
| | Const. of Slaughter Houses | Nos | | | 45 |
| | Installation of Latrines | Nos | 22905 | 15545 | 167567 |
| | Installation of Tubewells | Nos | 4160 | 2484 | 17745 |
| | Development of Markets | sq.m | 33250 | 17050 | 5000 |
| | Tree Plantation | Km | 133 | 96 | |
| | Slum Improvement | Nos | | | 36500 |
| | Pipelines for water supply | Km | | | 250 |
| Water Resources | Const. of Road Network | Km | 41 | 26 | 154 |
| | Const. of Bridges/Culverts | Nos | 745 | 464 | 550 |
| | Development of Markets | Nos | 10 | 9 | 25 |
| | Const. of Drains | Km | | | 255 |
| | Const. of Cyclone Shelters | Nos | | | 45 |
| | Improvement of Slums | Nos | | | 4500 |
| | Installation of Tubewells | Nos | | | 65 |
| | Installation of Latrines | Nos | | | 2465 |
| | Tree Plantation | Km | | | 152 |
| Agriculture | Const. of Rural Road | Km | 33 | 30 | 456 |
| | Bridges/Culverts | M | 4695 | 2614 | 4000 |
| | Development of Markets | Nos | | | 60 |
| | Const. of Landing Stages | Nos | | | 45 |
| | Const. of Regulators | Nos | | | 26 |
| Primary Schools | Const. of Primary Schools | Nos | | | 20000 |
| | Repair of Primary Schools | Nos | | | 1500 |
| | Const. of Thana R. Centers | Nos | | | 45 |

As far as RD&I is concerned, the target of Fifth FY Plan reflects the recommendation made by the Rural Infrastructure Strategy Study conducted by the World Bank in 1996. The study indicated that for the next 10 years, 70 % of the current needs of infrastructure development be accomplished. On the annual basis, it was estimated Taka 8.1 billion including Taka 6.3 for development and 1.8 for maintenance.

In addition to the physical achievements and targets seen in Table 2, below Table 3 shows actual annual expenditure under the projects implemented by LGED during Fourth Five Year Plan in comparison with proposed budget for Fifth Five Year Plan by sub-sector.

Table 3 Budget for Last and Current Five Year Plan

| Year | RD&I | PPWS&H | WR | Agricu. | Prim. Sch. | Total | Total |
|------------------|--------|--------|-------|---------|------------|--------|------------|
| | Lakh | Lakh | Lakh | Lakh | Lakh | Lakh | mill. US\$ |
| Fourth FYP | | | | | | | |
| 1990-91 | 15112 | 128 | - | - | - | 15240 | 33.9 |
| 1991-92 | 25212 | 999 | - | - | - | 26211 | 58.2 |
| 1992-93 | 30504 | 3138 | 34 | 3 | - | 33679 | 74.8 |
| 1993-94 | 45628 | 3642 | 1264 | 516 | - | 51050 | 113.4 |
| 1994-95 | 60373 | 3843 | 1746 | 2042 | - | 68004 | 151.1 |
| Total Lakh | 176829 | 11750 | 3044 | 2561 | - | 194184 | 431.5 |
| Total mill.US\$ | 393.0 | 26.1 | 6.8 | 5.7 | - | - | - |
| Fifth FYP | | | | | | | |
| 1997-98 | 78831 | 23395 | 1966 | 1630 | 24842 | 130664 | 290.4 |
| 1998-99 | 92901 | 25994 | 1478 | 1811 | 27603 | 149787 | 332.9 |
| 1999-00 | 102307 | 28594 | 2400 | 1992 | 30363 | 165656 | 368.1 |
| 2000-01 | 111600 | 31771 | 1806 | 2193 | 33737 | 181207 | 402.7 |
| 2001-02 | 125759 | 34659 | 2913 | 2414 | 36804 | 202549 | 450.1 |
| Total Lakh | 511398 | 144414 | 10563 | 10060 | 153349 | 829784 | 1844.0 |
| Total mill. US\$ | 1136.4 | 320.9 | 23.5 | 22.3 | 340.8 | | |

note:

-in conversion from Taka to US\$, an exchange rate of 45 Taka/US\$ is used.

-If the current level of budget for the infrastructure development with food aid as per Table 1, 33480 Lakh which is not included in Five Year Plan is added, for instance to 149787 Lakh for 1998-99 it will amount to 183267 Lakh equivalent to US\$ 407 million. This is very close to the current budget of LGED as seen in Table 1.

It is widely recognized that all development activities can not be properly handled by the public sector alone. Involvement of the private sector, local communities and NGOs is also necessary to speed up the process of development. In this context, in above Fifth Five Year Plan it is included the contributions in money or in kind from the private sector and others up to 20-25 % of the total cost.

Chapter 3 Rural Development and Other Sub-Sectors related to LGED

Besides the Rural Development sub-sector, a prime concern of LGED, as an efficient implementor of infrastructure related projects, LGED has thus been asked to implement projects on behalf of ministries other than LGD such as the Ministry of Irrigation Flood Control & Water Resources, Ministry of Agriculture, the Primary and Mass Education Division, the Cabinet Division and the Special Affairs Division of the Prime Ministers Office. LGED has also been entrusted with the implementation of the rural development projects financed through Food for Works.

3.1 Rural Development Sub-Sector

This sub-sector remains a top-most priority for LGED with the budget accounting for 45% of the total annual budget disbursed by LGED.

Below are provided main issues of interest around rural development including strategies, objectives and impacts.

3.1.1 Strategies

There are three planks on which the strategies of rural development have rested, i.e., Comilla Model initiated by Dr. Akhtar Hamid Khan in Comilla District in early 1970's, Strategy for Rural Development Projects, formulate by the Planning Commission, Ministry of Planning under a Sectoral Policy Paper in 1984 and Perspective Plan (1995 - 2010).

The Comilla Model

It emphasizes the formation of cooperatives and the integration of support services specifying the following elements.

- Two tier cooperatives - Krishak Samabaya Samity, KSS, and Thana Central Cooperative Association, TCCA
- Rural Works Programme, RWP
- Thana Irrigation Programme, TIP
- Thana Training and Development Center, TTDC

The Model which had proved as useful and effective in the rural development has been replicated widely in Bangladesh and still remains valid as a prime strategy of rural development.

The Strategy for Rural Development Projects

The Strategy for RD contains below three components and designates responsible bodies for implementing each of them.

- Development of physical infrastructure including roads, storage and markets; LGED
- Irrigated agriculture, minor drainage and flood control; BRDB and the Ministry of Agriculture in association with the Local Government Bodies

- Production and employment programs for the local poor; BRDB in collaboration with the Local Government Bodies and other concerned agencies including NGOs

Perspective Plan (1995 - 2010)

In line with the development achieved on the basis of above strategies, the Perspective Plan (1995 - 2010) was drafted for the government to endorse. The Plan includes more elements than above two strategies reflecting emerging needs in rural development as follows.

- Improve basic physical infrastructures in rural areas (growth centers/markets, feeder roads type-B, other key rural roads in the road network, bridges and culverts, minor irrigation, drainage and water control structures, etc.) facilitate social and economic growth in the rural areas and better interaction among rural markets and between rural areas and urban markets
- Develop water routes along with roads in the riverine areas, if feasible and cost effective, as a part of communication network for growth centers
- Develop adequate maintenance system including organizational structure, financing, etc., for proper maintenance of rural infrastructure
- Plan rural infrastructure development activities on the basis of Union/Thana Plan Books and Maps and involve the representatives of the Union Parishads and other local government institutions in identification, selection, implementation and monitoring of rural infrastructure development schemes
- Strengthen local government institutions and local resource mobilization to promote local level development based on participatory planning
- Undertake studies and pilot projects for the development of non-motorized rural transport and provide the sector with knowledge in rural transport development

It is noteworthy that in above Plan, as the development progresses, stress is given not only on the physical development but also on maintenance of the developed infrastructure, mobilization of local people in planning, implementation and maintenance of infrastructure development.

3.1.2 Objectives and Impacts

The prime objective of rural infrastructure development lies in alleviation of rural poverty through activating rural economy. The rural infrastructure development entrusted to LGED is well geared to it by developing rural growth centers which are linked with Thana Headquarters or arterial road system with development of Rural Feeder Road type-B supplemented by development of other major rural road systems.

Areas with well developed infrastructure have significant advantages in rural development which lead to alleviation of poverty in respect of;

- In combination with the provision of such agricultural supports like extension, credit and agriculture inputs including fertilizer and improved seed varieties, agriculture production in rice as well as diversified agricultural products such as vegetables, livestock and fisheries will increase creating more jobs in the form of self

employment, wage employment, agro-based and non-farm labour intensive micro enterprises.

- A good opportunity will arise for the poor by linking them with basic social services and institutions in the fields of health, education, domestic water supply and sanitation
- Social mobilization and forming organizations which are essential for empowerment of the poor will be promoted.
- Adult education with a view to reducing illiteracy rate and several vocational training will be made available for the poor to undertake productive activities.

These envisaged advantages have already well been materialized in infrastructure developed areas. Various project evaluation study reports have indicated many positive effects through bench mark surveys and comparisons between infrastructure developed and undeveloped areas.

Household income increase is evident in farmers and farm labours thanks to a rise of farm products and their sales at good prices. Alleviation of difficulties of transportation made rural business expanded which contributed to income increase of non-farm self employment including rickshaw pullers, shop owners, agri-business entrepreneurs. Further, subsistent farmers and landless farmers benefited with employment opportunities generated directly by project implementation. During the Fourth Five Year Plan, it is estimated that 157 million persondays of jobs were given to the rural poor in the following ways.

- short term (seasonal) employment through construction activities
- regular employment through maintenance activities

From the overall economy and efficiency point of view, it is recommended that further integration of activities of LGED which carries out infrastructure development and BRDB which implements cooperatives' development and credit services.

3.2 Other Sub-Sectors

3.2.1 Small Water Resource Schemes

No organization in Bangladesh is looking at or is clearly responsible for the rural small scale water resources schemes. Reportedly, BRDB is only concentrating on larger schemes. LGED has already some project interventions in this sub-sector. It is believed that these endeavors are only a humble beginning. The overall task in this field can grow considerably if the present project interventions succeed. LGED has already come to be recognized as an organization carrying out these activities and has developed a design cell for the schemes with support of ISP.

3.2.2 Urban Development

Like Rural Development sub-sector, there is no strategy formulated for urban development and urban poverty alleviation.

While in terms of budget, this sub-sector accounts for only 7 % of the total annual budget of LGED, this sub-sector has a great potential to grow with support of LGED. In the study called Municipal Finance Management Sector carried out by the World Bank in 1997 describes importance about this sub-sector as follows.

Municipalities have a key role to play in overall supply of public goods and services to their communities. While Bangladesh's economy is rural based, with agriculture being the dominant sector, trends show that urban based industries are growing rapidly. The present urban population, estimated to be about 25 million, (over 20% of the total population of about 111 million) is growing twice as fast as the rural population. The level of urban poverty in Bangladesh is also increasing. There are at least 11 million people under the poverty line in the urban areas which consist of the four city corporations of Dhaka, Chittagong, Rajshahi and Khulna, and about 129 secondary towns or municipalities, locally known as pourashavas. The Ministry of LGRD&C is responsible for the supervision of municipalities and other lower level local governments, through the Local Government Division, LGD. Currently, though needed, there is no clear government plan for strengthening municipalities and city corporations. The municipal sector in Bangladesh presents deep problems associated with weak administration and institutional capabilities and foremost the inability to provide residents with minimum acceptable levels of basic services.

The study recommended that to strengthen municipalities, LGED should be given a more effective role in monitoring the financial performance of pourashavas and in providing technical support.

In the belief that LGED can significantly improve the technical competence and the project implementation capability of the pourashavas by providing the incremental staff resources and undertaking certain semi-urban tasks, the LGED involvement in pourashavas should be decided once for all by the ministry and the LGED together.

3.2.3 Education Sector Projects

LGED is managing implementation of a number of construction component of primary schools mostly in the rural areas. This constitutes 15% of the total annual budget of LGED. The overall implementation is carried out under the Primary and Mass Education Division now directly under the Prime Minister's Secretariat.

Chapter 4 Relevant Issues to the Rural Development Engineering Center

4.1. Capacity Building in LGED

LGED has been pursuing strenuously quality works and efficient project implementation by developing planning and designing tools, introducing of efficient management systems and adjusting organizational structures. Specifically, a number of manuals and guidelines have been prepared, planning data made available and field level training facilities as well as laboratories established. While part of these achievements can be attributed to some large development projects, most of them are owed to the technical assistant project, Institutional Support Project, ISP under SIDA funded Rural Employment Sector Programme, RESP. Through Phase I (1986-90) and Phase II (1990-96) now RESP III is in progress up to year 2000. While RESP has undergone several changes to its focus from the onset of the project, ISP has continued activities with a focus on strengthening of technical capacity of LGED and developing of human resource. Using 66 % of the total budget earmarked for ISP (US\$ 5.5 million) under phase III for recruiting a quite large number of national professionals, ISP is carrying out activities including development of the tools and organizing of training courses. While the achievements up to date will be described in the later part of this section, when it comes to the plan of the Center the fact that more than 150 staff is recruited under ISP in HO posting in almost all areas including not only engineering but monitoring & evaluation of project implementation and financial and administration functions has a serious implication in terms of continuation of the activities after year 2000 when ISP phases out.

4.2 Institutional and Managerial Development in LGED

As introduced in previous section, the workload on LGED has grown very significantly over the years with adding new working areas under an almost constant LGED core staff. This has lead to an overload on most personnel and ad-hoc organizational arrangement. In recognition of a need for institutional restructure together with improvement of efficiency in management, a study called MANCAPS, Management Capability Strengthening Project was conducted with a financial assistance of ADB. Started in 1995, the study has prepared several reports which culminated in Action Plan in Management Development and Organizational Manual in 1998. The study, conducting an in-depth assessment covering all aspects of LGED ranging from LGED's strategy as a whole, management system and technical competence in LGED HO and field offices to the management of Union level, made recommendations on phased institutional restructure and management development plan.

The recommendations can be boiled down to below three points;

- The HO organization should be more efficient in systematic management and professional support to the field organizations.
- At all levels, it is required to improve the professional competence and management skills of the staff

- It is important to develop various types of management systems and put them into practice under the overall framework of MIS Master Plan. (M&E, budget, personnel, project planning data base, infrastructure inventory, etc.)

MANCAPS's assessments and recommendations are closely investigated in the MP study and reflected in below function wise issues.

4.3 Project Implementation

Selection of good contractors and carrying out proper supervision are the key of ensuring quality construction works. Works under LGED field project are supervised by a set of LGED supervising staff headed by the Thana Engineer. Whereas, District Engineer holds an overall responsibility for contract management, monitoring of works, quality control and payment to the contractor. In most of donor funded projects, it is provided consultants in technical assistance to support the Thana/District Engineers during these processes. Whereas Project Directors and his staff at Project Implementation Office oversee the performance of all activities through the main chain of command in LGED between HO, District and Thana Offices and provide logistic support.

In view that there is a considerable variance between projects in organization set up, mode of contract, mobilization of local contributions, involvement of local institutions/people and monitoring system, there is a need to conduct inter-project analysis so as to develop uniformity among projects.

4.4 Planning

4.4.1 Scheme Selection

The projects consist of components and sub-components. Each of these is further sub divided into schemes which are the actual units for the on-ground implementation of the projects. No matter when schemes are selected either during feasibility study or implementation stage, it is important to include local people in the selection process so as to ensure that priority facilities be constructed within the resource constraints.

In this context, it is important that proper tools like Union Plan Books and Base Maps, infrastructure directory, and clear guidelines on scheme selection on different type of projects be developed and updated.

