CHAPTER 6

CONCLUSIONS, RECOMMENDATIONS

AND FUTURE RESEARCH
6.0 CONCLUSIONS, RECOMMENDATIONS AND FUTURE RESEARCH

6.1 CONCLUSIONS

From this research it was revealed that the work of the Consultants can be divided into four stages, viz. Pre-tender Stage, Tender Stage, Construction Stage and Completion Stage, depending on the nature of work.

At the Pre-Tender Stage, there is no organized information system readily available. The Consultants go to various organizations, such as RDA, RMV, Central Bank, Survey Department etc. and collect the information required to produce the feasibility report. Mainly they carry out the field surveys on their own to collect information. Further they collect information from documents published and project reports prepared by various organizations viz. Ministry of Finance and Planning, UDA, Consultant Organizations etc. At the Pre-Tender Stage, information is required from; Transport investment plans / studies, RDA organization and maintenance procedures; Socio-Economic Study; Traffic Study; Topographical Survey; Pavement Condition Survey; Drainage and Hydrological Observations; Existing Utility Services; Material Survey; other similar projects; Design Standards to be adopted; Land Acquisitions and shifting of Existing Services; Cost Estimates for various improvement options, (viz. Vehicle Operating Costs, Construction Costs and Maintenance Costs); Requirements of the Doner Agency. With these information, the Consultants produce the Phase 1 - Draft Final Report which includes the improvement options and economic evaluation with their recommendations on improvement work. For preparation of the Phase - 2 Final Report, information is required from the Comments on Phase 1 - Draft Final Report from the Employer and the Doner Agency; Review of the Design Criteria adopted; Detail Construction Drawings and from the Review of RDA's project implementation capacity.

At the Tender Stage, the work involved is merely following up of a set procedure. Information is required on: identification of the Company (Contractor); Technical...
Management Information System (MIS) for Consultants

Capability of the Contractor; Financial Ability of the Contractor; Past Experience of the Contractor; Guide lines of the Doner Agency. With these information the Potential Contractors are pre-qualified for tendering. After this, the tender procedure has to be followed up as per the guide lines given by the Doner Agency. For evaluation of tenders received, the information required is: Requirements of the tender; Arithmetic correctness of the tenders submitted; Engineer’s Estimate; Schedules prepared for comparison and the Bid Opening Report. Selection of the Contractor depends on the recommendation of the Tender Evaluation Committee and on the approval from the Employer/Doner Agency. The last item of the Tender Stage is award of the contract which required for both parties, the Employer and the Contractor, to perform the requirements stated is the Contract Documents.

The information systems adopted at the Construction Stage were different from project to project depending on the provisions made in the Consultancy Agreement for supervision work. But basically the information required is the same.

Information is required for preparation of Detail Construction Drawings from: Public and Local Authorities; Field Surveys; Design Standards to be adopted; Approved Programme for work; Contract Documents; Contractor, as and when become necessary; Quality Control and Supervision Team and the Project Monitoring Staff.

The information required for execution of work by the Contractor is: Detail Drawings and Instructions from the Design Team; Approved Programme for work; Contract Documents; Feedback and instructions from the Project Monitoring Staff; Feedback on certification of Interim Certificates and Claims submitted by the Contractor; Approvals from the Quality Control and Supervision Team for the work done.

The information required for Quality Control and Supervision is: Requests for checking from the Contractor; Approved Programme for work; details from the Contract Documents; Information from the Design Team; Instructions from the Project Monitoring Staff.
Management Information System (MIS) for Consultants

For the Project Monitoring by the Consultants, information is required from the approved Programme for work, Contract Documents, Design Team, Quality Control and Supervision Team, Contractor on various matters, Data Base; information on Interim Certificates and Claims submitted by the Contractor, Requirements of the Employer.

The information required for Operation and maintenance of Consultants Data Base is: Requirements of the Project Monitoring Staff; Information from the Design Team on Instructions and Drawings issued; Information from the Quality Control and Supervision Team on progress of work, joint measurements of the work done, stoppages and delays of the work etc.; Information from the Contractor on procurement of materials, deployment of machinery and equipment, employment of labour, Information on requirements for certification of Interim Certificates and Claims.

The information for certification of Interim Certificates is required from the Data Base; Contractor; Contract Documents and the Project Monitoring Staff. Similarly, information is required for evaluation of Claims from the Data Base; Contractor; Contract Documents and the Project Monitoring Staff.

Feedback to the Employer is required from the Project Monitoring Staff on progress of work, variation of work, total cost estimates, Employer's financial commitments, etc. and recommendations on Interim Certificates and Claims submitted by the Contactor.

The system adopted at the Completion Stage dependeds on the provisions made in the consultancy agreement. The information required at this stage on the Inspection for substantial completion, identification of balance work to be done and defects of the work done is: Contractor's request for substantial completion; Information on instructions and drawings issued; Information from the Contract Documents; Information from the Contractor as and when become necessary. Once this is completed the Employer can issue the Partial Completion Certificate depending on the Consultant's recommendations. The rectification of defects and completion of the balance work are done by the Contractor as per the instructions issued by the
Consultants in accordance with the Contract Documents. For Final Measurements and evaluation of Claims by the Consultants, information is required from the Data Base; Contractor and the Contract Documents. Also information is required for preparation of As-Built Drawings and Project Completion Report from the Data Base; Field Surveys and the Terms of Reference for Consultancy work. The information required by the Employer at this stage is: Final Accounts from the Consultants; information from the Contract Documents; As-Built Drawings, Schedules of Structures and Road Furniture and the Project Completion Report from the Consultants.

