OUTLINE TERMS OF REFERENCE FOR DETAILED DESIGN CONSULTANTS

I. Objectives

1. The design consultant (DC) will be required to prepare detailed engineering documentation required for implementation. In summary, DC will (i) develop design criteria, (ii) prepare scheme designs for all elements of the Project, (iii) prepare detailed designs for a significant part of the Project, (iv) prepare a strategy for the operation & maintenance (O&M) of the bridge, (v) define requirements for any further investigations or tests, (vi) prepare tender documents for all elements of the Project, and (vii) assist with the prequalification and appointment of contractors who will be responsible for construction.

II. Scope of Works

A. Scheme Design

2. (Review Previous Studies) A number of previous studies have been undertaken in connection with establishing a fixed crossing at the selected site; they are summarized as follows: (i) "Padma Bridge Study – Prefeasibility Report", by Rendel, Palmer & Tritton, Nedeco and Bangladesh Consultants Ltd (February 2000); (ii) "The Feasibility Study of the Padma Bridge" prepared by Nippon Koei Co., Ltd. in association with Construction Project Consultants, Inc. undercontract to the JICA (March 2005); (iii) "Preparing the Padma Multipurpose Bridge Project" by STUP (September 2006); and (iv) "Land Acquisition Plan (LAP), Resettlement Action Plan (RAP) & Environmental Management Plan (EMP)" prepared by Bangladesh Consultants Ltd (June 2006). These reports summarize the considerable amount of work already undertaken to date. The DC shall review these reports and verify any technical, economic or commercial findings given in these reports which have a direct bearing on the Project as it develops.

3. (Confirm Scope of Construction Works) The DC is required to review the scope of works proposed in the various preliminary studies and confirm the scope of the construction works. This includes determining the full requirements for all aspects of the Project including the main bridge, approaches, bridge end facilities river training works and all other works that are required to achieve the project objectives.

4. (Review and Confirm Contract Strategy) It is anticipated that the Project will be constructed under several contracts awarded to different contractors. The DC is required to define the precise split of responsibility between the individual construction contracts and to define the interfaces. The initial break down of construction contracts, which shall be reviewed and modified as necessary by the DC as required, is as follows:

Contract 1	Main Bridge
Contract 2	River Training Works
Contract 3	Approach Roads and Bridge End Facilities Mawa Side
Contract 4	Approach Roads and Bridge End Facilities Janjira Side
Contract 5	Site Accommodation for Engineers and Contractors staff

5. (Bridge End Facilities**)** The bridge end facilities include the following in addition to any other requirements which the DC may determine (i) toll plaza and toll collection facilities for westbound traffic; (ii) weigh-in-motion station and weigh bridge; (iii) service area with offices and facilities for future operation and maintenance staff; (iv) a small compound with offices and

accommodation facilities to be used by the Contractor, Engineer and Client during construction and also by the Client and others during the ongoing operation phase; (v) whatever end facilities are required to connect the high voltage power cables on the bridge with the surrounding power transmission network; (vi) whatever end facilities are required to connect the gas pipes on the bridge with the surrounding gas pipe system; (vii) whatever end facilities are required to connect the telecommunications and other services carried by the bridge with the surrounding networks; and (viii) all necessary safety and security provisions associated with the above.

6. (Develop Design Criteria**)** The consultant shall prepare a comprehensive design criteria that achieve the objectives of the Project. The design criteria shall be prepared and presented in such a way that they can be readily applied by the DC, Panel of Experts (POE), the Checking Engineer (CE)) and any other design consultant such as one that may be engaged under a design and construct contract. The design criteria shall include all rail related elements including track and track support systems regardless of whether or not the railway will be installed immediately following completion of the crossing. Similarly the design criteria shall include all aspects relating to the installation or future installation of utilities on the bridge. It should clearly state all assumptions regarding loads imposed on the bridge and the expected bridge movements so that that the effects of these movements can be accounted for in the design of the utilities.