4.4.2 Physical Planning

Heavily supported by ISP this function has been developed in two areas one in rural development and the other in urban development. The rural section has developed useful planning tools like Thana/Union Plan Books, inventory of road networks, growth centers and guidelines on growth centers, land/water use, environmental issues.

Whereas, the urban section has been dealing with developing pourashava base maps, slum upgrading, pourashava planning manuals. Further using AutoCad, drawings for growth centers, primary schools and functional building are undertaken.

It is important to update and improve above tools stressing environmental consideration so that they are used effectively during project finding and scheme selection stages.

4.4.3 GIS

With a modest beginning in an ILO assisted effort, GIS has come to have a special standing in LGED. Notable progress has been achieved when it comes to computer applications in developing micro and macro level database. Firstly, thana base maps covering all over the country have been produced. Then by aggregating the thana maps, now the district base maps have been made available. Union maps have also been produced for about 100 unions. The preparation of pourashava base maps consisting of 4 basic layers are in progress.

The collaborative link with some international organizations, e.g. ESRI in USA and ICIMOD in Nepal has already established. In close collaboration with other relevant functions in HO, like planning and design, it is hoped that continuing efforts be made in improvement and updating of the base maps and widening application areas.

4.5 Design and Quality Control

4.5.1 Design

It is found that in most of the donor funded projects they include technical assistance component whereby consultants who deal with design of infrastructure are recruited. Whereas, for projects undertaken by GoB allocation, Thana Engineers prepare engineering design with the help of the design manuals and their own knowledge based on field investigation. Up to date, according to the need for design standards covering common infrastructure like FRB, RR and bridges and culverts, Road Structure Manual has been prepared and used by many projects.

While design of special structures will continue to be done by the project or contracted outside consultants, it is hoped that more standards on small scale water structures and urban development related structures need to be prepared.

4.5.2 Quality Control, QC

It is said that LGED has been rightfully moving not only to quantitative but also to qualitative achievements. Owing to the set up of field laboratories attached to all district offices of LGED as well as improvement of the central laboratory at HO, quality of the works being executed in recent years has been improved in comparison to the works done in earlier years. Construction material samples of cement, bricks, reinforcement, bitumen, etc., are tested in the laboratories and quality test during and at completion of works are carried out. It became possible to carry out all quality control tests in these laboratories except sophisticated tests like tri-axial compression, tensile test, etc.,

At the center laboratory, in order to upgrade some equipment procured under projects over years and to carry out research work to adopt and develop new technology, as per planned equipment list, new equipment is expected to be provided.

More stress needs to be placed on development of cost effective technology to be applied to the construction of rural infrastructure which holds required strength and durability and can be constructed even by unskilled labours.

4.6 Human Resource Development, HRD

4.6.1 Training

In recognition that the human resources is a key to the quality of services that LGED is expected to render and in view of the growth of tasks and changes in technology, LGED has put stress on training of LGED staff from early 1980's. At present at HO and 10 district training centers, about 40 training courses are conducted annually in technical, financial, management fields and computer technique with targeting LGED officers in district and thana level. Some courses are also arranged for contractors. While all the training courses are coordinated from the HO most of the courses are implemented in the district by the respective distinct training officer with constant supervision and guidance from HO.

In preparation of these training programme, some aspects below are taken into consideration.

- the training should be practical and application oriented exercises
- a combination of classroom and on the job training is quite effective
- training is an exercise which never ends in an organization and opportunities to attend training should be given to newly recruited staff, promoted and transferred staff.

In line with ever changing demands for LGED staff in their competence, training programming is requested to be revised appropriately based on needs assessment conducted every 2-3 years.

While both HO and district training centers are almost well equipped with modern teaching aids, at HO, it is requested to have more space for large and small group training as well as accommodation for trainees from upcountry.

Further it is also requested to widen the target of trainees from LGED staff and contractors to members of Union Project Implementation Committees which are authorised to implement its own small projects and members of Union Market Management Committees which are responsible for operation and maintenance of markets/growth centers.

4.6.2 Library

While there is a library at HO, it is not used effectively due to insufficiency in the number of literature and management. There is a need for improvement which ensures storing more references including study reports, project documents and continuous inflow of periodicals. In order to realize the improvement there will be more space and a library software which enable users to retrieve what they want easily.

4.7 Maintenance of Infrastructure

The primary responsibility for maintenance of infrastructure such as roads and growth centers constructed by LGED lies with the Local Government Institutions. However, since the Institutions are not able to meet the cost of the maintenance from their own resources,

in principle, LGED solicit donors to include maintenance component in their projects in order to cover the cost of the maintenance during the project life with scaling down to a minimum toward the terminal year of the project.

Apart from above, in accordance with the increase of developed rural infrastructure, LGED has been receiving maintenance fund from national revenue budget commenced in 1992 at a constantly increasing allocation with Taka 300 million in 1992 and Taka 900 million in 1997. The fund allocated by HO to each district is expended under the contract signed at Thana level for priority maintenance schemes in routine, periodic and emergency maintenance. In order to ensure proper implementation of maintenance works, a manual entitled Road Maintenance Management was published with support of ISP in 1998.

In carrying out maintenance works it is stressed to use human labour to the maximum extent with a view to providing income sources to the rural poor.

With regard to markets/growth centers, they amount to nearly 300 which have been developed by LGED under different projects. While it is reported that the benefits of such market development are apparently visible in increase of trading and service activities and revenue collection, a concern was raised about their operations and maintenance most of which are not satisfactory. In this regard, based on an intensive study a report was prepared under RESP III, which is calling for appropriate actions involving beneficiaries.

4.8 Construction Equipment

Even though there is a heavy involvement of human labour in the earth works of infrastructure development projects, in order to ensure quicker progress required to complete contracted works prior to the flood season and better quality of works, construction equipment such as graders, rollers, compactors, water bowsers, bitumen sprayers, concrete mixers are used in general. The equipment purchased under donor funded projects is kept under the custody of LGED district offices after termination of the project for use of other projects. Mechanical engineers of LGED core staff are posted in old districts (22 districts) and some mechanics employed under projects carry out regular maintenance and ensure the stock of spare parts in liaison with the Mechanical section in HO which is working with sophisticated inventory of equipment on computer.

Due to the poor facilities at the district workshops run by LGED at district offices, all repairs are contracted out to private workshops. However it is said that unskilled mechanics and poor workmanship common in local workshops make it difficult to maintain necessary equipment in good shape.

As a matter of fact, there exists a high requirement for the equipment kept in the district offices to be rented out to contractors who do not possess equipment. In this regard, district offices are requested to make common used equipment such as compactors and water bowsers available on the basis of the request. However, it is important that LGED

should not discourage some contractors who have purchased equipment by providing cheap leasing equipment. The lease rate, as insisted by ADB, should be reviewed every year to represent all costs including depreciation and considering the re-purchase price.

Given the huge number of main equipment kept under LGED district offices (they amount to 757 including construction machines and vehicles) and unsatisfied level of local private workshops, it is requested to improve at least the existing district workshops to the extent that they can carry out necessary maintenance and repair in collaboration with private workshops.

In this context, a central workshop is planned to be established to conduct on the job training of district mechanical engineers and mechanics including private workshops besides undertake major repairing works. In view of the huge investment and recurrent costs, due consideration needs to be given to ensure efficient use of the central workshop in respect of assistance in improvement of capacity in LGED district workshops and grooming emerging private workshops in consistence with the government policy of privatization.

Chapter 5 Plan of the Rural Development Engineering Center

5.1 Rationale and Objectives

A rapid growth of LGED implemented field projects combined with limited manpower, LGED have been forced to prioritize activities on field rather at HO, which inevitably invited weakness in performing necessary functions at HO. In order to compensate this weakness, LGED has been relying heavily on supports from technical assistance projects in various areas to maintain LGED's competence and efficiency in implementation of the projects and providing technical support to LGIs.

However, there is a limit to the support of projects in respect of their continuation and coherence with long-term strategy of management and institution improvement at HO. Instead of soliciting projects for short lived technical assistance, it is important to establish a permanent base where are engineering functions of HO concentrated associated with a functional organization so as to institutionalize the functions in LGED's core organization and ensure continuous activities based on LGED's long-term strategy. As the base of the engineering functions above, it is planned to construct the Center with following objectives.

- **Long-term objectives**

LGED will be able to deal with ever expanding rural development activities in the way which maximizes the positive impact of infrastructure development on rural economy and poverty alleviation.

- **Medium-term objectives**

The Center will continue to strengthen the engineering capacity of LGED field organizations and Local Government Institutions, LGIs not only in civil works but also in social, economic and environmental areas through the provision of a number of timely and effective technical supports.

This will result in multiple effects like

- i) improvement of quality of works
- ii) maximizing of project impact on rural societies
- iii) enhancement of project efficiency and reduction of project cost
- iv) ensuring proper implementation of infrastructure maintenance works (periodic, routine and emergency) and
- v) promotion of capacity of LGED field organization, LGIs and local contractors/consultants

- **Short-term objectives**

The Center will take over relevant engineering functions developed at HO under the support of GoB, ISP and others in the fields of Planning, Design, Quality Control, Research Development, and Human Resource Development together with establishment of some new functions.

The Center will in close linkage with LGED field organizations and projects

- i) promote acceleration of the implementation of long-term proposals in MANCAPS

- ii) ensure the effective use of the engineering instruments developed with timely updating and improvement
- iii) expand engineering support areas by developing new systems and technologies effective for use of projects in every stage in the project cycle based on needs assessment and feed back from the field.

5.2 Composition and Functions

As LGED is field oriented, the Center will also focus on field activities and work as an arm of HO in engineering in support of LGED field projects and LGIs by providing various technical assistance. The functions of the Center will, in principle, constitute those already developed in HO with adding limited new functions which are regarded as necessary tools of the Center. Through a careful investigation on the current functions at HO and deliberation toward future, it is planned that following functions be accommodated in the Center.

- Planning
Physical Planning, GIS and Urban Planning
- Design
Rural Infrastructure Design, Water Resource Schemes and Quality Control, Research Development
- Human Resources Development, HRD
Training, Library
- Construction Equipment Central Workshop, CECW

Whereas, rest of the functions currently undertaken at HO as below will remain in HO.

- Policy and Strategy matters
- Project Planning, Formulation and Appraisal
- Project Implementation and Maintenance of Infrastructure including Project Implementation Offices
- Finance and Personnel Affairs
- Maintenance of HO building and car fleet
- Internal Audit and Master control of MIS

In view of the importance of the Center in making effective interventions on LGED implemented field projects and LGIs, keeping a strong linkage between the Center, projects and LGIs is essential. An authorization of carrying out technical audit through monitoring should be designated to the Center in order to look at quality of works, socio-economic impact and performance of LGIs.

As described below, the Center will hold 4 engineering related wings with specific tasks assigned to each section. In addition to the specific tasks, every section is requested to i) carry out technical audit for LGED implemented field projects and LGIs, ii) provide appropriate advice if necessary and iii) assess and identify needs of the projects and LGIs and take actions to meet them.

- **Planning**

- Physical Planning;**

- to develop/upgrade and update physical planning tools such as manuals, thana/union plan books and manuals/guidelines including land use planning and environmental issues

- to cooperate the preparation of union, thana and district base maps with GIS

- to co-ordinate with all projects involved in rural infrastructure development

- to co-ordinate training courses, seminars and workshops

- to upkeep physical planning

- GIS**

- to look after GIS technical assistance projects

- to prepare union, thana, district and pourashava maps of different kinds

- to improve accuracy of maps and increase useful information on different kinds of maps

- to coordinate training courses, seminars and workshops regarding of maps and computer technologies

- to expand areas of geographical data application

- Urban Planning**

- to co-ordinate with all projects involved in pourashavas

- to keep a direct liaison with various pourashavas

- to cooperate the preparation of pourashava maps with GIS

- to convene a workshop on urban planning and pourashava works

- to take part in the training of the pourashavas staff

- to develop physical planning tools, manuals pourashava plan-books

- **Design**

- Rural Infrastructure Design**

- to develop and update design standards and manuals

- to co-ordinate with all projects involved in rural infrastructure development

- to undertake, advise, guide and co-ordinate activities

- to take part in training courses

- to make use of computer design software on the job in the design

- Water Resource Schemes**

- to develop and update design standards and manuals

- to undertake, advise, guide and co-ordinate activities

- to co-ordinate with all projects involved in water resource schemes

- to take part in training courses

- to make use of computer design software on the job in the design

- to make hydrological data available on a computer system

- to undertake hydrological and hydraulic analysis

- to assist in the development of the design manual for WR Schemes

Quality Control

- to set up and update laboratory standards for quality control
- to maintain a Central, country wide inventory of all laboratory equipment
- to supervise activities undertaken in district laboratories
- to take part in training courses on field sampling and associated lab testing
- to prepare an annual Research & Development related report

• Human Resources Development, HRD

- to conduct training need assessment
- to prepare a draft training calendar
- to assess the needs of new projects in training of staff
- to conduct and co-ordinate various training courses
- to work as a trainer or resource person in various training courses
- to prepare training materials
- to improve a level of computer literacy in the LGED as a whole
- to upkeep records of performance of various participants
- to upkeep training database and co-ordinate with the personnel database
- to supervise activities undertaken in district training centers

• Construction Equipment Central Workshop, CECW

- to keep liaison with all district level workshops
- to upkeep main equipment inventory and maintain spare parts, maintenance and repairing records for each equipment
- to organize training of district mechanical engineers and mechanics as well as mechanics in private workshops in construction equipment maintenance and repair
- to undertake repair and maintenance of construction equipment located in Dhaka and in nearby districts
- to co-ordinate equipment transfer between districts
- to advise on maintenance and repair undertaken in districts and participate in procurement procedure of new equipment/machines

5.3 Organization

The Center will be headed by an Additional Chief Engineer, ACE supported by two Superintending Engineers, SE, one is responsible for Planning, Design and Q.C related functions and the other for HRD and CECW related functions. These are sub-divided into several functions taken care by executive engineers, XEN.

Following the nomenclature applied in MANCAPS, from organizational point of view, above each function taken care by the executive engineer is called a section whereas, the collective functions taken care by SE is called a wing.

Financial and administrative affairs including budget, accounting, personnel and maintenance of the building and vehicle will be taken care by existing relevant sections in HO.