The major difficulty that the Consultants face at the Pre-Tender Stage is the collection of information required for traffic study, pavement condition survey etc. in a consistent format. Therefore the Consultants have to depend mainly on the information collected from the field surveys done in a short period of time. Further, the insufficient data for assessing quantities, nonavailability of records on utility services were also a problem for the Consultants. These problems lead to high cost overruns and extra claims from the Contractor due to inaccurate or insufficient information in the Contract Documents.

From the surveys carried out it was found that, at the Tender Stage the accuracy of the information provided by the Contractors on their capability was questionable. Therefore some method should be adopted to check the accuracy of the information provided by the potential contractors. Imperfections of the Contract Documents, insufficient information for locating aggregate quarries, finding a suitable location for asphalt plant due to environmental problems, lack of communication between the Contractor's asphalt plant, laboratory, etc. and the Consulting Staff were the major difficulties encountered by the Consultants at the Construction Stage.

Based on the major areas of information required and the difficulties discussed above, a basic conceptual structure of a MIS was developed. Further studies should be done on the sub-systems to develop the detail design.
6.2 RECOMMENDATIONS

As we are aware, there are few local consultancy companies engaged in the road construction work jointly with internationally recognized foreign companies, where local consultants are hired on contract basis for each road project. Neither the local Companies nor the foreign Companies have the interest to operate and maintain a separate data base or other form of information system on their own. This can be due to high cost involved and uncertainty of getting consultancy contracts in the future. But the Employer, RDA, is an engineering organization who has the ultimate interest on the work produced.

From this research, it was revealed that the Traffic and Planing Division, Research Laboratory and Contract Management and Contracts Division of the RDA are very good sources of information for traffic studies, pavement condition studies and obtaining data from other similar projects, respectively. It can be recommended that the work of these divisions of RDA can be organized in such a way to perform as sub-systems of a MIS. Care should be taken to direct, monitor and co-ordinate these divisions on a common objective under a Transport Structure Plan (TSP) as outlined in the section 4.1.5 of this report. Further this can be extended to collect data required from other organizations, viz. RMV, Central Bank, Survey Department, UDA, NWS & DB, CEB etc. and produce information required by the Consultants for feasibility studies.

Lack of communication among the various sections of the Contractor’s Organization and the Consultant’s Staff is a common problem. Excessive time delays in certifying the Contractor’s Interim Certificate, Claims etc. and the delays in approving the Contractor’s work by the Consultant’s Quality Control Team are some of the difficulties arise due for the lack of communication. The large amount of data to be handled by the Consultant’s Quantity Surveyor, Quality Control and Supervision Team can be another cause for the delays. Therefore, it is recommended that these work has to be computerized based on a properly designed MIS. The input data at the Construction Stage can be utilized to produce information in preparation of balance
work, as-built schedules of structures, road furniture etc. at the Completion Stage. Further, preparation of summaries of the test results, Cost Variations, Quantity Variations, expected total cost of the project etc., which are the information required by the Consultant’s Project Monitoring Team, can be easily produced.

However, in developing a computerized MIS, due consideration has to be given for type and form of information required, availability of data, financial implications, institutional capacity to maintain such a system.
6.3 FUTURE RESEARCH

The MIS developed in this research is only a basic conceptual design as described in the section 6.1 of this report. Each input data given in this design is a separate information sub-system. Therefore the MIS thus developed require further research on each and every sub-system for a detail design. This could be subject matter for future research.
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APPENDIX A

MIS for Consultants Engaged in
Road Construction/Rehabilitation Projects in Sri Lanka

The Consultants can involve in the Project work at the following stages.

1). Pre - Tender Stage
2). Tender Stage
3). Construction Stage
4). Completion Stage

1). Pre-Tender Stage

Work involved:

1.1 Investigation
1.2 Primary designs
1.3 Land acquisition and shifting of existing services (electricity poles, telephone poles and other obstacles)
1.4 Estimation and preparation of tender documents

1.1 Investigation

This consist of the following

1.1.1 Traffic counts
   a) Manually
   b) Auto counters
   c) Past Records
1.1.2 Determination of traffic growth rate
1.1.3 Pavement condition survey
   a) Roughness index
   b) Bumpiness index
   c) Benkleman test
1.1.4 Testing for foundations of structures and sub-grade condition of the road
   a) Bore holes
   b) CBR
   c) Standard penetration test

1.1.5 Hydrographic survey

1.1.6 Collecting information and testing where necessary construction materials for the availability and suitability for construction work.

1.1.7 Public inquiries, complaints, suggestions, etc,

Sources of Information : Field Surveys, RDA, RMV, Central Bank, Geological Department, Survey Department, Meteology Department, etc.

Note: In Sri Lanka;
Employer → Ministry of Highways (RDA)
Implementing Agency → Road Development Authority (CM and C Division)

RDA being an engineering organization with adequate facilities for testing etc., the information/records of many investigation work given above are available with them.

1.2 Initial Designs

1.2.1 Geometric design of the road
   a) Road center line (lay out of road)
   b) Carriageway widths
   c) Roundabouts, intersections etc.