7. (Develop Scheme Design) Notwithstanding earlier feasibility studies, the DC is required to develop outline designs for a number of different options for both the main bridge, approach roads and, if appropriate, the river training works to enable options to be objectively compared against each other. Each option shall be developed in sufficient detail to demonstrate that the project objectives and design criteria have been complied with and to enable preliminary construction costs to be estimated and to enable a construction program to be prepared. The DC shall then formulate an objective method for comparing the options in order to select the preferred scheme design.

8. (Project Program**)** The DC is required to prepare a program for all aspects of the project including activities within the DC's scope and those undertaken by others. Hereinafter referred to as the project program. The program should reflect the agreed procurement strategy and Scheme Designs for all elements of the Project. It should be achievable but should be accompanied by a commentary which identifies options or alternative scenarios where appropriate.

9. (Develop O&M Strategy**)** It is anticipated that an Operation and Maintenance (O&M) contractor will be appointed for the project by the JMBA under a 5 year contract tendered on a competitive basis in strategy similar to that adopted for Jamuna Bridge.

10. (Risk Register**)** The DC is required to prepare and maintain for the duration of the project a detailed risk register. This register will identify technical, commercial, contractual, environmental, program, financing and other risks. It will identify the probability of occurrence, mitigating measures required, residual risks and the consequences should the risk be realized. It should identify those responsible for addressing the risks and at what stage the risks are to be addressed.

11. (Define Additional Studies) Additional studies prior to or during the detailed design phase are expected to be needed to provide important information that will reduce uncertainty associated with technical, program and commercial aspects of the Project. The additional studies are expected to include (i) geotechnical investigations, (ii) wind tunnel testing, (iii)

topographic survey, (iv) bathymetric survey, and (v) river flow, scour and hydrological studies and physical modeling. The DC shall identify the extent of the above studies and any other studies considered appropriate which may lead to the overall objective of reducing risk to an appropriate level. As part of this undertaking the DC should define in detail where and if appropriate how the additional studies should be executed and what the objectives of the studies are.

12. (Specifications and Contract Documents for Additional Studies) The DC shall prepare and agree a strategy for undertaking the additional studies along with cost estimates and, as noted earlier, a program for completion. The DC is required to prepare comprehensive detailed technical specification setting out the objectives of the studies, the required deliverables and what information will be provided by the DC to form part of the studies. These technical specifications should, where appropriate, set out the minimum requirements for tests e.g. scale, duration, sample type etc.

13. (Terms of Reference for Checking Engineer) The role of the checking engineer (CE) will be to review the design criteria, specifications, drawings and other documents submitted by the DC and to check the detailed design to ensure that it meets the project objectives, it is safe, buildable and economic. The scope of the CE's check is expected to be limited to the main bridge but may also include the river training works and other civil engineering works forming part of the Project if agreed with the JMBA. The proposed TOR should be endorsed by POE.

14. (Assist JMBA with Appointment of CE) The CE will be appointed by the JMBA. The DC shall assist the JMBA with every aspect of the CE's appointment including preparing tender documents and submission requirements, prequalification, assessment of tenders and final appointment. The CV of the candidates should be reviewed and accepted by POE.

15. (Project Cost Estimate) The DC shall prepare a preliminary cost estimate broken down into the different contracts showing the projected expenditure profile throughout the project on a month by month basis for each construction contract and any other works associated with the Project.

16. (Economic and Financial Evaluation**)** The DC shall develop economic and financial models comparable to that produced in the earlier feasibility studies. This shall include evaluations that are directly comparable to those produced previously but should be expanded and refined in whatever way that the DC sees as appropriate. The economic evaluation will output the predicted EIRR, benefit to cost ratio and the NPV for the Project. Sensitivity studies should be undertaken in a way similar way to at the feasibility stage. The financial evaluation is aimed at measuring and evaluating financial aspects of the Project including but not limited to (i) analysis of toll rates and predicted traffic volume, (ii) analysis of revenue from charges levied to utility companies, (iii) tax and customs revenues, (iv) project construction costs and operational and maintenance costs, and (v) analysis of probable financing methods including those of private financing methods as well as conventional methods of project financing. From this financial evaluation the DC shall prepare income and expenditure profiles for the Project.