With regard to the staff, taking into the capability of the current staff of XEN, AE and SS level positions provided by ISP (108) and LGED (19) into consideration, as per Table 4 it

Table 4 Section wise Staff Number and Floor Space for Offices

| section | | | staff | | | | floor space for offices | |
|----------------------------|----------|---------|-------|----|----|-------|--|--|
| | | | XEN | AE | SS | total | sq.m | calculation |
| Add. C.E | | | 1 | 1 | 1 | 3 | 30 | 1x15+1x10+1x5=30 |
| Planning | Physical | M. Plan | 1 | 2 | 3 | 6 | 70 | 1x15+2x10+3x5=50 |
| | Planning | ISP | 1 | 2 | 3 | 6 | | plus 20 for drawing |
| | | LGED | 0 | 0 | 0 | 0 | | |
| | | MANCAPS | 1 | 2 | | | | |
| | GIS | M. Plan | 1 | 6 | 10 | 17 | 325 | 1x15+6x10+10x5=125 |
| | | ISP | 1 | 9 | 10 | 20 | | plus 200 for equipment and demonstration, etc. |
| | | LGED | 0 | 0 | 2 | 2 | | |
| | | MANCAPS | 1 | 1 | | | | |
| | Urban | M. Plan | 1 | 2 | 2 | 5 | 65 | 1x15+2x10+2x5=45 |
| | Planning | ISP | 0 | 2 | 2 | 4 | | plus 20 for drawing |
| | | LGED | 0 | 0 | 0 | 0 | | |
| | | MANCAPS | 1 | 1 | | | | |
| Design | Rural | M. Plan | 1 | 5 | 6 | 12 | 115 | 1x15+5x10+6x5=95 |
| | Infra. | ISP | 1 | 6 | 9 | 16 | | plus 20 for drawing |
| | | LGED | 0 | 0 | 2 | 2 | | |
| | | MANCAPS | 1 | 1 | | | | |
| | Water | M. Plan | 1 | 1 | 2 | 4 | 55 | 1x15+1x10+2x5=35 |
| | Resource | ISP | 0 | 2 | 2 | 4 | | plus 20 for drawing |
| | | LGED | 0 | 0 | 0 | 0 | | |
| | | MANCAPS | 2 | 1 | | | | |
| | QC | M. Plan | 1 | 2 | 7 | 10 | 70 | 1x15+2x10+7x5=70 |
| | | ISP | 1 | 2 | 7 | 10 | | |
| | | LGED | 0 | 2 | 0 | 2 | | |
| | | MANCAPS | 1 | 2 | | | | |
| HRD | HRD | M. Plan | 1 | 14 | 26 | 41 | 100 | in view of current space of 82sq.m |
| | | ISP | 1 | 16 | 31 | 48 | | many staff posted in districts |
| | | LGED | 0 | 9 | 0 | 9 | | |
| | | MANCAPS | 2 | 2 | | | | |
| CECW | CECW | M. Plan | 1 | 2 | 2 | 5 | 45 | 1x15+2x10+2x5=45 |
| | | ISP | 0 | 0 | 0 | 0 | | |
| | | LGED | 0 | 2 | 2 | 4 | | |
| | | MANCAPS | 1 | 1 | | | | |
| | Total | M. Plan | 9 | 35 | 59 | 103 | 830 | |
| | | ISP | 5 | 39 | 64 | 108 | | |
| | | LGED | 0 | 13 | 6 | 19 | | |
| | | MANCAPS | 10 | 11 | 0 | 21 | | |
| Total number of staff | | | | | | | Office Floor Space calculation | |
| Additional Chief Engineer: | | | 1 | | | | Unit space: in sq.m | |
| Superintending Engineer: | | | 2 | | | | ACE (40), SE (30), XEN (15), AE (10), SS (5) | |
| Executive Engineer: | | | 9 | | | | ACE: | 1x40=40 |
| Assistant Engineer: | | | 35 | | | | SE: | 2x30=60 |
| Supporting Staff: | | | 59 | | | | XEN, AE and SS 810 as above | |
| total | | | 106 | | | | expatriate expert | 6x10=60 |
| | | | | | | | total | 970 |

Mp2

CE JAFU CENTER MP-3

is estimated section wise staff by down sizing but providing one XEN for each section. The staff numbers 106 altogether including an ACE, 2 SE and 103 staff of XEN, AE and SS. This figure is less than the current figure by 15 considering that Add. C.E's office staff and the staff in CECW are not included in the current figure. $(108+19-6-106=15)$ In accordance with the set-up of the Center organization, there will be a need for a readjustment to the proposed organization by MANCAPS in respect of the retained wings and sections in HO. The new organization of LGED incorporating the Center is illustrated in Figure 2.

5.4 Budget

ISP budget earmarked under RESP III (1996-2000) amounts to US\$ 5.5 million for 4 years. 66% of the total is allocated for the cost of staff and consultants, 14% for training and the rest for equipment and contingencies. While ISP covers such areas which are not included in the Center as M&E, maintenance of infrastructure, finance and personnel, the Center covers such areas which ISP does not cover as CECW. Offsetting these areas above and assuming that current activities continue, US\$ 1.4 million (US\$5.5 million/4 years) should be earmarked as an annual budget of the Center. The amount, however, varies largely depending on the number of staff and their payment conditions. After the termination of ISP, the annual budget should be made available by any of possible means. One of possible ways is that the budget of the Center is met by the on-going LGED implemented rural development projects which amount to 24 in number with an annual budget of US\$ 183 million. The above amount can be met by them if 0.8% of their annual disbursement is appropriated. It is urged to establish an appropriate mechanism whereby necessary budget be ensured.

5.5 Construction site and Floor Space of the Building

5.5.1 Construction site

The Center building will be put up on the northern plot, adjacent to HO where belongs to LGED and is currently used as a vehicle repair shop. This plot shapes rectangular and measures 573 sq.m (15.0 m x 38.2 m). This area is nearly half the size of 1176 sq.m (22.8 m x 51.6 m) where HO building is standing. (Figure 3)

5.5.2 Floor Space

The necessary floor space was calculated for each facility based on the questionnaires. It was summed up to 3,188 sq.m in total including common space. They are shown in Table 5 in comparison with the current space occupied by relevant facilities in HO building.

Table 5 Floor Space

| Facilities | current space sq.m | necessary space sq.m | remarks |
|----------------|--------------------|----------------------|--|
| Office | 892 | 970 | as per Table 4 |
| Training Rooms | 34 | 280 | 2 main classes (100 each) and 4 syndicate rooms (20 each) |
| Library | 74 | 100 | increase by 35% |
| Dormitory | 0 | 390 | for accommodating 30 people (30x10), kitchen (40) and dining room (50) |
| Laboratory | 230 | 320 | increase by 39% |
| CECW | 0 | 490 | based on project proposal |
| net total | 1230 | 2550 | |
| Common space | 308 | 638 | 25% of above total including toilets, corridors, elevators, stairways, etc., |
| Grand total | 1538 | 3188 | |

In comparison with the current space in HO building, the net increase of space, excluding dormitory and CECW which are newly accommodated in the Center, is 440 sq.m. The total space of the Center, 3,188 sq. m exceeds the figure in the project proposal (2324 sq.m) by 864 sq.m about 37% .

Given the size of the construction site (573 sq.m) the building will consist of 6 floors. In terms of floor space, the HO building which holds 13,200 sq.m in total with 12 floors (average space for one floor is 1100 sq.m) is four times as big as the Center building. After shifting the planned functions to the Center, in the HO, approximately a full one floor space will be made available for use of new project offices or others purposes.

5.6 Provision of Equipment

Items of equipment with specification, quantity and cost were specified through a questionnaire to each section requesting to identify either new or replacement items. The summary of the procurement items is given in Table 6 by section. Detailed lists are attached in Appendix.

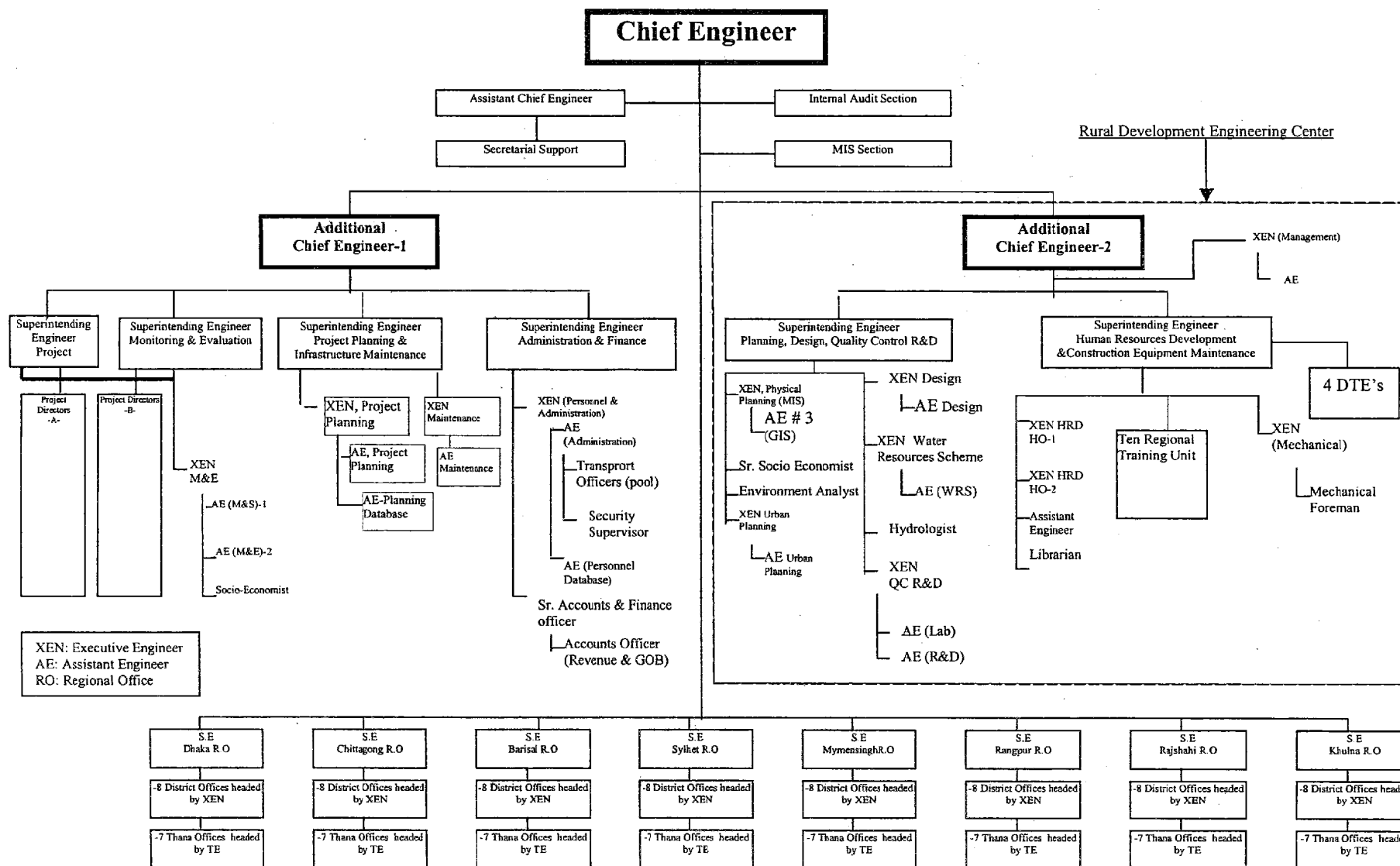
Table 6 Provision of Equipment

| | | cost: in US\$ '000 | |
|--|--------------------------------------|--------------------|---------|
| sector | main items | total cost | Remarks |
| Physical Planning | | 14 | |
| GIS | | 232 | |
| Infra. design | | 51.8 | |
| Water R. schemes | | 57.5 | |
| Q.C | material testing equipment | 393 | |
| HRD | computer teaching instrument | 182 | |
| CECW | machine maintenance and repair tools | 1000 | |
| Total one million nine hundred & thirty thousand US\$ only | | 1930.3 | |

Figure: 2

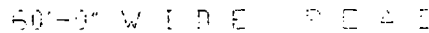
Proposed Organization for Local Government Engineering Department (LGED)

Including Rural Development Engineering Center, RDEC - Adjustment to MANCAPS Proposal



С. А. МАКИН

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5.7 Technical Assistance, TA

5.7.1 General

It is said that there is a salient difference of attitude between majority of organizations in Bangladesh and LGED. While most of organizations in Bangladesh focus on the various difficulties and constraints in getting the job done, LGED looks at how the things can be done whereby LGED has gained reputation for its excellent performances in rural infrastructure development. This attitude can be associated with the way in which LGED sees the glass as half full rather than half empty. While the above attitude of LGED toward the job execution should be highly commended, LGED will need to change the manner of seeing the glass, otherwise it will be left behind the new technology development and even it can be jeopardized even in maintaining of the current pace. This is especially true to the Center which accommodates comprehensive engineering functions is not allowed to live in its own shell but should be keen on technology development. There are several areas of technology where LGED could seek technical assistance from overseas together with strengthening technical cooperation with relevant institutions in Bangladesh.

5.7.2 Rural Planning

Physical planning section has completed a thana plan book for each of all 460 thanas in the country associated with a corresponding base map in collaboration with GIS section. However, there is a long way to go if these books become a real tool for rural development effectively used by the Thana Development Committee which is an authorized body to plan, implement and maintain rural infrastructure as well as by LGED field projects. In order to improve the thana plan books there is a need to prepare a union plan books which should be the base of the thana book. Given the extreme number of unions in the country most of which are not accessed by car and need for regular upgrading and updating it is necessary to have increasing interventions of LGED HO using its Thana offices on technical and financial support.

5.7.3 Design Standard

To speed up design process , more standard design on structures, a number of which are constructed by LGED projects like markets, primary schools cyclone shelters, small scale water control structures, structures related to urban development need to be prepared for universal use by projects. Like the standard on road structures, however these standard are being developed under certain projects focus of which tends to be put on the design for use of the project rather than for use in common. Moreover, there might be several options in the standard to be applied depending on local conditions regarding the capability of contractors and material availability. In this regard, it is requested to prepare such standard on various structures useful for projects based on widely collected models and information on local conditions.

5.7.3 GIS

So far, GIS function has produced digitised data in 13 layers and maps for all thanas. By aggregating the thanas under a district, now all the district base maps of computer print outs can be obtained as and when required. However as the scale of the map is so small as 1 to 72,000 (1 inch corresponds to 1 mile) there is a need to enlarge the scale, especially for union maps so that sufficient information for rural development planning can be made available. Further, in the hope that GIS be grown not only as a tool of LGED but also as a national tool, it should be stressed a need for widening applications for capturing data on flooded areas and cropped areas as well as improvement of accuracy.

5.7.4 Quality Control, QC

All rural infrastructure works under LGED field projects are requested to have sample materials tested at the district laboratory and receive the quality check on field. Due to this arrangement, quality of works has achieved significant improvement. Further LGED has developed new technologies such as aggregate sand soil used for road pavement and low cost reinforced concrete pile used for improvement of poor bearing capacity of sub-soil strata. Given a variety of soil characteristics spread around the country and materials availability from place to place, there are abundant requirements in research ranging from sub-soil and slope strengthening and stabilization to construction materials development.

5.8 Implementation Schedule

There is a strong common desire in LGED to have the Center constructed as early as possible. This arises based on several needs, i.e., need for more office and working space seen in HRD section in particular, need for new facilities like CECW and dormitory, need for more equipment and technical assistance common in all sections.

Taking other factors such as MANCAPS recommendations which need to be pursued, termination of ISP, which calls for a new system to be established, it is very opportune for LGED to have the Center in shortest span of time. As shown in Figure 3, assuming that the proposal of the Center is appraised by OECF in November 1998, the Loan Agreement signed at early stage in 1999, it is foreseen that without a gap after the Loan Agreement all pre-construction steps from issue of invitation to consulting firms, tender of consultancy to implementation of detailed design will be finished by the end of 1999. It will be followed by issue of invitation and tender for construction works at early part of year 2000 and the construction will be completed during the same year.

Prior to the completion of the building, some technical assistance should be made available from donors and JICA.

5.9 Project Cost Estimates

It is estimated the total cost at US\$ 4.2 million (Taka 188 million) which constitutes i) constancy cost as per Table 7 at US\$ 0.12 million (Taka 5.5 million), ii) building construction portion at US\$ 2.13 million (Taka 95.85 million) and as per Table 6, equipment portion at US\$ 1.93 million (Taka 86.85 million).