1.2.2 Pavement Structure
   a) Edge widening, Sub-base, Base course thickness
   b) Surface Regulation (Pen-Mac, Asphalt etc)
   c) Wearing surface (Asphaltic Concrete, DBST, etc)

1.2.3 Ancillary Structures (Bridges, Culverts, Retaining walls, Line drains)

Sources of Information : Field Surveys, RDA, Design Standards, Guidelines of the Donor Agency
Note: Normally at this stage a detail design will not be done. This is due to the following reasons:

a). The actual construction may get delayed by many years and during that period the site conditions may change depending on the defects of the road maintenance system, other development in the area, etc.

b). Actual site conditions will be known only once the construction work commenced. (Eg. Extent of edge treatment work, etc.)

c). The contractors may have improved equipment etc. so that a design could be done to carry out the work cost effectively.

1.3 Land acquisitions and shifting of existing services obstructing the proposed development of the road.

1.3.1 a). Survey work and preparation of land acquisition

b). Following up of legal acquisition procedure

1.3.2 a). Preparation of lists / schedules of the services (water, electricity, telecommunication) which are obstructing the proposed development, required to be shifted.

b). Getting the services shifted through these respective organizations.

Sources of Information: Field Surveys, RDA, Connected Organizations.

1.4 Estimations and preparation of Tender Documents

1.4.1 Preparation of approximate quantities of the work to be done.

1.4.2 Preparation of specifications for work

1.4.3 Preparation of Tender Drawings and other documents

Sources of Information: Standard Specifications, RDA
2). **Tender Stage**

2.1 Pre-qualifying tenders and short listing
2.2 Calling for tenders evaluation of the tenders (financial and technical analysis)
2.3 Selection of the contractor and awarding of the contract.

Sources of Information: Guidelines of the Donor Agency, RDA

3). **Construction Stage**

3.1 Preparation of detail construction drawings

3.1.1 Preparation of detail plan drawings of the road and cross section drawings.
3.1.2 Preparation of detail drawings for structures - (Culverts, Retaining walls, Lined drains etc).

Sources of Information: Field Surveys, Design Standards, Contract Documents

3.2 Monitoring Progress of construction work and control

3.2.1 Obtaining progress of work and comparison with the programme submitted.
3.2.2 Recording weather conditions
3.2.3 Collecting details of contractor’s resources (Man, materials and machinery and comparison with their commitments as per the Contract Documents).

Sources of Information: Field Inspection Reports, Approved Programme of Work, Conditions of Contract

3.3 Construction Supervision and Quality Controls

3.3.1 Mix Designs (concrete and asphalt)
3.3.2 Testing on construction materials
3.3.3 Testing of work done
   a). Insitu density (earth compaction)
   b). Cube testing (concrete)
   c). Tests on asphalt work (Hot-bin samples cold-bin samples, insitu densities).

3.3.4 Supervision of work as per the requirements stated in the Drawings, Instructions, etc.

Sources of Information; Field Inspections, Tests, Specifications, Standards, etc.

3.4 Information to the Employer on financial status and progress of work

3.4.1 Variation orders (Qtys.)
3.4.2 Financial commitments on Interim Certificates in near future.
3.4.3 Progress of work
3.4.4 Possible claims by Contractor.

Sources of Information; Data from the field, Data Base

3.5 Certification of Measurements and Interim Certificates of the Contractor for payments

3.5.1 Taking joint measurements of the work done
3.5.2 Keeping records and checking against Contractor's Interim Certificates.

Sources of Information; Data from the field; Data Base

3.6 Dealing with public and other organizations on complaints, suggestions, etc.
3.6.1 Inspections/inquiries and solve the problems which falls within the scope of the work.
3.6.2 Refer other matters to the Employer.

Sources of Information; Public, Local Authorities, etc.
4). Completion Stage

4.1 Inspection of work for acceptance and record defects, if any.
4.2 Final measurements and certifications
4.3 Handling Claims of the Contractor
4.4 Closing of the project
4.5 As-built drawings and other necessary information for the Employer to carry out maintenance work.

Sources of Information: Instructions and Drawings issued, Field measurements, Contract Documents
APPENDIX B

QUESTIONNAIRE

DEVELOPMENT OF A MANAGEMENT INFORMATION SYSTEM (MIS) FOR CONSULTANTS ENGAGED IN ROAD CONSTRUCTION / REHABILITATION WORKS IN SRI LANKA

Eng. A.K. Herath
INTRODUCTION TO QUESTIONNAIRE

This questionnaire will be used to develop a Management Information System (MIS) for Consultants engaged in the Road Rehabilitation / Construction works in Sri Lanka.

When filling this, please use one questionnaire for each project, if the management system adopted in those are different from each other. If you do not agree with the system adopted, your alternative proposals are welcome. Your name and other details are requested in this form for the completeness of the report.

This exercise is for the preparation of the M.Eng. (Construction Management) thesis. Apart from the academic work this report may be useful for the future Road Rehabilitation / Construction Projects in Sri Lanka.

When filling the form please mark the appropriate word YES or No with "✓" against each question and write briefly how or from where you collected the informations.

Example

2.1.1.1.1 Traffic Volume Survey ✓ YES / NO

1. From Where/ How : Field Surveys were carried out. or Data available with RDA or both.
   a). Reliability 95% b). Consistency 80% c). Sufficiency 85%.