17. (Review Possibilities for Public Private Partnerships) The DC is required to appoint an PPP/financial expert to review options for Public Private Partnership (PPP) on any aspects of the Project. Some work has already been undertaken looking at PPP options for the project. These are to be reviewed and updated for both the construction and post construction stages. In addition the DC shall explore, with the JMBA and Donor Agencies, the possibility of gap funding on PPP schemes. It is currently considered that there is limited scope for PPP involvement in

the project but that the greatest opportunity for PPP is most likely come from the O&M stage of the Project. The DC shall report on any identified PPP opportunities and pay particular attention to any possible PPP models for the O&M phase, making recommendations on the preferred options.

18. (Scheme Design Reports) At a point in the program to be approved by the JMBA the DC shall submit an interim scheme design report. This shall include details and general arrangement drawings of the options considered and a preliminary assessment of the preferred option. The DC shall make a presentation of the Interim scheme design to the JMBA, other representatives of the Government, donor agencies and other relevant authorities. Any comments received from relevant interested parties shall be considered and incorporated into the development of the final scheme design. The DC shall prepare and submit a final scheme design report that will include general arrangement drawings and presentation images for planning and promotional purposes. The report will include comprehensive details of the studies in sufficient detail to allow close scrutiny by others. The report must set out a full justification for the recommendations made.

B. Additional Studies

19. The DC shall propose additional studies and surveys required to complete the detailed design. The agreed additional studies shall be carried out under full responsibility of the DC, regardless of subcontracting arrangement that may be needed. If subcontracting arrangement is required, the DC is responsible for recruitment, technical supervision of the additional studies, and finalization of the final reports of the studies.

20. The DC shall assess the implications of the results of the additional studies and where relevant, identify any requirements for further testing that may have arisen. The DC shall seek approval to undertake such further testing. The implications of the results of the additional tests will be fully evaluated by the DC. The design criteria should be revised as required to reflect the results of the additional studies. In addition the DC shall ascertain the technical, commercial, economic and other implications arising from the results of the additional studies. Further detailed analysis and development of the scheme design is assumed to be undertaken at the commencement of tender actions. After completion of the additional studies and the DC will be required to update the project cost estimate and the project program. As in scheme design, the project cost estimate and project program must be comprehensive in their coverage and should include sensitivity studies.

C. Detailed Design

21. (Update Final Scheme Design) As soon as possible within detailed design phase, the DC shall update the final scheme design prepared in scheme design based on the results and findings of the additional studies. This update shall take into account any reports prepared as part of the additional studies and any interpretative reports prepared by the DC or others.

22. (Detailed Engineering Design) Based on the agreed contract strategy, the DC is required to prepare detailed designs for all parts of the Project except those identified as being for detailed design by contractors. The DC shall use state of the art techniques, methods and standards to produce an efficient, robust and buildable design that complies fully with the agreed design criteria developed in scheme design. The design shall conform to international codes and standards and, where relevant reference shall be made to published design and detailing guides. Proprietary analytical software should be generally be independently verified

and in all cases benchmarked against known or published solutions. Analytical techniques used in the detailed design should be described in the design report.

23. (Design Certificates) The DC shall submit to the JMBA design certificates signed by the DC's project director that itemize all drawings, and if appropriate bar bending schedules, for all detailed design elements of the Project except where detailed designs are to be prepared by contractors. The certificates shall be in an agreed format and shall in reflect the DC's obligations under his contract.

24. (Liaison with CE) The DC is required to liaise and co-operate in a proactive manner with the CE supplying design information for checking in accordance with an agreed schedule. The CE will be required to provide check certificates as a key deliverable. The check certificates will state that the CE is satisfied that the design complies with the design criteria. It is the DC's responsibility to resolve all technical issues raised by the CE relating to the design in order to get to the stage where the CE is in a position to sign the check certificates.