Table 7 Consultancy Cost Estimates

| Items | quantity | cost in '000 Taka | remarks |
|-----------------------------------|--|--|-----------------------------------|
| Detailed Design of the building | sub-soil survey architects an expatriate consultant sub-total | 120m x 5=600 2per x 3mons x 180=1080 1per x 2 mons x 500=1000 2140 | boring:4x30m=120m review of MP |
| Preparation of Contract Documents | a civil engineer an architect sub-total | 1 per x 2 mon x 180=360 1 per x 1 mon x 180=360 720 | |
| Construction Works Supervision | a civil engineer an architect a mechanical engineer sub-total | 2 per x 3 mons x 180=1080 2 per x 5 mons x 180=1080 2 per x 2 mons x 180=720 2080 | |
| Total | | 5480 | US\$ 122 thousand |

The cost for building construction was estimated based on an unit cost per sq.m incurred by the construction of the HO building. The building with the total floor space of 12,100 sq. m (1100 sq.m x 11 floors) was constructed for Taka 240 million in 1996/97 by a local contractor. This gave an unit cost as Taka 20,000 per sq.m. Taking inflation factor and disadvantage of economies of scale, it was assumed Taka 30,000 as the unit cost for the Center building. As a result, the building construction costs will amount to Taka 95.6 million (US\$ 2.13 million).

5.10 Risk Analysis

Since the Master plan is prepared i) based on proposals made by MANCAPS which have been accepted by LGED management, ii) involving of persons concerned through a broad and individual discussions in HO and iii) through a questionnaire to each section to be shifted to the Center, there would be no questions about the overall framework of the Center.

However, there are some factors which may affect the sustainability and effective use of the Center. The clearance of these factors is all depending on the decisions and actions by LGED top management.

5.10.1 Availability of staff and budget

Staff assigned to the Center

Given that the existing functions which are to be shifted to the Center are currently maintained by heavy inputs of human resources as technical assistant staff provided by ISP and the fact that ISP is phasing out in June 2000, how to maintain the current

functions is the critical concern. It is essential to make a plan to replace the technical assistant staff under ISP by several optional and supplementary means which include i) reduction of the current number of staff with retaining minimum key staff ii) increase of LGED core and/or reimbursable staff through deputation and iii) soliciting some new projects for sharing consultants' cost.

If the current assignment of staff provided by ISP; 117 people engaging in the various functions which are to be shifted to the Center is discontinued without substantive replacement, the impact could be so huge that no visible activities be continued on these functions in the Center.

Budget of the Center ensured

Based on the present scale of the budget under ISP as discussed in section 5.4, it is estimated that the annual budget will amount to US\$ 1.4 million, two thirds the amount is spent for staff and consultants. If LGED fails to take appropriate actions in personnel management and in establishing an appropriate mechanism to ensure the budget, the Center will face serious budgetary constraint in recruiting necessary technical assistant staff on consultant basis let alone management cost of the Center.

5.10.2 A robust linkage between the Center and LGED field projects/offices and LGIs established

It is crucial for the Center to establish a close and robust linkage with all LGED implemented projects/field offices as well as LGIs with a view to ensuring effective interventions of the Center on them. In order to ensure the linkage between them, each executive/assistant engineer in the Center, under the supervision of the Additional Chief Engineer, needs to carry out technical audit based on the delegated authority as and when required. If this linkage is not properly established and maintained, the Center will be gradually ignored by them resulting in the introduction of idle staff.

5.10.3 Facilities used effectively

Dormitory

It is planned to put a dormitory with accommodation for 30 people based on the request of HRD section. If training courses in the Center gathering LGED district & thana level officers are held very rarely the dormitory will lose economic viability.

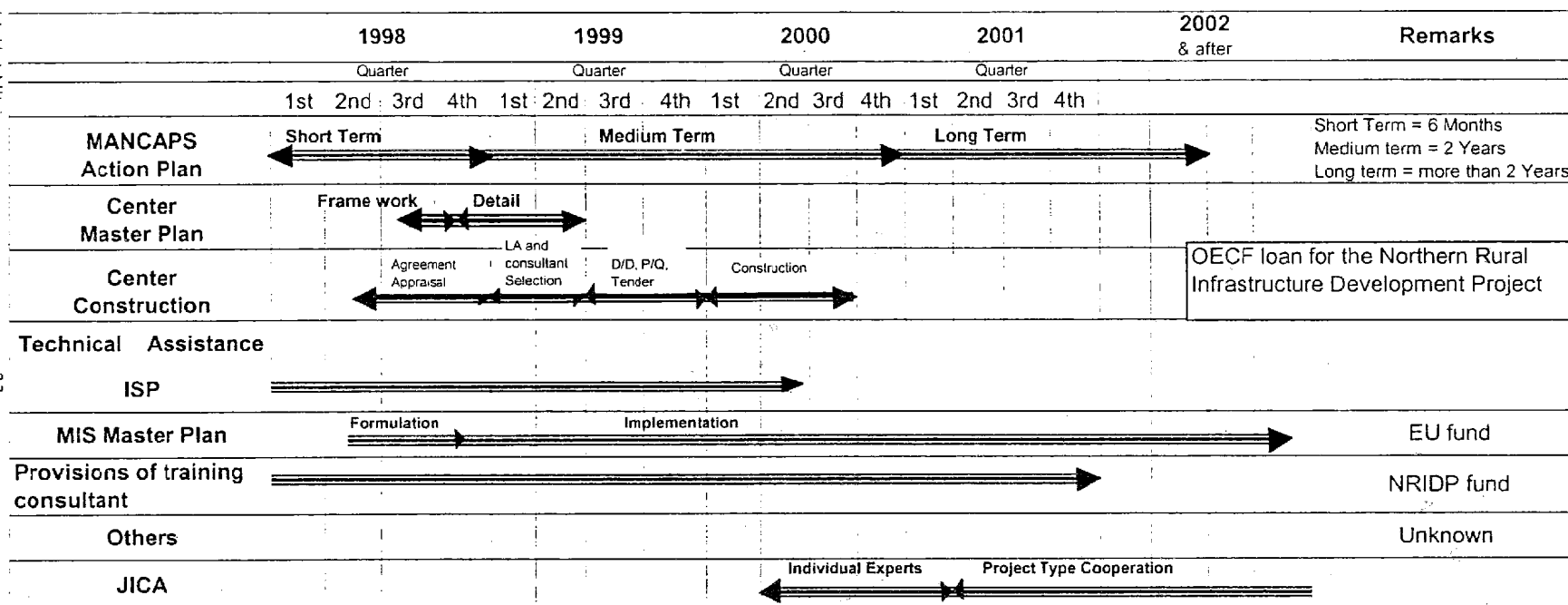
Construction Equipment Central Workshop, CECW

The workshop is to be included in the Center with a provision of costly equipment for repairing and maintenance of construction equipment. The prime objective is to train mechanical engineers and mechanics of LEGD staff posted in districts so as to enhance their mechanical skills and to have equipment kept under district offices maintained and repaired properly. If LGED district workshops in at least old districts offices (22 districts) are not well equipped and manned in time for some reasons as budget constraint, little

need for the district workshops due to availability of qualified local, private workshops the CECW will become an white elephant.

Figure 3

Time Horizon of Center Construction Project and Associated Activities



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Appendix: List of Equipment

Laboratory Section

| Sl. No. | Name of equipment | Specifications | Unit | Quan | Unit Price | | Total Cost | | Remarks |
|---------|--|----------------|------|------|------------|-------------|------------|------|---------|
| | | | | | Unit | (Lakh) | Unit | Cost | |
| 1 | Triaxial Assembly (Air control type) | | No. | 1 | Tk | 5.00 | | | |
| 2 | Automatic Recording system for Triaxial Test | | No. | 1 | | 3.00 | | | |
| 3 | Precision Motorized Compression Device | | No. | 1 | | 5.00 | | | |
| 4 | Recording for Unconfined Compression Test | | No. | 1 | | 3.00 | | | |
| 5 | Electric Proving ring (50 kgf) | | No. | 1 | | 0.75 | | | |
| 6 | Electric Proving ring (100 kgf) | | No. | 1 | | 0.80 | | | |
| 7 | Electric Proving ring (200 kgf) | | No. | 1 | | 1.00 | | | |
| 8 | Electric Proving ring (300 kgf) | | No. | 1 | | 1.25 | | | |
| 9 | Electric Proving ring (500 kgf) | | No. | 1 | | 1.40 | | | |
| 10 | Electric Proving ring (1000 kgf) | | No. | 1 | | 1.50 | | | |
| 11 | Consolidation Apparatus (6 units type) | | Set | 1 | | 7.00 | | | |
| 12 | Large Direct Shear Machine (type-B) | | No. | 1 | | 17.00 | | | |
| 13 | Electric Dial Gauge | | No. | 4 | | 0.40 | | | |
| 14 | Improved Direct Shear Apparatus | | No. | 1 | | 14.00 | | | |
| 15 | X-Y Recorder | | Set | 1 | | 4.00 | | | |
| 16 | Unit Type Constant Head Permeameter | | No. | 1 | | 8.00 | | | |
| 17 | Aspirator Set | | Set | 1 | | 3.00 | | | |
| 18 | Automatic Mechanical Compactor | | No. | 1 | | 4.00 | | | |
| 19 | Denver Type Consolidation Permeameter | | Set | 1 | | 1.00 | | | |
| 20 | Shrinkage Limit Set | | Set | 1 | | 0.50 | | | |
| 21 | Distilling Apparatus | | Set | 1 | | 1.00 | | | |
| 22 | Electronic precision balance (310g-1mg) | | No. | 1 | | 1.00 | | | |
| 23 | Electronic precision balance (3100g-1mg) | | No. | 1 | | 1.50 | | | |
| 24 | Trafficability Test Apparatus | | Set | 1 | | 1.50 | | | |
| 25 | Plate Bearing Set (three point type) | | Set | 1 | | 3.00 | | | |
| 26 | CBR/Marshall Laboratory set | | Set | 1 | | 5.00 | | | |
| 27 | Portable Cone Penetrometer | | No. | 1 | | 1.00 | | | |
| 28 | CBR Testing Set for Field Use | | Set | 1 | | 3.00 | | | |
| 29 | Oven (constant temperature) | | Set | 1 | | 1.50 | | | |
| 30 | Universal Testing Machine with Accessories | | No. | 1 | | 40.00 | | | |
| 31 | Muffle Furnace for determining the ash content of rubber bearing pad | | No. | 1 | | 4.00 | | | |
| 32 | Hardness Tester for Neoprene bearing pad | | No. | 1 | | 0.80 | | | |
| 33 | Chemical analysis test set for testing Neoprene bearing pad | | Set | 1 | | 1.00 | | | |
| 34 | Pile Integrity Tester | | Set | 1 | | 10.00 | | | |
| 35 | Computer with Printer | | Set | 1 | | 6.00 | | | |
| 36 | Digital Data Recorder | | No. | 1 | | 15.00 | | | |
| Total | | | | | Taka | 176.90 lakh | | | |

Training Section

| Name of Equipment | Specifications | Unit | Quant. | Unit Price | | Total Cost | | Remarks |
|--|---|------|--------|------------|-------|------------|------------|---------------------------|
| | | | | unit | Price | unit | Cost | |
| Laptop | IBM Pentium 233 MHZ, 64 MB RAM 3.2 GB HDD | No. | 2 | Lac | 2.00 | Lac | 4.00 | |
| Multimedia Projector | 3 M Brand MP- 8640 | No. | 2 | Lac | 2.00 | Lac | 8.40 | |
| Close Circuit Video Vecorder with TV | | No. | 1 | Lac | 2.00 | Lac | 2.00 | |
| Scanner | | No. | 1 | Lac | 1.00 | Lac | 1.00 | |
| Camera | Cannon | No. | 11 | Lac | 0.30 | Lac | 3.30 | 10 for DTC + 1 for TU HQ. |
| Computer | IBM Pentium | No. | 10 | Lac | 0.50 | Lac | 5.00 | for 10 DTC |
| Slide Projector | Reflector | No. | 10 | Lac | 0.30 | Lac | 3.00 | for 10 DTC |
| Photo Copier (Heavy duty) | Cannon | No. | 10 | Lac | 3.00 | Lac | 30.00 | 10 nos for 10 DTC |
| Microphone with recording system sound box | | No. | 1 | Lac | 1.00 | Lac | 1.00 | |
| OHP | 3 M | No. | 2 | | | | 1.00 | |
| Computer | Pentium 133 MHz 16 MB RAM, 1.2 GB HD | No. | 2 | | | | 1.00 | to be upgraded |
| Slide Projector | Reflector | No. | 2 | | | | 2.00 | |
| Photo Copier | Sherp, ST 2025 | No. | 1 | | | | 1.00 | |
| Video set: | | | | | | | | |
| 1. Vidieo Camera | Bentacom | No. | 1 | Lac | 10.00 | lac | 10.00 | |
| | Panasonic (M-9000) | No. | 1 | lac | 0.51 | | 0.51 | |
| | Panasonic (M-005) | No. | 1 | Lac | 0.3 | | 0.3 | |
| 2. Flash light with stand | Sun burnt) | | | | | | 0.05 | |
| 3. VCP for auditing | Panasonic MX Pro | No. | 1 | Lac | | | 0.74 | |
| Vidieo Deamy | | | | | | | | |
| Mixture | Sony | No. | 1 | Lac | | | 7.00 | |
| Audio set | | | | | | | 0.3 | |
| Total : | | | | | | Taka | 81.60 lakh | |

Construction Equipment Central Workshop

| Name of Equipment | Specifications (Model) | Unit | Quant. | Unit Price | | Total Cost | | Remarks |
|--|------------------------|------|--------|------------|-------|------------|------|---|
| | | | | unit | Price | unit | Cost | |
| CDM CHASSIS DYNAMOMETER | CDM - 1020 | | 1 | | | | | Provision for operation, Maintenance and Repairing of |
| IBS BRAKE SPEED COMBINATION TESTER | IBS - 3000 | | 2 | | | | | Provision for operation, Maintenance and Repairing of |
| SST-A SIDE SLIP TESTER (METER POST) | SST- 305 | | 2 | | | | | Provision for operation, Maintenance and Repairing of |
| HEADLIGHT TESTER | HLT-100 | | 2 | | | | | Provision for operation, Maintenance and Repairing of |
| ALTAS CO-HC EMISSION ANALYZER | ALTAS-100D | | | | | | | Provision for operation, Maintenance and Repairing of |
| GSM-2 DIESEL SMOKE METER (AUTOMATIC TYPE) | GSM-2 | | 4 | | | | | Provision for operation, Maintenance and Repairing of this equipment should be there. |
| HUNTER LITE-A-LINE WHEEL ALIGNER | 901AT | | 1 | | | | | |
| S-218 WHEEL BALANCER | S-Z18 | | 2 | | | | | |
| SICE TYRE CHANGER | S-401 | | 1 | | | | | |
| DIAL TYPE TIRE GAUGE | AD-104 | | 3 | | | | | |
| PRECISION TIRE PRESSURE GAUGE | 6-CH | | 3 | | | | | |
| TP TUBE VULCANIZER | TP | | 1 | | | | | |
| EA-ST-S EARTH STICK SET (TUBELESS TIRE REPAIR SET) | EA-ST-S | | 5 | | | | | |
| ONE PATCH (COLD PATCH) | S | | 5 | | | | | |
| VT VALVE CAP-REPAIR TOOL | VT-3 | | 2 | | | | | |
| BT PORTABLE BRAKE | BT-4 | | | | | | | |
| BRAKE CYLINDER POLISHER | ACP-6 | | 3 | | | | | |
| BC FLEX-HONE | BC-A | | 3 | | | | | |
| ETS-101 INTELLIGENCE ENGINE ANALYZER | ETS-101 | | 1 | | | | | |
| SE DIGITAL ENGINE TECHOMETER | SE-230 | | 2 | | | | | |
| CCO-2 & 3 COIL CONDENSER | CCO-3 | | 2 | | | | | |
| | | | | | | | | |