If you have any difficulty in filling this questionnaire please contact me over the Telephone Nos

036 - 2632, 2633 - Office
036 - 2613 - Residence

Thanking You

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DHV/RDC Office.
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Avissawella
QUESTIONNAIRE ON MANAGEMENT INFORMATION SYSTEM (MIS) FOR CONSULTANT ENGAGED IN ROAD CONSTRUCTION / REHABILITATION WORKS IN SRI LANKA
(Please use one questionnaire for each Project, if necessary)

1.0 INFORMATION ABOUT THE PROJECT

1.1 Name of the Project : ..............................................................

1.2 Whether New Construction or Rehabilitation : NEW / REHABILITATION

1.3 Length of the Project : ................. Km.

1.4 The Project Involved;

a). Construction of New Bridges YES / NO
b). Widening of Bridges YES / NO
c). Construction of New Culverts YES / NO
d). Widening of Existing Culverts YES / NO
e). Widening of Existing Pavement YES / NO
f). Construction of Retaining Wall YES / NO
g). Construction of Lined Drain YES / NO
h). Surface Regulation By
   i). Asphaltic Concrete YES / NO
   ii). Penetration Macadam YES / NO
   iii). Others - Please specify :
   iv). Wearing Surface with
      i). Asphaltic Concrete : YES / NO
      ii). DBST : YES / NO
      iii). Others - Please specify :

1.5 Name of the Consultancy Organization :

........................................................................................................

1.6 Address & Telephone Nos. Of the Organization :

........................................................................................................

1.7 The Project is funded by a LOAN / GRANT / GIFT

1.8 Funding Agency (Please Specify) : ADB/WB/ :

........................................................................................................

1.9 Your Name, Address & Contact Telephone Numbers :

........................................................................................................
2.0 INFORMATION ABOUT MIS ADOPTED

2.1 PRE TENDER STAGE

2.1.1 What informations/observations/Data that you considered in Preparation of the Feasibility Report and Primary Designs. If your answer is YES for the following headings, please state from WHERE/HOW you collected your Informations/observations/Data and indicate the degree of reliability, Consistency and Sufficiency of the data as a percentage.

2.1.1.1 Traffic Survey

2.1.1.1.1 Traffic volume survey

YES / NO

From Where / How ..............................................................
..........................................................................................
a). Reliability ... %  b). Consistency ... %  c). Sufficiency ... %

2.1.1.1.2 Traffic growth rate, Past trends & Current traffic

YES / NO

From Where / How ..............................................................
..........................................................................................
a). Reliability ... %  b). Consistency ... %  c). Sufficiency ... %

2.1.1.3 Axle loads

YES / NO

From Where / How ..............................................................
..........................................................................................
a). Reliability ... %  b). Consistency ... %  c). Sufficiency ... %

2.1.1.4 Other informations collected on the Traffic Survey (please state briefly)

..........................................................................................
..........................................................................................
2.1.1.2 Topographical Survey

If your answer is NO for the above, please go to 2.1.1.3

2.1.1.2.1 Open traverse survey

How ........................................................................

2.1.1.2.2 Longitudinal profile

How ........................................................................

2.1.1.2.3 Cross - Sections

How ........................................................................

2.1.1.2.4 Existing carriageway widths

How ........................................................................

2.1.1.2.5 Platform width

How ........................................................................

2.1.1.2.6 Survey at major junctions

How ........................................................................

2.1.1.2.7 Drainage structures (Culverts & Bridges)

How ........................................................................

2.1.1.2.8 Other informations collected on Topographical Survey (please state briefly)

........................................................................

........................................................................

........................................................................

2.1.1.3 Pavement Survey

If your answer is NO for the above, please go to 2.1.1.4

2.1.1.3.1 Geological investigation (main & subsidiary rock types etc)

How ........................................................................
2.1.3.2 Trial pit investigation

How

2.1.3.3 Pavement deflection tests (Benkleman beams)

How

2.1.3.4 Dynamic cone penetration test

How

2.1.3.5 Existing pavement construction & strength

How

2.1.3.6 Drainage of the road

How

2.1.3.7 Surface roughness

How

2.1.3.8 Other informations collected on Pavement Survey (please state briefly)

2.1.4 Hydrological & Drainage Observations

If your answer is NO for the above, please go to 2.1.5

2.1.4.1 Climatic conditions

How

2.1.4.2 Details of rivers nearby

How

2.1.4.3 Flood peak studies

How
### Management Information System (MIS) for Consultants

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<th>Description</th>
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<td>2.1.1.4.5</td>
<td>Other informations collected on Hydrological &amp; Drainage Observations (please state briefly)</td>
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<td>How</td>
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<td>Observation on Existing Utility Services</td>
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<td>Materials Survey</td>
<td>YES / NO</td>
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<td>2.1.1.6.2</td>
<td>General fill materials (Natural soils)</td>
<td>YES / NO</td>
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2.1.6.3 Sub-Base materials  
YES / NO