25. (Design Checks for Other Structures) All detailed engineering designs not checked by the CE shall be subject to a check by separate teams within the DC's organization who have not been involved in preparation of the detailed design. The DC shall submit a design check certificate for all such designs in an agreed format to the JMBA.

26. (Special Investigations) Special Investigations may be required to prove particular aspects or details of the detailed engineering design. If the DC or the JMBA determines that special investigations are required during the detailed design stage he shall prepare all necessary technical specifications and other tender documentation, tender, supervise and assess the results of these tests and report on the same to the JMBA.

27. (Confirm Scope of Each Construction Contract) Taking into consideration the detailed design, the DC is required to confirm, or modify as required, the precise scope of each construction contract as proposed in scheme design.

28. (Design Specifications for Contractor Designed Elements) The DC shall prepare illustrative designs, design specifications and construction specifications, based on the final scheme designs, for all contractor designed elements.

29. (Update Project Cost Estimate and Project Program) The DC is required to update the project cost estimate, project program and expenditure profile on a month by month basis to reflect the detailed design stage. The estimated construction supervision costs should be identified along with the anticipated running costs of the JMBA staff dedicated to the Padma project during the construction phase. The cost estimate should clearly identify the estimated value of each contract in both local currency and foreign currency, including supervision contracts, along with contingencies and allowances for currency fluctuations.

30. (Operation & Maintenance Cost Estimate) With due consideration for the choice of standard contracting arrangements (similar to that used for the O&M of Jamuna Bridge), PPP or otherwise, the DC shall develop a maintenance intervention schedule for the first 30 and 60 years after bridge opening based on the detailed design. The schedule should identify the likely activities and anticipated costs.

31. (JMBA Operation & Maintenance Requirements) From the O&M strategy developed the DC shall advise the JMBA regarding the organizational structure of the JMBA through the O&M

period. This shall include staff levels and requirements and equipment to enable it to operate and maintain the Padma bridge effectively.

32. (Operation & Maintenance Manuals) For elements of the works for which the DC is responsible for the detailed engineering design the DC shall prepare maintenance manuals which include outline method statements for key maintenance procedures, e.g. bearing replacement, stay replacement, etc.

33. (Prepare Contact Documents) The DC shall prepare all additional contract documents for each construction contract including materials and workmanship specifications, bills of quantities, instructions to tenderers and any further documentation required to complete the tender packages to the satisfaction of the JMBA and other interested Government departments.

34. (Prepare Detailed Design Report) The DC shall prepare a detailed design report for the Project that comprehensively describes the design process, methods, assumptions, analytical techniques and software used to develop the detailed engineering design and final scheme designs (for design and build contracts).

D. Tender Action

35. (Contractor Prequalification) The DC shall assist the JMBA with the prequalification procedure for each of the contracts. This shall include preparation of prequalification and selection criteria, assistance with advertising, reviewing and assessing submissions, interviewing and preparation of a prequalification report which shall include a recommended list of list of prequalification contractors.

36. (Assistance during Tender Period) The JMBA will be responsible for administering tender procedures including issuing all tender invitation documents and responding to queries raised by contractors. The DC shall provide whatever support to the JMBA throughout the Tender Period. The DC shall attend briefing sessions with contractors as required by the JMBA throughout the tender period.

37. (Tender Evaluation) The DC will be responsible for assessing all tenders and making recommendations as to which contractor should be selected for each contract. This shall include preparing, in advance, a tender evaluation strategy based on agreed technical and commercial criteria. The DC shall review each tender for completeness and compliance with the tender documentation. Thereafter the thoroughly review each tender to ensure the technical and commercial feasibility of the proposals.