| Name of Equipment | Specifications (Model) | Unit | Quant. | Unit Price | | Total Cost | | Remarks |
|---|------------------------|------|--------|------------|-------|------------|-------------|---------|
| | | | | unit | Price | unit | Cost | |
| IVA-2 IGNITION VOLT AMPERE TESTER | IVA-2 | | 2 | | | | | |
| VAR-2 VOLT AMPERE REGULATOR TESTER | VAR-2 | | 1 | | | | | |
| RT-2B REGULATOR TESTER | RT-2B | | 1 | | | | | |
| UCT-1 UNIVERSAL CIRCUIT TESTER | UCT-1 | | 2 | | | | | |
| DH-3207 DIGITAL POCKET HI TESTER (CIRCUIT TESTER) | DH-3207 | | 2 | | | | | |
| BATTERY QUICK CHARGER | HR-MAX 100 | | 1 | | | | | |
| SPC-7 SPARK PLUG CLEANER TESTER | SPC-7 | | 2 | | | | | |
| SPC-11 SPARK PLUG CLEANER | SPC-11 | | 2 | | | | | |
| SPV-3 SPARK PLUG & BATTERY TESTER | SPV-3 | | 2 | | | | | |
| BATTERY TESTER | BC-4 | | 2 | | | | | |
| PLASTIC GAUGE | PG-1 | | 5 | | | | | |
| ST VALVE & CLUTCH SPRING TESTER | ST-120 | | 1 | | | | | |
| VFT-2 VACUUM & FUEL PUMP TESTER | VFT-2 | | 2 | | | | | |
| DVG-1 DUAL VACUUM GAUGE | DVG-1 | | | | | | | |
| ACT-3 AIR CLEANER ELEMENT TESTER | ACT-3 | | 2 | | | | | |
| CBT-R CARBURETOR BALANCER | CBT-R | | 2 | | | | | |
| RCT-2 RADIATOR CAP & COOLING SYSTEM TESTER | RCT-2 | | 2 | | | | | |
| T-500S FUEL CONSUMPTION GAUGE | T-500S | | 3 | | | | | |
| M-1 SOUND SCOPE | M-1 | | 2 | | | | | |
| TX-1000 DIGITAL THERMOMETER | TX-1000 | | 2 | | | | | |
| CCA COLOR CHECK (FLAW DETECTOR) | 41809 41810 | | 5 | | | | | |
| S-21 INJECTOR TEST UNIT | S-21B | | 2 | | | | | |
| Total: | | | | | | | 0.00 | |

| Name of Equipment | Specifications (Model) | Unit | Quant. | Unit Price | | Total Cost | | Remarks |
|---------------------------------------|------------------------|------|-----------|------------|-------|------------|------|---------|
| | | | | unit | Price | unit | Cost | |
| S-11A UNIVERSAL NOZZLE CLEANER | S-11A | | 2 | | | | | |
| DCG-U DIESEL COMPRESSION GAUGE | DCG-U | | 2 | | | | | |
| TRT-D2 DIESEL TIMING RPM TESTER | TRT-D2 | | 2 | | | | | |
| 2607B PHOTO TACHOMETER | 2670 | | | | | | | |
| OIL SUPPLY PUMP | OPG-1 | | 2 | | | | | |
| STAND TYPE OIL BUCKET | STB-50 | | 2 | | | | | |
| OIL FILTER WRENCH | NT-5 | | 1 | | | | | |
| BLACKHAWK 20-TON PORTO-POWER SET | TZ-20 | | 1 | | | | | |
| BLACKHAWK 20-TON PORTO-POWER UNIT | P-76 | | 11 | | | | | |
| SW-8000DX SPOT WELDER | SW-8000DX | | 1 | | | | | |
| GW-11 GAS-WELDER SET | GW-11 | | 2 | | | | | |
| WELDING TORCH | A1 | | 2 | | | | | |
| CUTTING TORCH | No.1, No.2 | | 2 | | | | | |
| OXYGEN & ACETYLENE PRESSURE REGULATOR | OXYGEN No. 1 | | 4 | | | | | |
| AIR ORBITAL SANDER (W/DUST COLLECTOR) | SAT-75 | | 2 | | | | | |
| PO ELECTRIC ROLISHER | PO-125S1 | | 2 | | | | | |
| CM-50 CARLMAHR TYPE CYLINDER GAUGE | CM-50 | | 2 | | | | | |
| PHT-3 AIR-HYDRO RIVETTER | PHT-3 | | 2 | | | | | |
| OC AUTO CRANE | OC-H-500 | | 1 each | | | | | |
| HYDRAULIC GRAGE JACK | RJ-50 | | 3 | | | | | |
| HP HYDRAULIC PRESS | HP-35Y | | 1 | | | | | |
| R PORTABLE HYDRAULIC JACK | R050-A1 | | 2 of each | | | | | |
| RMC MAT CLEANER | RMC-601 | | 2 | | | | | |
| VACUUM CLEANER | JE-48 A-5 | | 2 | | | | | |
| PC PARTS CLEANER | PC-3 | | 2 | | | | | |

| Name of Equipment | Specifications (Model) | Unit | Quant. | Unit Price | | Total Cost | | Remarks |
|---|------------------------|------|--------|------------|-------|------------|------|---|
| | | | | unit | Price | unit | Cost | |
| CP-740-TL-2 TORQUE LIMITED AIR WRENCH | CP-740-TL-2 | | 1 | | | | | |
| U BOLT SOCKET IMPACT WRENCH | 3/4 WAU (22-50) | | 1 | | | | | |
| ELECTRIC DRILL | DR-6S3 | | 2 | | | | | |
| PRESER TYPE TORQUE WRENCH WITH GRAUATIONS | 600L | | 1 | | | | | |
| DIAL INDICATING TYPE TORQUE WRENCH | 60DB | | 205 | | | | | |
| INTERCHANGEABLE HEAD TORQUE WITH INTERCHANGEABLE HEAD | ALL TYPE | | 1 set | | | | | |
| D TORQUE WRENCH TESTER | ALL TYPE | | 1 | | | | | |
| VERNIER CALIPER WITH DEPTH | ALL TYPE | | 2 or 5 | | | | | Digital meeting wide range |
| OUTSIDE MICROMETER | ALL TYPE | | 2 or 3 | | | | | Digital meeting wide range |
| FIRM - JOINT CALIPER | ALL TYPE | | 1 | | | | | |
| W CONVEX RULE | ALL TYPE | | 3 | | | | | |
| THICKNESS GAUGE | ALL TYPE | | 2 | | | | | |
| FEELER GAUGE | ALL TYPE | | 2 | | | | | |
| MECHANIC GAUGE SET | TGZ-1818 | | 2 | | | | | |
| MAGNETIC BASE | MB-B | | 2 | | | | | |
| AIR HOSE | ALL TYPE | | 2 | | | | | |
| HOSE BAND | ALL TYPE | | 2 | | | | | |
| AV AIR COCK & STOP VALVE | ALL TYPE | | 4 | | | | | |
| AHJ AIR HOSE JOINT | ALL TYPE | | 2 | | | | | |
| BV BENCH VICE | ALL TYPE | | 4 | | | | | |
| GL-10R GARAGE LAMP | GL-10R | | 5 | | | | | |
| COMPUTERIZED AUTOMATIC CAR WASHER | DUAL-ZW | | 1 | | | | | Provision for operation, Maintenance and Repairing of |
| MW HOT WATER HIGH PRESSURE CAR WASHER | MW-700 | | 1 | | | | | |
| SC-400N STEAM CLEANER | SC-400N | | | | | | | |
| | | | | | | | | |

| Name of Equipment | Specifications (Model) | Unit | Quant. | Unit Price | | Total Cost | | Remarks |
|------------------------------------|------------------------|------|---------|------------|-------|------------|------|---------|
| | | | | unit | Price | unit | Cost | |
| CJ SUPER HI-PRESSURE CAR WASHER | CJ-130 | | 2 | | | | | |
| CM CAR WASHER | CM-2 | | 1 | | | | | |
| EC-ENGINE CLEANER | ALL TYPE | | 1 | | | | | |
| AIR GUN | ALL TYPE | | 2 | | | | | |
| AIR COMPRESSOR FOR PAINT SPRAY | SU-07NBR | | 4 | | | | | |
| RIGID JACK | ALL TYPE | | 15 UNIT | | | | | |
| PORTABLE SCREW JACK | ALL TYPE | | 5 UNIT | | | | | |
| COMPRESSION GAUGE FOR GASOLINE CAR | G-4C | | 2 | | | | | |
| | | | | | | | | |

GIS Section

| Name of Equipment | Specifications | unit | Quant. | Unit Price | | Total Cost | |
|----------------------------|----------------|------|--------|------------|-------|------------|---------------|
| | | | | unit | Price | unit | Cost |
| Computer | Pentium - II | No | 20 | US\$ | 1200 | US\$ | 24000 |
| Note book computer | Pentium - II | No | 5 | US\$ | 4000 | US\$ | 20000 |
| Printer | | No | 10 | US\$ | 1800 | US\$ | 18000 |
| Magellan GPS Pro Mark X-CP | | No | 50 | US\$ | 3000 | US\$ | 150000 |
| Large Scanner | | No | 1 | US\$ | 20000 | US\$ | 20000 |
| Total | | | | | | | 232000 |

Physical Planning Sections

| Name of Equipment | Specifications | unit | Quant. | Unit Price | | Total Cost | |
|---------------------------------|----------------|------|--------|------------|-------|------------|--------------|
| | | | | unit | Price | unit | Cost |
| Computer | Pentium -II | No | 1 | US\$ | 1200 | US\$ | 1200 |
| Monitor | | No | 1 | US\$ | 800 | US\$ | 800 |
| Printer | | No | 3 | US\$ | 1800 | US\$ | 5400 |
| UPS | | No | 1 | US\$ | 600 | US\$ | 600 |
| Photocopier | | No | 1 | US\$ | 2500 | US\$ | 2500 |
| Composit Colour Scanner-printer | | No | 1 | US\$ | 3500 | US\$ | 3500 |
| Total | | | | | | | 14000 |

Design Sections

| Name of | Specifications | unit | Quant. | Unit Price | | Total Cost | |
|--|---------------------|------|--------|-------------|-------|-------------|---------------|
| | | | | Unit | Price | Unit | cost |
| Computer 4 Nos with accessories | Pentium -II | No | 4 | US\$ | 2500 | US\$ | 10000 |
| Printer | Dot Matrix | No | 2 | US\$ | 900 | US\$ | 1800 |
| Printer | Ink jet | No | 1 | US\$ | 2000 | US\$ | 2000 |
| Version Software for 10 users | | | | | | | |
| | | | | | | | |
| Autocad | | | | US\$ | | US\$ | 30000 |
| Stadd III | | | | US\$ | | US\$ | 4000 |
| Autolisp | | | | US\$ | | US\$ | 4000 |
| Total | | | | | | | 51800 |
| Equipment & software's for Hydraulic analytical unit for the design of water resources | | | | | | | |
| Windows MT | | | 1 | US\$ | 1000 | US\$ | 1000 |
| HPSF | | | 1 | US\$ | 500 | US\$ | 500 |
| Hydraulogical real time simulation package for small drainage basins | | | 1 | US\$ | 500 | US\$ | 500 |
| MIKE 11 with GIS ARCINFO | | | | US\$ | 20000 | US\$ | 20000 |
| Two dimensional hydraulic simulation models RMA 2, TABS | | | | US\$ | 500 | US\$ | 500 |
| Computers | Reasonably Powerful | | 5 | US\$ | 5000 | US\$ | 25000 |
| Plotter | | | 1 | US\$ | 5000 | US\$ | 5000 |
| Scanner | | | 1 | US\$ | 5000 | US\$ | 5000 |
| Total | | | | | | | 57500 |
| Grand Total | | | | US\$ | | US\$ | 355300 |

3. 在バングラデシュ日本大使館からの報告（抄）

本件（農村開発技術センター設立計画）要請プロジェクトは、下記の通り我が国援助重点分野である農業・農村開発を推進するために必要な技術協力と思料されるところ、採択に向け前向きに御検討願いたい。

当国の人口の8割（GDPに占める第一次産業の割合は約26％）が農村部に居住しており、その大半が農業及び関連産業に従事しているが、その半数が土地無し農民である。そのため、農村地域においては、農業の発展及び農業以外の産業の育成を通じて、農村地域開発及び貧困緩和を行うことが、同国の経済成長をはかる上で重要な課題となっている。しかし、発展の基盤となる農村部の道路、市場、灌漑施設等農村インフラの整備が遅れており、農村部内あるいは都市と農村部との経済活動を図る上でのボトルネックとなっている。こうした認識からバ政府は、農村地域のインフラ整備に対し、高いプライオリティを置き、積極的に事業を推進している。本事業を推進しているのが、地方自治・農村開発

・協同組合省傘下の地方政府技術局（LGED）であり、農村部の基礎的農村インフラ整備、即ち、市場／集・出荷場、農村道路／付随する農道橋、小規模灌漑施設等に係る計画、工事及び維持管理を実施している（なお、他省庁からの受託事業として、小学校／船着場、地方都市の上下水道、衛生設備等も実施している）。

LGEDは、これまで培ってきた実績により比較的優秀な技術者、豊富な予算と経験を有しているが、当国農業・農村開発に必要な農業基盤整備をさらに効率的に実施し、事業の質的向上を図るために我が国に対して技術センター設立に係るプロジェクト方式技術協力の要請をしてきた。

なお、技術移転活動のために必要とされる施設は、有償資金協力（北部農村インフラ整備事業の1コンポーネント）の中で手当されることとなっており、我が国の技術協力と資金協力の連携案件として有意義なプロジェクトであると思料する。（了）

平成 11 年 9 月

バングラデシュ農業開発技術センター
プロジェクト方式技術協力に係る基本的な考え方

JICA バングラデシュ事務所

1. 貴電における問い合わせの「農村開発に絞るべきか」「社会開発というより幅広い視点で行うべきか」の点については、「社会開発」を比較的大規模な上下水道施設の建設、幹線道路建設とそのための建設機械運営維持管理、洪水対策、学校施設の計画策定と建設、流通計画と市場の建設といった、いわゆる社会開発分野と定義した場合、つまり「農村開発」、「社会開発」をセクター或いは対象技術の内容といった狭義に捉え、「農村開発」は農業技術のみを対象とし、農村における社会開発としては捉えない場合、LGED は、かかる政策及び計画策定、施設建設は対象としておらず、あくまで農村規模で必要な農道、小規模灌漑施設、他省庁から委託を受けて実施する小学校、役所等の建設を対象としており、この中で本件プロジェクトは「農村開発」を対象とするプロジェクトであると言える。
2. 他方、当国の「農村開発」においては、地方村落の様々なセクター開発を、それぞれの省庁、機関が実施しているものの、実質的には村落の規模、農業従事人口の割合等から地方開発＝村落開発＝農村開発である部分が大きく、LGED が果たす役割は非常に大きく、もって LGED の『農村開発技術センター』はセクターとしては狭義の農業を越えたセクターの技術を対象としている。
3. さらに、地方開発＝村落開発＝農村開発という図式の中で、LGED 『農村開発技術センター』は開発技術の支援を行うものではあるが、農村開発においては、貧困撲滅を大目標に、ジェンダー、環境といった課題を必須要素として取り組むことが不可欠であり、このため、広義の意味の社会開発の視点が各技術分野に求められることは言うまでもない。特に当国においては、絶対貧困人口が集中する農村部の開発は最優先課題であり、これは単に技術の改善のみでは解決できず、インフラを中心とした事業を担う LGED にも当然かかる視点を入れたアプローチ、技術の開発、適用が求められており、本件プロジェクトの協力においても不可欠な要素である。

4. 『農村開発技術センター』において、我が国プロジェクト方式技術協力要請のある本件プロジェクトは、右センターのすべての分野についてを対象とするものではなく、同センターの基幹をなす、農業を基盤とする農村の開発に必要な部分についてが絞込まれ、技術協力要請があったものであるが、これらの分野は上記の背景から当国の農業開発の特殊性を反映しているものであるとも思料され、本件プロ技の内容検討に際しては、当国の農業開発にもっとも適した協力範囲、内容、方法等が検討される必要があるものと思料する。
5. このため、右について、今次基礎調査では、『あり得るべきセンターの機能を検討・確認した上で』、その必要性、妥当性、詳細内容について、「社会開発的視点」も十分考慮した調査を期待する。
6. 加えて、本件プロ技においては特に、個々の技術分野の協力のみならず、新しく設置される農村開発技術センターの運営（Institution Building）についての強力な指導力が求められるものと思料され、基礎調査においては、右についても十分調査の上、プロ技のスコープとして検討いただくことが効果的なプロジェクトの策定に重要であると思料する。

以上

5. バングラデシュ側からのレター類

Government of the Peoples Republic of Bangladesh
Local Government Engineering Department
LGED Bhaban, Agargaon
Sher-e-Bangla Nagar, Dhaka-1207

Date: October 27, 1999

Memo No: LGED/PD/RDP-21/

Mr. Shindo
JICA Headquarter, Tokyo, Japan

Re: Forwarding of Manuals and Guidelines prepared by LGED

Dear Mr. Shindo,

I am pleased to hear that JICA is planning to send a preliminary study mission on a JICA Technical Assistance Program, i. e., Project Type Technical Cooperation Project (PTTCP) to the Rural Development Engineering Center (RDEC), LGED.