2.1.6.4 Natural sand  
YES / NO

2.1.6.5 Water  
YES / NO

2.1.6.6 Other informations collected on Materials (please state briefly)


2.1.7 Environmental aspects, Cost & Economic Analysis  
YES / NO

If your answer is NO for the above, please go to 2.1.1.8

2.1.7.1 Construction costs  
YES / NO

2.1.7.2 Vehicles operating costs  
YES / NO

2.1.7.3 Maintenance costs  
YES / NO

2.1.7.4 Time cost savings  
YES / NO

2.1.7.5 Background data & Socio - Economic profile  
YES / NO

2.1.7.6 Regional development  
YES / NO
2.1.1.7.7 General environmental issues

How

2.1.1.7.8 Specific environmental issues

How

2.1.1.7.9 Post construction aspects

How

2.1.1.7.10 Interference with the wildlife movements and livestock practices

How

2.1.1.7.11 Other informations collected on Cost & Economic Analysis and Environmental aspects (please state briefly)

2.1.1.8 Data From Other Similar Projects

If your answer is NO for the above, please go to 2.1.1.9

2.1.1.8.1 Data for estimation

If YES, specify briefly

2.1.1.8.2 Construction methods

If YES, specify briefly

2.1.1.8.3 Data for cost & economic analysis

If YES, specify briefly
2.1.1.8.4 Data for environmental aspects

YES / NO
If YES, specify briefly ..............................................................
..............................................................................................

2.1.1.8.5 Any other informations collected from other similar on going or completed projects (please state briefly)
..............................................................................................
..............................................................................................
..............................................................................................

2.1.1.9 Design Standards

YES / NO
If your answer is NO for the above, please go to 2.1.1.10

2.1.1.9.1 Right of way

YES / NO
• If YES Please specify .....RDA / International/ Specific .....................

2.1.1.9.2 Road geometry

YES / NO
If YES Please specify .....RDA / International/ Specific .....................

2.1.1.9.3 Pavement design

YES / NO
If YES Please specify .....RDA / International/ Specific .....................

2.1.1.9.4 Junction design

YES / NO
If YES Please specify .....RDA / International/ Specific .....................

2.1.1.9.5 Structural design

YES / NO
If YES Please specify .....RDA / International/ Specific .....................
2.1.9.6 Other informations collected in relation to the design standards (please state briefly)

2.1.10 Land Acquisitions & Shifting of Services

2.1.10.1 Whether the land & property acquisition were required for the implementations of the project

2.1.10.2 Whether shifting of existing services (Electricity, Telecommunication, Water etc) were required for the implementation of the project

2.1.10.3 Any other informations collected with regard to land acquisitions and shifting of existing services (please state briefly)

2.1.11 Requirements of the Doner Organization/ Employer

2.1.11.1 Were there any laid down specific requirements for the feasibility study by the Doner Organization

If YES please specify
2.1.1.11.2 Were there any laid down/ specific requirements for the feasibility study by the Employer

YES / NO

If YES please specify

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2.1.1.12 Any other informations collected in preparation of Feasibility Report and the Primary Designs (please state briefly)

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2.1.1.13 Indicate the time that was available for you to collect information and prepare necessary documents in the Pre-Tender stage. also state whether the time available was sufficient or not

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2.1.1.14 Please give your comments on the difficulties or problems that you encountered in the Pre-Tender work

........................................................................................................................................

........................................................................................................................................

........................................................................................................................................
2.2 TENDER STAGE

2.2.1 What informations that you were considered in Prequalifying the Potential Contractors. If your answer is YES for the following headings, please state HOW you collected your informations.

2.2.1.1 Identification of the Company

If your answer is NO, please go to 2.2.1.2

2.2.1.1.1 Name of the Company

YES / NO

2.2.1.1.2 Nationality

YES / NO

2.2.1.1.3 Registration number

YES / NO

2.2.1.1.4 Date of creation of the Company

YES / NO

2.2.1.1.5 Address of the Head Office

YES / NO

2.2.1.1.6 Name of the responsible firm and the responsible persons within the firm

YES / NO

2.2.1.1.7 Any other informations collected under the identification of the Company (please state briefly).

..........................................................

..........................................................

2.2.1.2 Technical Capability

If your answer is NO, please go to 2.2.1.3

2.2.1.2.1 Plant & Equipment

YES / NO

If YES, please state briefly how you assessed

..........................................................

..........................................................

..........................................................

..........................................................

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..........................................................
2.2.1.2.2 Managerial capability (Staff) 
If YES, please state briefly how you assessed 


2.2.1.2.3 Other information collected under Technical Capability, (please state briefly) 


2.2.1.3 Financial Resources 
If Your answer is NO, please go to 2.2.1.4. 

2.2.1.3.1 Current assets 


2.2.1.3.2 Current liabilities 


2.2.1.3.3 Summary of quick assets and liabilities 


2.2.1.3.4 Details of any credit, substantiated by a Bank / Insurance Company etc 


2.2.1.3.5 Any other information collected under Financial Resources, (please specify) 


2.2.1.3.6 How you assessed the Financial Capability of the Contractors with the informations considered above, (please state briefly) 