E. Land Acquisition Plan and Resettlement Plan

38. The DC is responsible for preparing quality resettlement plan (RP) as required, ensuring that resettlement studies are conducted in line with ADB's *Policy on Involuntary Resettlement (1995)*, *Operations Manual (OM)/F2 on Involuntary Resettlement (2003)* and other related policies such as the Public Communications Policy (2005) so that an ADB mission can prepare the required documents for ADB financing. The Consultant may use the Handbook on Resettlement- A Guide to Good Practices; and Involuntary Resettlement Checklist as a guide. The Consultant will ensure that affected persons are consulted and resettlement information disclosed to affected persons as required under OM/F2 and the Public Communication Policy.

39. Specifically, the Consultant will conduct all but not limited to the following tasks. The Consultant will also refer to the recent findings of ADB's TA 6091-REG: Capacity Building for Resettlement Risk Management.

40. In order to prepare and update the RP, the DC will undertake the following tasks:

- **International Resettlement Specialist:**
  - (i) Provide overall guidance/instruction to national resettlement specialist in the respective aspects and be overall responsible for delivery of expected results.
  - (ii) Identify the project-related interests of key stakeholders (poor and vulnerable groups in particular) and barriers that are likely to prevent them from participating in and benefiting from the project resources. Suggest possible strategies for addressing their concerns.
  - (iii) Design a methodology for poverty impact assessment of the main investment project and develop the procedures for collecting and analyzing data required for the evaluation of such impacts and benefits.
  - (iii) Identify covenants or policy changes necessary to ensure the protection of populations at risk and vulnerable groups during project implementation.
  - (iv) Review and finalize (a) RP prepared by national resettlement specialist and confirming compliance with ADB's safeguard policies, and (b) Gender Action Plan prepared by Gender Specialist and confirming compliance with ADB's Gender and Development policy objectives.
  - (v) Provide guidance and training workshops to EA, NGOs on ADB's *Policy on Involuntary Resettlement (1995), Operations Manual (OM)/F2 on InvoluntaryResettlement (2003)* and other related policies; procedural requirements and required activities for each stage of the resettlement plan implementation.
  - (vi) Identify requirements for additional capacity building for EA in implementation of land acquisition and resettlement activities.

- **National Resettlement Specialist:**
  - (i) Conduct 100% census survey conducted based on detailed design and assesses the impacts on the people, properties, common property resources and loss of livelihood.
  - (ii) Record all non-titled occupants so that identity cards can be issued to ensure there is no further influx of people into the project area. The recorded date will serve as an eligibility cut-off date for non-titled occupants. Document fully all consultations with affected persons (APs), including the list of participants with participation of officials of the EA, as applicable, to the extent possible, and make the records available to the EA.
  - (iii) Work closely with (a) the design engineer and ensuring the designs that avoid and minimize land acquisition to the extent possible and document all the information; (b) relevant local government authorities and be in close touch with development that are currently underway for preparing a national resettlement policy in the country.
  - (iv) Assess and analyze land for land options to the extent possible for affected households that are dependent on land-based livelihoods, livestock raising, and do not have the skills and capacity to undertake alternate livelihoods.
  - (v) Based on the identified direct or indirect impacts by the Project, design a detailed plan and scooping for the income restoration program for both short and long

term (including social development fund) in agreement with JMBA. Conduct needs assessment of the APs for skills development, capital support feasibility, and marketing facilities while designing the income restoration program. Assess the availability of those facilities at the resettlement sites. Also, review EA on-going projects (Jamuna Bridge etc.) on income restoration program aspects and identify the best practice and lesson learned.

(vi) Develop the detail process of grievance redress mechanism. Formulate Grievance Redress Committees in each union where land acquisition and resettlement will take place. Provide a list of Grievance Redress Committees in the updated RP.

(vii) Develop Management Information System (MIS) and enter all the database generated by the census/SES, JVT/PVAT surveys and monitoring and evaluation system.

(viii) Prepare TOR and tender documents for NGOs for resettlement plan implementation and assist EA for recruitment of NGOs.

(ix) Revise implementation budgets, sources and timing of funding and schedule of tasks.