As far as I became to know, the mission will be vested with important tasks in assessment of an overall mandate assigned to and corresponding activities undertaken by LGED in order to come up with prospective functions of RDEC. The mission will further go on to identify relevant technical areas that are to be supported under PTTCP.

In recognition of critical importance of the mission in opening discussions with us, I am fully prepared for exchanging views as well as provision of any information and documents that you want to obtain.

In view of time constraints envisaged for the mission in Bangladesh, I wish herewith to send you relevant technical documents prepared and utilized by LGED for your perusal in advance.

I hope these will help you understand our current performance and further needs for development and improvement of our technical capacity for the betterment of rural societies in Bangladesh.

I would like to inform that we are providing you with a paper for discussion with the mission on issues to be focused together with their supporting information. I wish the paper will reach you well in advance to your departure.

Should you wish to have anything before departure, please feel free to contact me by e-mail: tridp@bangla.net addressing Mr. Wahidul Rahman, PD-RDP 21.

I am looking forward to hearing the finalized schedule so that we can arrange meetings and field tours accordingly.

With best regards,

Shahidul Hassan

Additional Chief Engineer, LGED

c.c Chief Engineer, LGED
Mr. Wahidul Rahman, RDP-21, LGED
Mr. Y. Suzuki, Technical Adviser to LGED, JICA Expert
Mr. Ito, Deputy R. R. JICA Bangladesh Office
Mr. Sudo, Program Officer, OECF Dhaka Office

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List of Documents included in the package

Planning related Documents

- Thana Plan Book
- Manual on Land and Water Use Planning, 1998
- Guidelines on Environmental Issues Related to Physical Planning, 1994
- Manual for Growth Centre Planning, 1995
- Beneficiaries' Participation in Planning, Development, Operations and Maintenance of Growth Centres, 1998

Design Documentation

- Road Structure Design Manuals (Part B: Standard Design), 1998
- Road Pavement Design Manual, 1999
- Appraisal and SIEE (Summary Initial Environmental Evaluation) Overview Report, 1998
- Training on Subproject Engineering, SSWRDSP, 1999

Project Implementation related Documents

- Standard Specifications for Feeder Road Type-B & Rural Road Type-R1 under LGED, 1999

Quality Control related Documents

- Quality Control Manual, 1998

Maintenance related Documents

- Guidelines for the Maintenance of Rural Infrastructure, May 1999
- Manual for Road Condition Surveys and Detailed Visual Inspections, 1998

Project Evaluation related Documents

- Guidelines for Effect Monitoring and Evaluation (EME) of Road and Market Improvement, 1999
- An Evaluation of Amgram Ecological Village, 1999

Human Resources Development related Documents

- Issues related to Institutionalizing the LGED Training Unit, 1999
- Basic Computer Training for Assistant Engineer (AE)/Thana Engineers (TE), 1999

Policy related Documents

- Rural Infrastructure Strategy Study, World Bank, 1996

Technical Database

- User's Manual for Road & Structure Database Management System-III, 1999
- Standard Design Catalogue, Small Scale Water Resources Development Sector Project, 1998

Others

- Model Planning and Implementation Guidelines for Infrastructure Development Project, 1995
- Annual Progress Report 1 July 1998-30 June 1999, Rural Employment Sector Programme III (RESP-III), 1999
- Compilation of the Financial and Accounts Manual for LGED, 1999

Government of the People's Republic of Bangladesh
Local Government Engineering Department
Rural Development Project-21
LGED Bhaban, Level-12
Agargaon, Sher-e-Bangla Nagar
Dhaka-1207.

Memo. no. LGED/RDP-21/JICA-PTTCP/98/2947

Dated. 18.11.99

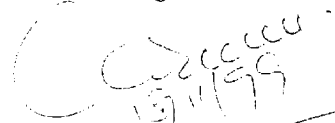
To,
Mr. Takeki Ishida
Second Secretary
Embassy of Japan
Gulshan, Dhaka.

Subject: A Discussion paper with JICA Preliminary
Study Mission on JICA Technical Assistance
to Rural Development Engineering Center
(RDEC) in LGED

Dear Mr. Ishida,

I am pleased to send herewith a copy of Discussion paper with
JICA Preliminary Study Mission visiting Bangladesh from Nov. 20
to 26, 1999 in connection with JICA Technical Assistance to
Rural Development Engineering Center (RDEC) in LGED for your
kind information and necessary action.

With best regards.


(Md. Wahidur Rahman)

Project Director NRIDP (RDP-21)

Cc to:
✓ Mr. Y. Suzuki, Technical Adviser, JICA

At Dto. JICA

**Discussion Meeting with JICA Basic Study Mission in connection with Rural
Development Engineering Center**

Date: 21.11.99

**Venue: LGED Bhaban,
Agargaon, Level -4**

Dhaka

Time: 12-15 PM

List of Participants

| Sl .no | Name and Designation | organization |
|--------|--|---------------------------|
| 1. | Mr.Md. Ataullah Bhuiya, Add. Chief Engineer | LGED |
| 2. | Mr. Md. Shahidul Hasan , Add. Chief Engineer | LGED |
| 3. | Md. Abdul Karim, SE & PD MSP | LGED |
| 4. | Md. Akund Habidul Alam SE (Maint) | LGED |
| 5. | Mr. Tofazzal Hoque SE (Admin) | LGED |
| 6. | Mr. Soraj Kumar Sarkar SE (Planning) | LGED |
| 7. | Md. Nurul Islam PD SSWRDSP | LGED |
| 8. | Mohed. Azizul Haque, PD, RDP-11 | LGED |
| 9. | Mr. Abdus Shahid, PD-18 | LGED |
| 10. | Mr. Hyder Ali, PD - 480 | LGED |
| 11. | Mr. Jahingir Alam -PD, Low cost Bridge/Culvert) | LGED |
| 12. | Mr. Sabbir Ahamed , XEN , Mech | LGED |
| 13. | Mr. Y. Suzuki, Technical Adviser | JICA, |
| 14. | Mr. Tariqul Islam, Sr. GIS Specialist | LGED |
| 15. | MR. H.R. Akanda Mangement Consultant | ISP |
| 16. | Mr. Abul Quasem , Team Leader | ISC,RDP-21 |
| 17. | Mr. Mostafa Hossain , TC | ISP |
| 18. | Mr. A.H. Shafiqur Rahman , PPC | ISP |
| 19. | Mr. Wahiduddin, Laboratory Consultant | ISP |
| 20. | Mr. S.A. Shahadat , Media Consultant | ISP |
| 21. | Mr. Moksed Alam Design Specialist | ISP |
| 22. | Mr. Akram Consultant | SSWRDSP |
| 23. | Mr. Eklimur Reza , Water Structure Design Consultant | ISP |
| 24. | Mr. Oyvind Hondrom , PMA (スウェーデン) | RDP-21 Rural Dev. Pg. 213 |
| 25. | Mr. Kaneko, Maintenance specialist (日本) | RDP-21 |
| 26. | Mr Badiuzzaman ,MIS | RDP-21 |
| 27. | Mr. Syed Mohitul Islam, Maint. Specialist | ISP |
| 28. | Mr. Dick Lundbeng, Senior adviser (スウェーデン) | ISP |
| 29. | Mr. HerbWieb + Team Leader (オランダ) | SSWRDSP JICA 6/2/98 (ADB) |
| 30. | Mr. Walther Warnaar , MIS Adviser (オランダ) | IFADEP Final Act (EC) |

A Discussion Paper
with JICA Preliminary Study Mission
on JICA Technical Assistance
to Rural Development Engineering Center (RDEC) in LGED

Project Type Technical Cooperation Project (PTTCP)

November 1999

Local Government Engineering Department
Ministry of Local Government, Rural Development and Cooperatives
People's Republic of Bangladesh

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I Introduction

1. According to the official request for Project Type Technical Cooperation Project (PTTCP) to the Rural Development Engineering Center (RDEC), JICA is planning to dispatch a preliminary study mission to Bangladesh from November 19, 1999.
2. The mission is expected to conduct an overall study around RDEC through discussions with relevant officers in the Ministry as well as LGED and collect information covering broad areas related to RDEC including its objectives and functions, building construction plan and requested technical assistance to JICA.
3. The study aims at preparation of a comprehensive report to be discussed at the cross-ministerial coordination committee in order to make a decision whether the TA project is taken up.
4. Once the committee has decided to support the project, JICA will take further steps with a view to working up a detailed action plan including a draft Record of Discussion (R/D) to be signed between JICA and LGED. In this context, as the forthcoming mission is of significant importance in determination of the future of the requested PTTCP.
5. An overall framework of RDEC has already been firmed up in the Master Plan on RDEC Construction Project (hereinafter referred to as the Master Plan) in terms of objectives of setting up RDEC, envisaged institutional framework, functions to be assumed and the layout of the building.
6. Regarding the RDEC building construction, evaluation of offers submitted by prospective local consulting firms is under way and the contract on the detailed design and construction supervision will be concluded shortly. In respect of this, the arrival of the JICA mission is very timely in availing ourselves of the opportunity to discuss overall framework of RDEC as well as pave a way to the JICA's technical assistance (PTTCP).
7. In view of a short stay of the mission in Bangladesh, relevant documents have already been forwarded to the mission and this paper was prepared to facilitate fruitful discussions and lead to favorable conclusions.

II Background of Setting up RDEC

Technical supporting mechanism developed in LGED

8. All through the course of expansion of rural infrastructure development, LGED has strenuously been putting stress to ensure quality works through efficient project implementation. Besides the physical development, under a complex nature involved in the community level texture, LGED has also been making continuous efforts for ensuring sustainability of the project by raising local awareness and encouraging beneficiaries' participation.

9. In recognition of a need for a strong technical support mechanism, LGED has continued rigorous efforts. Thanks to the substantive support of ISP¹ and other projects like RDP-21 and IFADEP, LGED HO has come to have a strong technical basis consisting of the following 10 technical units. (for details see attached Overview of the Technical Supporting Units in LGED).
- Policy Development Support (PDS) Unit
 - Human Resources Development (HRD) Unit
 - GIS, Mapping and Database (GIS) Unit
 - Physical Planning (PP) Unit
 - Technical Design Unit
 - Quality Control (QC) Unit
 - Maintenance Unit
 - Computer and Management Information System (MIS) Unit
 - Evaluation and Monitoring (E&M) Unit
 - Financial Management & Audit (F&A) Unit
10. In addition to the technical support on specific fields, LGED is conducting a variety of training courses with an aim to strengthening human capacities of LGED and LGIs staff. Moreover, LGED is keen on development of computerized management and information systems such as project progress monitoring and evaluation, personnel management information.
11. Moreover, LGED has a plan to establish workshops for maintenance of construction equipment at 20 greater district offices to ensure appropriate maintenance of LGED owned equipment fleets with assistance of the Central Workshop to be established in RDEC.²
12. While these achievements above mentioned have significantly improved LGED's performance of rural infrastructure development, they still seem a long way to go and there remains a lot to be done.
13. Further, it should be noted that above units are functional under heavy inputs of local consultants provided by the projects. In accordance with the recommendation of MANCAPS, i.e. "Reduce the need for donor support of LGED's own functions as is now the case with ISP", LGED is moving forward to take over the current functions and institutionalize them within LGED by posting GoB staff as many as possible. However, since such functions which require special skills and expertise like development of technical tools and introduction of new systems still need outside

1. ¹ Institutional Support Project (ISP) started under Sida funded Rural Employment Sector Programme (RESP) from Phase II (1990-96). Now Phase III is on going up to June, 2000. While ISP has undergone several changes to its focus from the onset, it has continued activities with a focus on strengthening of technical capacity of LGED and developing of human resource.

support, LGED is soliciting the donor agencies to extend their support over the expected date of project termination.

Recommendations of MANCAPS

14. According to the final report prepared under ADB funded project; Management Capability Strengthening Project (MANCAPS) that evaluated the achievement of LGED in 1996-98, it was indicated that LGED should go further with an attitude of seeing the glass is half empty but half full.
15. This is true in many aspects. Taking human resources development for instance, given a huge number of LGED staff, over 9000 in the country plus more people in LGIs, training of them should be regarded as a continuous work. When it comes to rural infrastructure development, in view of a variety of rural infrastructure to be constructed, upgraded and maintained (FRB, drainage structures, GCs, etc.), multiple steps included in the project cycle (planning, scheme selection, implementation, monitoring & evaluation) and complex approaches requested (income generation, gender issues and environment) towards the ultimate goal (poverty alleviation) it would require further endeavor.
16. The recommendations made in the MANCAPS final report included as follows.
 - Develop the Head Office organization to make it contain those functions, which are necessary for the systematic management and professional support of the strong field organization.
 - Reduce the need for donor support of LGED's own functions as is now the case with ISP
 - Reduce the top-level management span
 - Develop management skills at all levels to make them fully competent for their jobs and consequently delegate appropriate responsibility and authority from top management.
 - Improve the professional competence of the staff and management to make it possible for them to take full responsibility for their assignments
 - Develop and introduce a Management Information System (MIS) in order to support systematic management at different levels
 - Enhance human resource development by establishing a special unit for that at Head Office with responsibility for training under long term strategy
 - Strengthen the planning function
 - Develop and put into practice proper project management and monitoring system
 - Reduce the differences of planning approach and design between projects through standardization

² In the discussion based on the Office Memorandum dated on October 25, 1998, Mr. Shahidul Hassan, Add. Chief Engineer, LGED assured that in each old district a workshop would be established. In this regard, establishment of the Central Workshop in RDEC became essential.

- Strengthen technical support to LGIs and enhance participation and dialogue with local communities
- Develop the systems and organization for financial management including an unified budgeting, accounting system, fund management and internal audit.
- Improve the private sector participation by supporting the evolution of stronger and independent contractors and actors in maintenance of equipment and infrastructure, etc.
- Strengthen the activities relating to socio-economic and environmental issues concerning infrastructure development
- Strengthen the issues of beneficiary participation and cooperation with NGOs/CBOs in respect of infrastructure development activities
- Continue emphasis on growth centre approach as a part of the rural development strategy of the country
- Increase use of local materials and resources by using more appropriate labor intensive technologies and techniques.
- Becoming possible by training of LGED/LGIs staff, developing planning and designing tools, introduction of effective management systems and adjusting organizational structures. Specifically, a number of training courses have been conducted every year, manuals and guidelines prepared, planning data made available in association with relevant physical facilities development including training class rooms, computer system and quality control laboratories.