2.2.1.4 Experience of the Contractor  
If your answer is NO, please go to 2.2.1.5  

<table>
<thead>
<tr>
<th>Subsection</th>
<th>Description</th>
<th>YES / NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2.1.4.1</td>
<td>Type of the Contractor</td>
<td>YES / NO</td>
</tr>
<tr>
<td>2.2.1.4.2</td>
<td>Number of years in business</td>
<td>YES / NO</td>
</tr>
<tr>
<td>2.2.1.4.3</td>
<td>Value of all contracts during past specified period</td>
<td>YES / NO</td>
</tr>
<tr>
<td>2.2.1.4.4</td>
<td>Largest contracts handled during past specified period</td>
<td>YES / NO</td>
</tr>
<tr>
<td>2.2.1.4.5</td>
<td>Details of work involved in contracts quoted above</td>
<td>YES / NO</td>
</tr>
<tr>
<td>2.2.1.4.6</td>
<td>Any other informations collected on experience of the Contractor, (please state briefly)</td>
<td></td>
</tr>
<tr>
<td>2.2.1.4.7</td>
<td>Briefly state how you assessed the experience of the Contractors with the informations considered above</td>
<td></td>
</tr>
<tr>
<td>2.2.1.5</td>
<td>Whether you have followed the guidelines prepared by the Doner Agency in prequalifying the potential contractors</td>
<td>YES / NO</td>
</tr>
<tr>
<td>2.2.1.6</td>
<td>Any other informations that you considered in pre-qualifying the potential contractors, (please state briefly)</td>
<td></td>
</tr>
</tbody>
</table>
### 2.2.2 What are the informations that you collected / issued in the Tender Procedure. If your answer is YES for the following headings, please state WHEN & TO/FROM WHOM you collected / issued the informations.

<table>
<thead>
<tr>
<th>2.2.2.1 Issue of Tender Documents</th>
<th>YES / NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHEN :</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.2.2.2 Issue of Addendums to Tender Documents</th>
<th>YES / NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHEN :</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.2.2.3 Pre-Tender Meeting</th>
<th>YES / NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHEN :</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.2.2.4 Any other information collected / issued in the Tender Procedure, (please state briefly)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

### 2.2.3 What are the informations collected / required during the Evaluation of Tenders. If your answer is YES for the following headings, please state HOW you collected your informations.

<table>
<thead>
<tr>
<th>2.2.3.1 Mathematical correctness of the Tender</th>
<th>YES / NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOW :</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.2.3.2 Whether the Tenders are in conformity with the requirements set out in the conditions of tender</th>
<th>YES / NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOW :</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.2.3.3 Estimated rates &amp; amounts (Engineer’s Estimate)</th>
<th>YES / NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOW :</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.2.3.4 Examination &amp; Comparison of rates &amp; documents</th>
<th>YES / NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOW :</td>
<td></td>
</tr>
</tbody>
</table>
2.2.3.5 Any other informations required / collected during the Evaluation of Tenders, (please state briefly).

2.2.4 What are the informations required for the selection of the Contractor.

2.2.4.1 Recommendations of the Tender Evaluation Committee YES / NO

2.2.4.2 Approval from the Ministry YES / NO

2.2.4.3 Any other informations required / collected for the selection of the Contractor, (please state briefly).

2.2.5 What was the time duration available for you to do the work involved in the Tender Stage. Also please state whether this time available was sufficient or not.

2.2.6 Please comment on the difficulties and the problems that you encountered during the Tender Stage.
Management Information System (MIS) for Consultants

2.3 CONSTRUCTION STAGE

2.3.1 What were the informations that you collected to carry out the Detail Design Work during the Construction Stage.

2.3.1.1 Levels, Measurements & other Records

2.3.1.2 Design Guides

2.3.1.3 Contractors approved programme for work

2.3.1.4 Contract Documents (ie Specifications, Conditions of Contract, BOQ, Tender Drawings etc)

2.3.1.5 Requirement of the Employer

2.3.1.6 Requests and informations provided by Contractor for alternate designs & other problems

2.3.1.7 Deviations of work progress from the main programme

2.3.1.8 Informations provided on problems by the Consultants Construction Supervision Team

2.3.1.9 Other informations collected (please state briefly)

2.3.2 What were the informations provided by the Consultants Design Team during the Construction Stage

2.3.2.1 Construction Drawings & Instructions to the Contractor

2.3.2.2 Construction Drawings, Instructions & Other necessary construction requirements to the Consultants Construction Supervision Team

2.3.2.3 Progress of Design Work to the Team Leader

2.3.2.4 Other informations provided (please state briefly)
2.3.3 What were the informations made available for the Contractor for execution of work during Construction Stage.

2.3.3.1 Approved Programme for work  

YES / NO

2.3.3.2 Contract documents (ie Specifications, Conditions of Contract, BOQ, Tender Drawings etc)  

YES / NO

2.3.3.3 Contract detail drawings and Instructions  

YES / NO

2.3.3.4 Approvals for work done at various stages on requests made by the Contractor  

YES / NO

2.3.3.5 Feedback on deviations of work progress from the approved programme  

YES / NO

2.3.3.6 Feedback on deviations of the Interim Certificates made by the Contractor  

YES / NO

2.3.3.7 Feedback on deviations of the Claims made by the Contractor  

YES / NO

2.3.3.8 Other informations / data made available to the Contractor during the construction stage (please state briefly)  


2.3.4 What were the informations obtained from the Contractor during the construction stage

2.3.4.1 Plant & Machinery utilization reports  

YES / NO

2.3.4.2 Reports on the procurement of construction materials  

YES / NO

2.3.4.3 Reports on labour strength  

YES / NO

2.3.4.4 Joint measurements of the work done  

YES / NO

2.3.4.5 Requests for further informations  

YES / NO

2.3.4.6 Informations required on Interim Certificates  

YES / NO

2.3.4.7 Informations on claims made or intended to make  

YES / NO
Management Information System (MIS) for Consultants

2.3.4.8 Other informations obtained from the Contractor during the construction stage (please state briefly)

2.3.5 What were the informations provided to / obtained from the Consultants Construction Supervision and Quality Control Team