(x) Develop a detailed internal and external monitoring mechanism to monitor land acquisition and resettlement activities.

(xi) Consult and disclose the final RP to the APs in accordance with ADB's *Public Communications Policy (2005)*.

(xii) Identify whether the Project will be located in, or pass through, areas of significant indigenous people's settlements based on detailed design, and if any impacts on indigenous peoples are identified, preparation of an Indigenous Peoples Development Plan (IPDP) in accordance with ADB's *Policy on Indigenous Peoples* or integration of specific actions in favor of the IP in the related Resettlement Plan.

(xiii) Incorporate any other suggestions of the ADB and EA, till the acceptance of the reports by ADB and EA.

41. The DC will (i) prepare screening and impact categorization form for involuntary resettlement (IR) for the Project, (ii) finalize updated resettlement plan based on detailed design, (iii) prepare indigenous peoples screening and impact categorization checklist, (iv) prepare indigenous peoples development plan (if required), and (v) prepare the summary poverty reduction and social strategies (SPRSS) after incorporating comments from ADB and the EA.

42. The DC will prepare detailed engineering design for (i) all resettlement sites, which should include both commercial and housing plots, civic facilities and basic infrastructure utilities as necessary; (ii) affected common resource properties (CPRs); (iii) Mawa fish market with proper access to Dhaka-Mawa highway; and (iv) Kabutarkhola Bazaar.

41. 43. The DC will (i) prepare Land Acquisition Plan (as required by Land Acquisition Act 1894) for land to be acquired for the project, including resettlement sites based on detailed design, and (ii) assist EA to prepare all necessary documents for initiating land acquisition process as stipulated in Land Acquisition Laws in Bangladesh.

F. Environmental Impact Assessment

42. For environmental impact assessment, the DC will undertake the following tasks:

(i) Review all available report from previous initial environmental studies, and taking into account the ADB and Government's requirement on environment impact assessment (EIA) study.
(ii) Based on assignment (i), prepare scoping document with detail information on boundary of the study, environmental aspect to be included in the study, and approach and methodology of the study including the sampling methods. The scoping document should be presented as a draft terms of reference (TOR) for EIA study.
(iii) Submit the draft TOR for EIA to the Department of Environment (DoE) for approval.
(iv) Undertake the EIA study.
(v) Prepare the EIA report and its summary. This EIA report should include the detailed environmental management plan that should be included in the bidding document.
(vi) The EIA study should address all potential direct and indirect environmental impacts of the project. The assessment of environmental impact should be presented in the order of project cycle: pre-construction, construction and operation. In each stage of project cycle, the environmental impacts of all project components (river training works, main and associated bridges, as well as eastern and western approach facilities).
(vii) The environmental aspect to be studied should cover physical environment, ecological environment, and social aspect related to environmental concerns.
(viii) During undertaking the EIA study at least 2 step consultations with affected people needs to be carried out. The first consultation aims to gather environmental concerns from affected people and the final consultation aim to share the result of the assessment and the proposed mitigation measures. The list of people attended the consultation, time and locations; subject discussed during consultation should be recorded in systematic manner and should be attached in the EIA report as an appendix.
(ix) Submit the report to the DoE and make presentation as required by the DoE to obtain a non objection certificate.
(x) Finalize the report to accommodate inputs from DoE as well as from ADB.
(xi) The detailed guidance on how to prepare the EIA study should be referred to the ADB's Environmental Assessment Guideline, 2003 and the Government Guideline for preparing EIA from the Department of Environment.

G. Gender Specialist

43. In order to prepare Gender Action Plan, the DC will include the following tasks:

(i) Develop components ensuring women's participation in the planning, design, and implementation of the program.
(ii) Review documentation for the project area and making recommendations as appropriate to address ADB's gender and development policy objectives.
(iii) Conduct an analysis of men and women's access to resources and services.
(iv) Conduct an analysis of men and women's roles in decision making, division of labor, development priorities, and other variables that will impact on their participation in the Project and guide the project design to avoid increasing the burden on women.
(v) Assess the absorptive capacity, considering how women and men will participate in the project–their motivation, knowledge, skills and organizational resources–

and how the Project will fit into their society.