Establishment of RDEC

17. To fully materialize the recommendations above, there is a high expectation for building a functional RDEC to be institutionalized into LGED so that RDEC can assume a consolidated responsibility of the technical support in order to strengthen the current functions and further develop a new horizon.
18. In accordance with the request by LGED with the Master Plan, the then OECF agreed to finance to the construction of RDEC building under the Northern Area Rural Infrastructure Development Project³ (NARIDP). Accordingly, under the supervision of Mr. Wahidur Rahman, PD-RDP 21, qualified local consultant firms were invited to tender for consulting services on detailed design and supervision of the construction of RDEC building and now their offers are being evaluated.

III Objectives of RDEC

19. RDEC is expected to provide technical assistance to Rural Infrastructure Development Projects (RIDPs) implemented by LGED as well as LGIs in dealing with ever expanding rural development projects in a way which maximizes the impact of rural infrastructure development not limiting to improvement of rural transport but on rural economic expansion and poverty alleviation.

Medium-term objectives

20. RDEC will continue to strengthen the technical capacity of LGED and LGIs staff and provide them with timely and effective technical supports in development of rural infrastructure. Addressing social, economic and environmental issues correctly. RDEC will ensure sustainable development and well off of rural people. Specifically, RDEC will aim to achieve the following objectives.
 - capacity of LGED field organization, LGIs and local contractors strengthened
 - quality of works improved, project costs reduced
 - the project sustained with local people's participation and timely maintenance work
 - project impact on rural communities enhanced

Short-term objectives

21. RDEC will take over relevant technical functions developed at HO and deal with the following tasks in pursuance of recommendations of MANCAPS.
 - Continue to strengthen human capacity of LGED/LGIs staff and people involved in rural infrastructure development
 - Continue to develop and update technical tools/systems and enhance effective use of them

³ Minutes of Discussions on the Draft Loan Agreement and the Draft Project Management of the project was signed on June 9, 1999 between OECF, ERD and LGED

- Continue to provide timely technical supports to RIDPs implemented by LGED and local level rural infrastructure development carried out by LGIs
- Enhance effective approaches to local people with an aim to ensuring sustainable development
- Put more stress on equitable benefit distribution among rural poor and destitute women
- Coordinate RIDPs to improve project efficiency and enhance project impact on rural communities
- Cooperate with other sector projects to enhance synergy in rural development

IV Composition of RDEC

22. RDEC will accommodate selected technical units and consolidate them under the supervision of an Additional Chief Engineer. The Master Plan selected the following 6 units⁴ and the Central Workshop for maintenance of Construction Equipment (CWCE).

- Human Resources Development (HRD) Unit
- GIS, Mapping and Database (GIS) Unit
- Physical Planning (PP) Unit⁵
- Technical Design (Design) Unit
- Quality Control (QC) Unit
- Computer and Management Information System (MIS) Unit⁶

⁴ There are still arguments that RDEC should accommodate such functions as maintenance, socio-economic, participatory development, financial and local resource mobilization

⁵ In view of a close linkage, it was decided to merge GIS and PP into one unit.

⁶ It is still argued that MIS should be retained in HO.

23. Whereas, LGED HO will retain all Project Implementation Offices (PIOs) of LGED projects and such units that are closely related to project implementation as Policy Development Support (PDS) unit, Monitoring and Evaluation (M&E) unit, Financial Management and Audit (F&A) unit, Maintenance unit and other non-technical functions like personnel and administration.

V Prospective Assignment to PTTCP

24. There will be 2 important functions to be executed by PTTCP. Firstly, PTTCP is expected to assist RDEC to grow to an effective and efficient institute to be able to achieve the medium and short-term objectives. Secondly, PTTCP will assist specific units/workshop with an aim to achieving the short-term objectives.

Assist RDEC to grow to a qualified technical institute

25. As a technical nerve center of LGED, RDEC should be responsible for the entire technical affairs. RDEC will pursue the responsibility based on the Technical Development Strategy (TDS) to be prepared and approved by high management. In order to formulate TDS, RDEC should be authorized to take the following actions.⁷

- Conduct periodic technical monitoring and evaluation of RIDPs.
- Conduct studies on selected RIDPs to identify their technical and project managerial strength and weakness.
- Organize inter-project meetings to discuss technical issues and modality of project implementation
- Organize workshops inviting relevant stakeholders of rural development
- Assign new technical trials to specific projects
- Conduct need assessment on training, planning/design tools and computerized systems as well as facilities and equipment

26. In this regard, PTTCP will be requested to assist RDEC in formulation of TDS through relevant actions.

27. In addition, RDEC is responsible for conducting the following routine activities. Likewise, PTTCP will have to assist RDEC to achieve these.

- Respond to requests for technical assistance from the project.
- Develop and update planning/design tools/database
- Disseminate new adaptive technologies
- Prepare annual budget and works
- Publicize annual progress report

⁷ In the course of finalization of the composition of RDEC, authorized activities should be reviewed.

Assist RDEC to strengthen individual technical units

28. Among the units to be accommodated in RDEC, in the request for PTTCP, the following 4 units and CWCE were indicated to be assisted by Japanese experts with the relevant TOR. Technical capacity of these units and the CWCE will be strengthened through transfer of adaptive technologies.

- GIS, Mapping and Database (GIS) Unit
- Physical Planning (PP) Unit
- Technical Design (Design) Unit
- Quality Control (QC) Unit

29. In passing, at first, the Japanese expert is requested to get abreast of the current situations regarding LGED institutional set up, mode of project implementation, training courses, developed tools and their use, participatory approaches and other related aspects.

30. Then he/she will become able to evaluate the level of technologies adopted, assess the degree of their usefulness and identify what inputs are required. As common in all TORs, it is requested to exercise the expertise in collaboration with his/her counterparts in the following areas.

- Assist in preparation of a development strategy for the technical unit
- Assist in prepare training materials and participate in training courses as a resource person
- Assist in improving the current level of technology
- Advise on technical solutions
- Encourage to take up new technologies and management systems
- Any other issues that are deemed necessary

VI Meetings and issues to be discussed

31. As the first mission on PTTCP to discuss with LGED, the mission is requested to contact as many units, Project Directors in LGED HO as well as LGED local level offices (District and Thana offices) as possible so as to recognize interactions and symbiotic functions between them. It would also be preferable for the mission to meet with high officials of LGED to clarify their determination on RDEC.
32. Although the mission is not expected to make any commitment at all, it is requested to hold a wrap up meeting in LGED before their departure so as to touch on their findings and observations and to confirm next actions to be taken at both sides.
33. There will be several issues to be discussed and clarified between the mission and LGED. To facilitate the discussion, these issues need to be addressed at different level of meetings.

<Issues to be addressed at a joint meeting>

Schedule of RDEC building construction

34. Commencement of technical inputs under PTTCP will largely depend on the building construction schedule and purchasing equipment under NARIDP. Based on the current status of the building construction, the prospective completion date need to be confirmed.

Institutional set up

35. As indicated in the Master Plan that RDEC will be headed by an Additional Chief Engineer and two Superintending Engineers. They will be supported by a number of professional staff including executive/additional executive engineers. Since successful performance could not be expected unless competent staff were assigned under strong leadership of the Additional Chief Engineer, this is one of focal points to be discussed.

Recurrent costs

36. While the RDEC building will be constructed and equipment provided under JBIC assisted NARIDP, operations and maintenance of RDEC will fall under responsibility of LGED. In this regard, sufficient budget for general operation expenses (telephone, electricity, water) as well as office maintenance expenses and costs for supporting staff should be ensured.

Counterparts

37. Given the principal rule of PTTCP: to transfer technologies to the counterparts of the recipient institution, under PTTCP, there is no scope of recruiting local professionals to work with Japanese experts. Therefore, it is essential to appoint competent LGED core staff the counterparts. However, in view that a transitional stage will continue in some units even after the onset of RDEC, local consultants

recruited under other TA projects could be the counterparts. At any rate, it is essential to have qualified professional(s) assigned to each Japanese experts.

Assistance in building the functional RDEC

38. It would be useful to exchange views on how to maintain effective functions of RDEC as a technical nerve center of LGED as a whole. Areas and mode of composition, interaction between RDEC, RIDPs and LGIs will be interesting.

<Issues to be discussed at individual meetings>

Assistance in strengthening individual units

39. Focus should be placed on requested 4 units and CWCE. Based on the proposed TORs for Japanese experts, discussion with ISP specialists and/or other responsible officials at their offices will help the mission understand their activities and needs for technical assistance. Manpower, equipment, publications and specific technical support provided to RIDPs and LGIs would be among interesting topics. (see attached Overview of the Technical Units in LGED)
40. Socio-economic issues will be discussed with Physical Planning units as well as relevant consultants working for typical RIDPs.
41. Discussions with design units should focus not only on road related design but on hydraulics and hydrology design.
42. With regard to CWCE, mechanical section in HO should be contacted.
43. It would be worthwhile contacting as many other units such as maintenance units in LGED HO as possible in order to explore possibility and relevance of technical assistance.
44. At the District and Thana office, the mission should hold a meeting with the Executive Engineer and the Thana Engineer. It would be of their interest to find how they are managing a variety of RIDPs in collaboration with their own/project recruited staff and LGIs on the hierarchical line in LGED (PD-Executive Engineer-Thana Engineer). At the same time, it will worthwhile to pay a brief observation on the training, laboratory facilities, PC unit as well as construction equipment garage.
45. The mission should be exposed to as many project sites as possible including road embankment/pavement/maintenance, road structures and growth center construction. In addition, visits to some sub-projects under ADB funded Small Scale Water Resource Development Sector Project (SSWRDSP) and thana/union complexes will be recommendable. It would be interesting for the mission to see a Labor Contracting Society (LCS) working on road maintenance.

Overview of the Technical Units in LGED

1/6

| | | Policy Development Support Unit | Human Resource Development (HRD) Unit |
|--------------------------------|--------|--|--|
| Current Professional Staff | ISP | Management Cst: Mr. H. R. Akanda Management Spr: Mr. S. K. Chanda Ass. M. Spr: Mr. Sas Mahmood | Training Cst: Mr. Mostafa Hossain Training Spr: Mr. Sohrab Hossain Training Spr: Mr. Munir Hussain Training Spr: Mr. Md. Eunus District Training Officers (DTOs): 10 |
| | GoB | None | Training Engineer (4 but 2 are vacant) |
| | Others | None | Training Spr: Mr. M. A. Quasem (RDP-21) District Training Engineers (DTEs): 14 (RDP-21) |
| Main Tasks | | Advising on policy/strategy Management development Coordination of socio-economic issues Coordination of institutional support | Preparation of plans and policies for all the training courses Preparation of course materials Implementation of courses at HQ and assist in district level courses Provision of management support to holding seminars and workshops of LGED Coordination of all local, regional and overseas training programs in LGED |
| Collaboration with other units | | All units | All units |
| Support to RDPs | | Liaison with missions to LGED projects | Planning and implementation of project specific training courses Provision of standard rates of training |
| Manuals/Guidelines | | Model Planning and Implementation Guidelines for Infrastructure Development Project, 1995 Guidelines for Effect Monitoring and Evaluation (EME) of Road and Market Improvement, 1999 Methodology for impact assessment (planned) | Training materials are available for all courses |
| Computerized systems | | | Training Data Bank |
| Training | | | Training of trainers' course Trainers' Group Session course, etc. |
| References | | | Issues Related to Institutionalizing the LGED Training Unit, June 1999 Report on Training Need Assessment of LGED Staff, 1995-96 |
| Note | | | In principle, from July 2000, functions of DTOs will be taken over by DTEs, likewise, from July 2003 by GoB revenue staff Continuation of Sida support is being requested. Training Data Bank will be integrated with Personnel Management Information System developed by MIS |

| | | GIS, Mapping & Database Unit | Physical Planning (PP) Unit |
|--------------------------------|--------|---|---|
| Current Professional Staff | ISP | Database Spr: Mr. Mostafa Ali GIS Spr: (Messr. Shakir Ahmed, Arozullah) Computer Spr: Md. Arif chowdhury Hardware Spr: Mr. Shahed Reza Ass. GIS/Remote Sensing Spr: (8) | Physical Planning Cst: Mr. A. H. Shafiqur Rahman Physical Planning Spr: (2) Environmental Specialist: Mr. Shamsuzzaman Khan |
| | GoB | 1. Mr. M.A. Quader , Executive Engineer (GIS) 2. Mr. Tariqual Islam, GIS Specialist 3. Mr. Ansar Ali , AE(GIS), RDP-21 4. Mr. Shahidul Islam, AE (GIS) RDP-21 | Mr. S. M. Selim, Executive Engineer, (Planning) |
| | Others | M. Kowsar (STDIP), Arozullah (IFADEP), Ranjan Kumar Roy(RDP-16), Sabia Chowdhury(GCCR) | |
| Main Tasks | | Preparation and updating of digital Upazila/Union/Pourashava base maps through DGPS (Differentiated Global Positioning Survey) Improvement of the mapping system incorporating land use and topography. Development of digitized planning tools | Improvement of Planning Tools Capacity building of LGED staff and local government institutions in planning |
| Collaboration with other units | | PP, MIS, Maintenance | GIS, Technical Design |
| Support to RDPs | | Provision of customized Upazila/Union/Pourashava base maps | Upazila/Union Plan Books Growth Center Planning Environmental guidance |
| Manuals/Guidelines | | Audio visual presentation on LGED Use of GIS for physical planning (under preparation) | Upazila/Union Plan Book (revision) Pourashava Plan Book (in progress) Growth Center Planning (English), 1995 Growth Center Planning (Bengali, revision) Environmental Issues related to Physical Planning, 1994 Manual on Land and Water Use Planning, 1992 Pourashava Solid Waste Management (draft) Manual on Use of GIS for Physical Planning (in progress) |
| Computerized systems | | | Local Government Database (being prepared in collaboration with GIS) |
| Training | | GIS course | Growth Center Planning Environmental consideration in planning |
| References | | | Evaluation report on the Angram Ecological Village Beneficiaries' Participation in Planning, Development, Operations and Maintenance of Growth Centres, 1998 |
| Note | | The merger with PP is on going | Upazila/Union Plan Books will be integrated with GIS database |

| | | Technical Design Unit | Quality Control (QC) Unit |
|--------------------------------|--------|---|--|
| Current Professional Staff | ISP | Road Infra. Design Cst: Mr. Moksed Alam Water structure design Cst: Mr. Eklimur Reza Sr. Building Design Spr: Mr. A. Nazrul Islam Road Infra Design Spr: Mr. Mizanur Rahman Water structure design Spr: Mr M. A. Raquib Sr. Ass. Specialists: 2 Ass. Design Specialist: 3 | Laboratory Cst: Mr. A. N. M. Wahiduddin Laboratory Spr: Mr. Masud Ahmed Ass. Laboratory Spr: Mr. Emdadul Bari |
| | GoB | 1. Mr. Saiful Islam 2. Mr. Zahedul Islam | Mr. Akramul Kabir, AE (Lab) |
| | Others | none | In most districts, there is a laboratory technician recruited by RIDPs |
| Main Tasks | | Development and improvement of standard on routine design Designing of routine structure and foundation for GoB funded projects Advice on non-routine design Introduction of innovative technology | Assurance of QC in LGED projects Improvement of laboratory equipment and their calibration: Central (1), Regional (20) and District (44) |
| Collaboration with other units | | HRD Unit | HRD Unit |
| Support to RDPs | | Assist in routine design and non-routine design of road/structures | Establishment of standard QC systems |
| Manuals/Guidelines | | <u>Road:</u> Road structure design manuals (Part A, B) updated in 1998 Standard Specifications for FRB & RR1, 1999 Road pavement design manual, 1999 Manual on Pre-stressed Concrete Bridges (Part A, B, C), 1996 Guidelines for managing private consultancies (99/00) Standard drawing on Steel Structure Bridges Standard drawing on low cost bridges <u>Buildings:</u> Standard architectural drawings <u>Water-structure:</u> Standard design catalogue (1. Hydrology, 2. Hydraulic Structure, 3. Hydraulic Gates), 1998, SSWRDSP Appraisal and Site Overview Report, 1998, SSWRDSP <u>Overall:</u> LGED Schedule of Rates (annual update) <u>Others:</u> Bio-gas plant manual | Quality Control Manual, 1998 Quality Assurance Plan Manual (in progress) Asphalt Mix design Manual (in progress) Concrete Mix Design Manual (in progress) |
| Computerized systems | | Computer programme for road structure (in progress) Standard drawings for bridges/culverts and water-structures in AutoCAD (in progress) Computer program for design, cost estimates STAAD-III, AutoCAD | Laboratory equipment database |
| Training | | Assist HRD unit when required in courses on; Drawing, Road construction, Concrete, Foundation, and Cost estimates | Compaction, CBR & its application course Field and Laboratory Testing course |
| Other References | | | Quality Control Measures for RID projects, 1999 |
| Note | | | |