2.3.5.1 Informations on Contractor’s approved programme for work YES / NO

2.3.5.2 Contract Documents (Specifications, Conditions of Contract, BOQ, Tender Drawings etc) YES / NO

2.3.5.3 Informations on approvals, failures or sub-standard of work done by the Contractor YES / NO

2.3.5.4 Informations on joint measurements with the Contractor YES / NO

2.3.5.5 Reports on Contractors work progress utilization of plant, Materials, Labour and Weather Reports YES / NO

2.3.5.6 Reports on Special Conditions like stoppages and delays of work, obstacles for work etc.

2.3.5.7 Other informations provided to or obtained from the Consultants Construction Supervision and Quality Control Team (Please state briefly)

2.3.6 a). Whether a computerized system was adopted for Project Monitoring Work YES / NO

b). What informations / data were stored, processed and used for generating reports for Project Monitoring

2.3.6.1 Progress Reports on Designs Works YES / NO

2.3.6.2 Reports on Contractor’s physical progress of work from the consultant’s supervision staff. YES / NO

2.3.6.3 Weather Reports YES / NO
Management Information System (MIS) for Consultants

2.3.6.4 Informations on utilization of plant materials
and employment of labour from Consultants
YES / NO

2.3.6.5 Contractor’s Plant & Machinery utilization reports
YES / NO

2.3.6.6 Contractor’s report on procurement of construction materials
YES / NO

2.3.6.7 Contractor’s reports on employment of labour
YES / NO

2.3.6.8 Conditions of Contract
YES / NO

2.3.6.9 Approved programme for work
YES / NO

2.3.6.10 Requirement of the employer
YES / NO

2.3.6.11 Other informations collected for Project Monitoring (please state briefly)

-------------------------------------------------------------------------------------------------------------------------------------

2.3.7 What were the informations produced by the Project Monitoring Consultants

2.3.7.1 Progress Reports to the Employer
YES / NO

2.3.7.2 Informations on Variations of the work
YES / NO

2.3.7.3 Informations on expected cost of the work
YES / NO

2.3.7.4 Informations on Financial Commitments of the Employer
YES / NO

2.3.7.5 Informations to Contractor on deviations of the work
YES / NO
progress from the approved programme.

2.3.7.6 Other informations provided by the Consultants in Project monitoring

-------------------------------------------------------------------------------------------------------------------------------------
Management Information System (MIS) for Consultants

2.3.8 a). Whether a computerized system was adopted for checking & certification of Contractor’s Interim Certificates YES / NO

b). What informations / Data were stored, processed & used or issued in checking and certification of Contractor’s Interim Certificates

2.3.8.1 Bill of Quantities YES / NO

2.3.8.2 Joint measurements of the work done YES / NO

2.3.8.3 Instructions, Drawings issued for Construction work YES / NO

2.3.8.4 Informations from the Contract Specifications, Conditions of Contract, Method of measurements etc YES / NO

2.3.8.5 Informations from the Contractor on rates and amounts YES / NO

2.3.8.6 Feedback information to Contractor on variations YES / NO

2.3.8.7 Recommendations to Employer on Contractor’s Interim Certificates YES / NO

2.3.8.8 Other informations collected or issued in checking & certification of Contractor’s Interim Certificates (please state briefly)

2.3.9 a). Whether a computerized system was adopted for evaluation of claims made by the Contractor. YES / NO

b). What were the informations / data stored processed and used or issued in evaluation of claims made by the Contractor. YES / NO

2.3.9.1 Informations or data from the Contractor YES / NO

2.3.9.2 Informations or data from the Consulting Staff Reports YES / NO

2.3.9.3 Informations from the Contract Documents YES / NO

2.3.9.4 Recommendations to the Employer on the Contractor’s Claim YES / NO

2.3.9.5 Feedback information to Contractor on variations YES / NO
<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
</table>
| 2.3.9.6 | Other informations / data collected or issued in evaluation of claims made by the Contractor (please state briefly)  
YES / NO |
| 2.3.10 | Any other informations collected or issued by the Consultants during the Construction stage which were not covered from 2.3.1 to 2.3.9 (please state briefly) |
| 2.3.11 | What was the original project duration and the time extensions granted, please state briefly the reasons to extend the project duration |
| 2.3.12 | Whether the major items of work has been exceeded the estimated quantities. If so please state the reasons briefly and by how much that it was exceeded (as a percentage) - (viz concrete work, asphalt work, aggregate for base course, RRM work, earth work etc.). |
| 2.3.13 | Please comment briefly on difficulties and problems encountered during the construction stage |
2.4 COMPLETION STAGE

2.4.1 What were the information collected / issued by the Consultants at the stage of substantial completion of the work.