(vi) Design mechanisms that will ensure women's access to project benefits.

(vii) Identify female staff required for project implementation, and their training needs. Prepare plans for gender-related training needs of the staff of line departments, other organizations, and the beneficiaries.

(viii) Together with other team members, assess and propose opportunities for those affected women by the Project for income generation through agriculture, livestock, forestry, and other proposed project activities.

(ix) Assess the most crucial issues in women's health, nutrition, functional literacy, and skills development, and assistance in designing-related activities with possibilities to link with ongoing social sector programs.

(x) Identify institutions (governmental and non-governmental) with a focus on women or an interest in gender and development which might contribute to project design, implementation, monitoring and evaluation.

(xi) Assess the capacity of the proposed implementing agency to deliver services to women in terms of the composition of its staff members.

(xii) Prepare TOR and tender documents for NGOs for Gender Action Plan implementation and assist EA for recruitment of NGOs.

(xiii) Develop a STI and human trafficking management program in light of the Bangladesh's National Strategic Plan (NSP) for HIV/AIDs 2004-2010 to address HIV/AIDs and human trafficking issues during construction period.

Category of Experts for Detailed Design Consultants

	Number		Person-Months	
	Inter-national	Local	Inter-national	Local
General Staff				
Project Director	1	0	22	0
Deputy Project Director - Project Manager	1	0	22	0
Deputy Project Director - Project Manager	0	1		22
Contracts Engineer	1	0	9	0
QS - Cost Estimates	1	0	9	0
QS - BOQ	2	0	12	0
Chief Economist	1	0	4	0
Economist	1	0	4	0
Transport Planning Engineer	2	0	12	0
Senior Architect	1	0	4	0
Architect	1	0	16	0
Planning Engineer	1	0	5	0
QA & Miscellaneous	2	0	26	0
Railway Specialist	1	0	6	0
M & E (Utilities Interface)	0	2	0	24
Interface Engineer	1	0	12	0
Interface Engineer	0	1	0	6
Environmental Engs.	0	2	0	28
Subtotal	**17**	**6**	**163**	**80**
Main Bridge				
Team Leader	2	0	33	0
Bridge Engineer	3	0	50	0
Assistant Bridge Engineer	5	0	60	0
Geotech Engineer	2	0	28	0
CAD	3	0	36	0
Subtotal	**15**	**0**	**207**	**0**
River Training Works				
Team Leader	1	0	20	0
River Engineers	2	0	32	0
River Morphologist / Hydraulics	1	0	10	0
Geotech Engineer	1	0	14	0
Assistant Engineer	3	0	46	0
CAD	2	0	12	0
Engineer	0	1	0	14
CAD	0	2	0	20
Subtotal	**10**	**3**	**134**	**34**
Approach Roads (Scheme Design Only)				
Team Leader	0	2	0	27
Geotech Eng	0	2	0	20
Highway Eng	0	2	0	24
Hydrologist	0	1	0	8
Assistant Eng	0	3	0	34
CAD	0	3	0	26
Subtotal	**0**	**13**	**0**	**139**

Bridge End Facilities				
Team Leader	1	0	17	0
Team Leader	0	1	0	17
Design Engineers	0	3	0	41
CAD	0	3	0	24
Subtotal	**1**	**7**	**17**	**82**
Additional Studies				
Overall Team Leader	0	1	0	7
Engineers (contributions from other teams)	0	3	0	21
Subtotal	**0**	**4**	**0**	**28**
Safeguard Compliance Test				
Resettlement Specialist	1	1	15	18
Gender Specialist	1	0	3	0
Environment Specialist	1	1	6	18
Subtotal	**3**	**2**	**24**	**36**
Total	**46**	**35**	**545**	**399**