| | | Maintenance Unit | Computer and Management Information System (MIS) |
|--------------------------------|--------|--|---|
| Current Professional Staff | ISP | Sr. Maintenance Spr: Mr. Syed Mohitul Islam Maintenance Spr: Mr. Shamsuddoha Sr. Ass. Maintenance Spr: Mr. Iqbal Mahmood Ass. Maintenance Spr: Mr. Arif Shaheed | |
| | GoB | 1 Mr. Akhand Habibul Alam, SE (Maint) 2. Mr. Amir Azam, Executive Engineer(Maint) 2. Mr. Sharfuzzaman, Executive Engineer(Maint) 3.Mr. Monmatrh Ranjan Haldar, Asstt. Engineers 4.Mr. Nazrul Islam Manik , Asstt. Engineers | Asstt. Engineer (10) |
| | Others | Maintenance Adviser: Mr. Kaneko (RDP-21) | IFADEP csts: MIS Adviser: Mr. Walther Warnaar LAN cst: Mr. Utpal Kumar Acharjee Software Development Csts: (3) |
| Main Tasks | | Updating of road and structure inventory with corresponding thana road maps. Compile annual maintenance plan for all districts Allocation of road maintenance budget (TK. 10200 lakh) Checking maintenance schemes Development of standard specifications of different items of work and unit rates | Installation and maintenance of LAN and Internet Development of sub-systems under MIS (LGED home page, Progress Monitoring System, Personnel Management Information System) |
| Collaboration with other units | | HRD, QC, GIS, MIS | HRD, M & E |
| Support to RDPs | | Planning and implementation of road maintenance | Provision of LAN and Internet |
| Manuals/Guidelines | | Guidelines for the Maintenance of Rural Infrastructure (English), 1999 Road Maintenance Management Manual, 1998 Manual for Road condition Surveys and Detailed Visual Inspections, 1998 User's Manual for Road & Structure Database Management System-III, 1999 Planning and Implementation Guidelines (updated) | LAN documentation LAN Operational Manual Personnel Management Information System (PMIS) Operational Manual |
| Computerized System | | Road and structure inventory database Maintenance Manager (under development) | |
| Training | | Rural infrastructures maintenance course Road database Management course | Basic Computer Training course for AE/TEs, 1999 Windows NT Server Administration and Maintenance Application software |
| Reference | | | |
| Note | | Monthly Maintenance Coordination Meeting is held including 10 RDPs which have maintenance component. | Support of EC could be extended after January 2000. Continuation of Sida support is envisaged. |

| | | Evaluation and Monitoring (M&E) Unit | Financial Management & Audit Unit |
|--------------------------------|--------|--|--|
| Current Professional Staff | ISP | M&E Spr: Mr. Shamsuddin Ass. Spr: Mr. Bazlul Kader Siddique | Financial Cst: Mr. Syed F. Mahmood Accountant Spr: Mr. Abul Barkot Audit Spr: Mr. Kazi Nazrul Islam Ass. Accounts Spr: vacant Ass. Audit Spr: Mr/ SM. Anwaruzzaman |
| | GoB | 1. Mr. S. M. Selim, Executive Engineer 2. Mr. Mahbubur Rahman, AE | AE (7) |
| | Others | None | none |
| Main Tasks | | Compilation of project progress reports (ADP, IMED) preparation of project physical/financial comparative statements Making comments and check on scheme wise monthly progress report Implementation of Contract Analysis Compilation of project Procurement Reports | Management of accounts on LGED Implementation of internal audit (all districts offices and half of thana offices covered every year) Prepare external audit reports |
| Collaboration with other units | | MIS (Progress Monitoring System) Financial Management Unit | none |
| Support to RDPs | | Reporting on project progress to relevant authorities | Reporting on project accounts and audit outcomes to relevant authorities |
| Manuals/Guidelines | | | Accounts Manual LGED Accounts Training Manual (draft) Internal Audit Manual (in progress) |
| Computerized systems | | Progress Monitoring System | NA |
| Training | | Report preparation course | Accounting course |
| Reference | | | |
| Note | | | |

| | | | |
|--------------------------------|--------|---|--|
| | | Construction Equipment Unit | |
| Current Professional Staff | ISP | None | |
| | GoB | XEN: Mr. Shabbir Ahmed AE: Mr. Mirza Amnul Islam, Mr. SM. Maninul Islam Foreman: Mr. Ziaruddin | |
| | Others | none | |
| Main Tasks | | Maintenance and updating of construction equipment inventory Provision of directives on equipment movement/maintenance Provision of spare parts Establishment of lease rates and keeping accounts | |
| Collaboration with other units | | | |
| Support to RDPs | | Support in procurement/maintenance of equipment | |
| Manuals/Guidelines | | | |
| Computerized systems | | Construction equipment inventory developed by Ausaid | |
| Training | | None | |
| References | | | |
| Note | | GoB staff look after not only construction equipment as well as mechanical facilities in LGED HO like power, lift. After establishing of central workshop, mandate would be expanded to training of mechanics at district level. | |

6. ラップアップミーティング議事録

Minutes on the Wrap up Meeting held on 24 November 1999 with JICA Basic Study Mission on Technical Assistance for Rural Development Engineering Center (RDEC). LGED

A wrap- up meeting with JICA Basic Study Mission on Technical Assistance for Rural Development Engineering Center (RDEC), LGED was held on 24 November 1999 at LGED Bhavan, Dhaka. Mr. Md. Monowar Hossain Chowdhury, Chief Engineer, LGED presided over the Meeting. The performance of the Mission and participants in the Meeting are shown in annex-1&2.

- 1 *Mr. M. Hossain Chowdhury, Chief Engineer of LGED called the meeting to order at 10:40 A.M before the mission and participants¹. He welcomed the mission and the participants and requested them to introduce themselves. Then having expressed his desire that an effective TA would be provided to RDEC from JICA, he invited Mr. Karimata, the Team leader, to present the observations of the Mission.*

2. *Statements of Mr. Karimata*

Mr. Karimata expressed his gratitude for the well organized meeting and the field trip arranged by LGED. He noted that the Mission had satisfactorily achieved the stated objectives. He pointed out that the mission members were very pleased with all useful information provided by and acquaintance of activities undertaken by LGED.

He went on to say that the nature of the mission was such that, although he could not make any commitments to LGED with respect to the TA, he would give due consideration to the request in Japan.

However, he observed that it seemed crucial for LGED to establish an internal technical support system by gradually having GOB core staff assume the technical roles currently provided by local consultants recruited under ISP and other projects.

He recommended that an appropriate Committee/ Working Group should be set up to discuss various issues on RDEC as early as possible in line with the coming detailed design and construction.

3. *Comments and wishes expressed by participants*

- a. The Team Leader of RESP said that during his home leave to Sweden, he had discussions with SIDA. During the discussions, SIDA confirmed that after July 2000, SIDA would scale-down the assistance they were providing to LGED through the ISP TA.
- b. Mr. H. Wiebe, the team leader of SSWRDSP, expressed his satisfaction with the Mission and stated that there was a need for TA to ensure that the RDEC to be established in a sustainable way, would build on and institutionalize the experiences of the various Projects implemented by LGED.

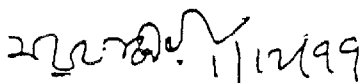
¹ They comprised LGED high officials, local and expatriate project consultants and representatives of JBIC and JICA over 25 persons in total.

- c. Mr. M. Hossain, training consultant of ISP, called for continuous inputs of local consultants for at least the coming 3-5 years. Mr. A. Quasem, RDP-21 Training Team Leader, stressed that the mandate of LGED was changing and this brought a pressing need for human capacity building in terms of technical training. He further elaborated on the ever expanding demand for training, not only of LGED staff, but of local stakeholders including members of local government institutions and project beneficiaries in the areas covering socio-environmental as well as technical aspects. He concluded by saying that even the current support of ISP was not enough to meet the changing and demanding mandate of LGED.
- d. Mr. Akanda, management consultant of ISP, emphasized that given the diminishing support of ISP from July 2000, it was very important to make every effort to avoid gaps in the external technical support being provided to LGED. He suggested that it would be worthwhile if both SIDA and JICA projects could be integrated and they could function complementarily. In this regard, he requested the mission to expedite the JICA assistance.
- e. Mr. Suzuki, technical adviser to LGED, expressed his opinion that given the multiple technical functions to be assigned to RDEC, JICA's TA project should be designed with in-built flexibility with respect to the technical areas to which assistance is to be provided since starting with a rigid project framework would not fit the requirements of the RDEC.
- f. Mr. W. Rahman, PD NRIDP briefly described various aspects of RDEC as well as Project Type Technical Cooperation Project (PTTCP). He also highlighted several new dimensions of LGED such as Participatory approaches, Human resources Development in LGED and LGI. He expressed his deep appreciation to the Mission and hoped that under an effective coordination between SIDA and JICA there could be a package of JICA'S TA that would provide short and long-term experts with a view to bridging these two TA projects.
- g. Mr. Toda, JICA social development specialist, clarified that a limitation of JICA's TA was that there was no budget for local consultants. He went on to observe that since the TA of donors was limited to a defined period, further efforts should be made to ensure self-supporting performances by LGED thus eliminating recourse to local consultants. In doing so, he emphasized that it was essential to invite donors as partners to work with LGED with a strong sense of ownership. He said that the technical areas that needed to be assisted were many fold but at this stage, it was difficult to prioritize them.
- h. Mr. S. K. Sarkar, Superintending Engineer (Planning), Mr. T. Hoque, Superintending Engineer (Administration) and Mr. N. Islam, PD SSWRDSP were all of a similar opinion that although LGED had achieved substantive development through the technical support systems, this was a continuous process and there still was a need for donor's TA. Both SIDA and JICA together should be requested to support LGED.
- i. Mr. A. Bhuiya, Additional Chief Engineer, stressed a need for ensuring that the potential gap that might occur after July 2000 was filled and expressed his concern that if this was not taken care of, the reduction in technical staff support and suspended functions would seriously affect the LGED performance.
- j. Mr. Sudo, JBIC in Dhaka office, encouraged LGED to make necessary arrangements to expedite technical take-off. Given a limited but flexible support from JICA, in collaboration

with GoB, SIDA and other agencies, he urged that there was a need to make local resource persons available for training.

2 Closing Remarks

- a. Mr. Karimata, wishing for a continuation of the current performance of LGED, expressed his willingness to recommend the requested TA to Japanese Government. He again thanked to LGED officials for warm welcome and hearty cooperation in performing the study.
- b. Mr. Chowdhury said that as the detailed design of construction of RDEC building would start shortly and ISP would continue in a new shape, cooperation with SIDA, RDP-21 and JICA projects was essential. He closed the meeting at 11:40 by thanking the mission for coming to Bangladesh. He also appreciated JICA for having provided a variety of assistance including cyclone shelters, and expressed his desire that MRDP phase II materialize quickly.



(Md. Monowar Hossain Chowdhury)
Chief Engineer, LGED

Memo no. PD/RDP-21/LGED/JICA/PPTA/98/3044

Dt. 01/12/99

Distribution:

1. Mr. Shigeo KARIMATA Mission Leader
2. Mr. Additional Chief Engineer, LGED
3. Mr. Superintending Engineer (All)
4. All participants

Performance of the JICA Basic Study Mission on Technical Assistance for RDEC

The mission consisting of 4 members headed by Mr. Karimata, Director in MAFF has visited Bangladesh from 20-26 November, 1999 to explore the rationale for a requested TA to support RDEC.

At the discussion meeting held on November 21, the Mission were briefed about the technical achievements and activities undertaken by the various technical units related to Geographic Information System (GIS), Physical Planning, Management Information System (MIS), Human Resource Development (HRD), Quality Control (QC), and Design. The presentations involved computer slide shows and overhead projectors.

On November 22, the Mission undertook a field trip to Mymensingh. Through the field trip, they became acquainted with the established system and mechanisms involved in implementing rural infrastructure development activities through visits to local institutions including an LGED District Office in Mymensingh, as well as a Thana and a Union complex. They observed a feeder road (type B) being upgraded and visited a growth center which is to be improved.

On November 23, they visited the main technical units in the LGED Head Office. These included the laboratory, mechanical shop, GIS, MIS, Physical Planning, Design, HRD units and the Project Implementation office of SSWRDSP.

These visits and discussions have promoted an understanding of the strengths and weaknesses as well as the constraints and opportunities associated with the LGED technical supporting system. This in turn, provided the mission with the understanding needed to come up with a future course of action with respect to the requested JICA assistance for the TA supporting the RDEC.

**Participants present at the Wrap-up meeting with JICA mission for
Technical Assistance to Rural Development Engineering Centre (RDEC)
held on 24 November 1999 at 10.30 A.M. at LGED Bhaban.**

| Sl. No. | Name and | Designation | Signature |
|---------|------------------------------|-------------------------------|-----------|
| 1. | Shigeo Karimata | Mission Leader | |
| 2. | Takao Toda | Senior Researcher JBIC-JICA | |
| 3. | Hitoshi Ishihara | JICA Mission | |
| 4. | Sozi Shinao | JICA | |
| 5. | Tomonani Sudo | Representative JBIC | |
| 6. | Kozo. Icd | JICA Bangladesh | |
| 7. | Y. Suzuki | Technical Advisor to LGED | |
| 8. | Md. Ataullah Bhuiya | Addl. CE, LGED | |
| 9. | Saroj Kumar Sarker | Superintending Engineer, LGED | |
| 10. | Md. Tofazzal Haque | SE, LGED | |
| 11. | Md. Wahidur Rahman | PD-RDP-21 | |
| 12. | Md. Nurul Islam | PD, SSWRDSP | |
| 13. | Mir. Mostaque Ahmed Jahangir | Asstt. Chief Engineer, LGED | |
| 14. | Abdul Quader | XEN, RDP-21, LGED | |
| 15. | Abdul Wahid | XEN (HQ) | |
| 16. | Khalilur Rahman Akhand | XEN (LCBCP) | |
| 17. | Md. Ali Siddique | DTE, RDP-21 | |
| 18. | Md. Ali Akbar | AE, RDP-21, LGED | |
| 19. | Md. Zahurul Alam | AE, NRIDP, LGED | |
| 20. | Md. Abul Quasem | Team Leader, RDP-21 (ISC) | |
| 21. | Herb Wiebe | Team Leader, BPPM | |
| 22. | Md. Mustafa Hossain | TC, ISP | |
| 23. | Dich Lundberg | SAIS, ISP/LGED | |
| 24. | Lars Hjerpa | RESP, CPA | |
| 25. | H.R. Aakanda | Management Consultant | |