2.4.1.1 Contractor's request for substantial completion certificate

2.4.1.2 Due date for completion of the work (from the contract documents)

2.4.1.3 Details of the defective work from the Consultants supervising staff

2.4.1.4 Balance work to be done in accordance with the Contract Documents

2.4.1.5 Issue of the substantial completion certificate to the Contractor along with the lists of defective and balance work

2.4.1.6 Other informations collected / issued for the substantial completion of the work (please state briefly)

2.4.2 What were the informations available for the Contractor with regards to the defective work and the balance work.

2.4.2.1 Informations on defective & balance work from the Consultants

2.4.2.2 Necessary instructions, approvals, drawings for completion of the defective & balance work from the consultants.

2.4.2.3 Necessary guides from the Contract Documents

2.4.2.4 Other informations available for or required by the Contractor with regards to the defective and balance work at the completion stage (please state briefly)
2.4.3 What were the informations received / issued by the Consultants at the stage of final costing

2.4.3.1 Final joint measurements from the Contractor YES / NO

2.4.3.2 Final bill from the Contractor YES / NO

2.4.3.3 Claiming from the Contractor (if any) YES / NO

2.4.3.4 Guidelines from the Contract Documents YES / NO

2.4.3.5 Reports and other necessary informations from the Consultant’s Supervising Staff YES / NO

2.4.3.6 Certified final Bill to the Employer YES / NO

2.4.3.7 Other informations received / issued by he Consultants at the stage of final costing (Please state briefly) 

2.4.4 What were the informations collected or issued by the Consultants in the Project Completion Report.

2.4.4.1 Statistics of the Project YES / NO

2.4.4.2 Description of the progress made during the construction period YES / NO

2.4.4.3 Details of the deviations made during the construction period and problems encountered (if any) YES / NO

2.4.4.4 Final cost figures YES / NO

2.4.4.5 Informations on major expenditure in each major bill items YES / NO

2.4.4.6 Recommendations for the improvement of documentation for future projects YES / NO

2.4.4.7 Recommended maintenance proposals YES / NO

2.4.4.8 Details of major quantities for assessing the quantities involved in future projects YES / NO
2.4.4.9 Any other informations collected / issued by the Consultants in the Project Completion Report (please state briefly)


2.4.5 What were the informations collected for preparation of As-built drawings YES / NO

2.4.5.1 Data (Levels & Measurements) from the field surveys done on completed work YES / NO

2.4.5.2 Informations from the instructions and drawings issued to the Contractor YES / NO

2.4.5.3 Other informations collected for preparation of As-built drawings (please state briefly)


2.4.6 What were the other informations collected / issued by the Consultants at the project completion stage (please state briefly)


2.4.7 Whether you had sufficient time to complete the work (viz. Reports, As-built drawings etc) at the completion stage


2.4.8 Please comment on the problems and difficulties that you encountered during the Completion Stage


3.0 COMMENTS & PROPOSALS FOR THE DEVELOPMENT OF MIS

3.1 Whether you have identified any problem or shortcomings of the MIS adopted in your project. If so please state briefly

3.2 Please list down any matters which you think are to be included in (or excluded from) the MIS for effective and better performance for consultants

End of Questionnaire

THANK YOU FOR YOUR CO-OPERATION
MANAGEMENT INFORMATION SYSTEM (MIS)

PRE-TENDER STAGE

TRAFFIC SURVEY

TOPOGRAPHICAL SURVEY

PAVEMENT SURVEY

DRAINAGE & HYDROLOGICAL SURVEY

OBSERVATIONS ON EXISTING UTILITY SERVICES

MATERIALS SURVEY

COST & ECONOMIC ANALYSIS AND ENVIRONMENTAL ASPECTS

DATA FROM OTHER SIMILAR PROJECTS

DESIGN STANDARDS

PREPARATION OF FEASIBILITY REPORT & PRIMARY DESIGNS

LAND ACQUISITIONS & SHIFTING OF EXISTING SERVICES

PREPARATION OF CONTRACT & PREQUALIFICATION DOCUMENTS

THE DONOR AGENCY & EMPLOYER

PREPARED FOR

APPENDIX C
MANAGEMENT INFORMATION SYSTEM (MIS)

TENDER STAGE

IDENTIFICATION OF THE COMPANY

TECHNICAL CAPABILITY

FINANCIAL ABILITY

EXPERIENCE OF THE CONTRACTOR

DONOR AGENCY REQUIREMENTS

ISSUE OF TENDER DOCUMENTS

ISSUE OF ADDENDUMS TENDER DOCUMENTS

ARITHMETIC CHECKS

REQUIREMENTS OF THE TENDER

EVALUATION OF TENDERS

ENGINEERS ESTIMATE

PREPARATION OF SCHEDULES

PRE-TENDER MEETING

MINISTRY APPROVAL

SELECTION OF THE CONTRACTOR

PREQUYLIFYING THE POTENTIAL CONTRACTORS

TRADE OFF THE CONTRACTORS

PREPARATION OF TENDER DOCUMENTS

SELECTION OF THE CONTRACTOR

ENGINEERS ESTIMATE

PREPARATION OF SCHEDULES

ARITHMETIC CHECKS

REQUIREMENTS OF THE TENDER

EVALUATION OF TENDERS
MANAGEMENT INFORMATION SYSTEM (MIS)

CONSTRUCTION STAGE

- Design Standards
- Consultant's Data Base
- Certification of Interim Certificates by Consultants
- Evaluation of Claims by Consultants
- Project Monitoring by Consultants
- Consultant's Data Base
- Execution of Work by the Contractor
- Quality Control & Supervision by the Consultants
- Consultant's Detailed Design Work
- Detail Surveys & Inspections
- Approved Programme for Work
- Contract Documents
- Employer
MANAGEMENT INFORMATION SYSTEM (MIS)

COMPLETION STAGE

- Inspection for substantial completion, supervision of balance work, and rectification of defects
- Conditions of contracts
- Preparation of as-built drawings & completion report by consultants
- Consultants' data base & project monitoring staff
- Final measurements & evaluation of claims by the consultants
- Employer

Field surveys