

QUANG NGAI RURAL DEVELOPMENT  
PROGRAM (QNRDP) - PHASE 2

Infrastructure Report - February 2003



**VIET NAM-AUSTRALIA**

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## Acronyms

ASAS	Australian Small Assistance Scheme
AusAID	Australian Agency for International Development
CCG	Commune Contact Group
CPC	Commune Peoples Committee
DCG	District Contact Group
DDOs	District Development Officers
DPC	District Peoples Committee
DPI	Department of Planning and Investment
GOA	Government of Australia
GOV	Government of Viet Nam
IEO	Infrastructure and Environment Officer
MEGO	M&E and GIS Officer
O&M	Operation and Maintenance
PMB	Commune Program Management Board
PMS	Program Management System
PMU	Program Management Unit
PPC	Provincial People's Committee
QN	Quang Ngai
QNRDP	Quang Ngai Rural Development Program
SC	Supervision Consultant
UNICEF	United Nations International Children's and Environmental Fund
VAT	Value Added Tax

## Summary of Recommendations

The recommendations are sub divided into five groups as follows:

### **(1) Those Requiring Immediate Action (within 1 month)**

The Infrastructure and Environmental Officer (IEO) needs to give priority to undertaking the following activities during the next month:

- 1) Ensure adequate construction supervision of QNRDP and Australian Small Assistance Scheme (ASAS) infrastructure projects by mobilising commune-based personnel to support and monitor the activities of the Supervision Consultant (SC). Closely monitor the effectiveness of the supervision regime and review the need for further action to maintain an adequate supervision regime. Achieving adequate construction supervision will require a set of simplified codes, which need to be developed for use on each small-scale commune project.
- 2) Prepare Gantt charts for all sub-projects as they are started.
- 3) Work with the Monitoring and Evaluation Specialist (M&E) and GIS Officer (MEGO) to establish database files as per Annex 4.
- 4) Ensure the District Development Officers (DDOs) record information in files as per Annex 3.

### **(2) The Main Priorities of the IEO**

Important priorities for the IEO over the next six months are to:

- 1) Check all designs for consistency and economy.
- 2) Review cost estimates for accuracy and value for money.
- 3) Ensure that the respective Activity Group, in close cooperation with the Commune Peoples Committee (CPC), will develop individual Operation and Maintenance (O&M) Plans for all infrastructure provided through the Program. These plans will include revenue estimates and cash flows for the next five years.
- 4) Ensure appropriate operational performance of infrastructure is assessed to ensure compatibility with local conditions and is defined as part of the design process.

### **(3) The Role of the IEO in Developing Improved Implementation Procedures**

The IEO, based on lessons learned, to develop:

- 1) Manuals for the CPCs to manage technical consultants and to train them in the use of these manuals. The documents will address selecting, briefing and managing consultants, basics of project management, assessing the completeness of cost estimates and identify useful resources.
- 2) In conjunction with CPCs, to compile new tendering procedures that are consistent with GOV regulations and address current shortcomings; draft new contract documents that address current weaknesses; and develop manuals for tendering and contracting consultants and contractors.

- 3) Guidelines for developing supervision procedures. The guidelines will cover the full range of supervision activities and address the nature and frequency of inspections, testing schedules, reporting and record keeping requirements.
- 4) Guidelines for the selection, appointment and management of construction supervisors. These will include a draft contract for construction supervisors.
- 5) Guidelines for preparing operation and maintenance manuals for the types of infrastructure to be provided through this program.

#### **4) The Role of the IEO in Capacity Building of the CPCs**

The IEO, in collaboration with the DDOs, will develop the capacity of the CPCs based on the results of a training needs analysis by training on:

- 1) the importance of the design process in achieving their objectives;
- 2) how to use the guidelines and manuals and improved procedures developed in the Program;  
and
- 3) the need, and how, to undertake adequate construction supervision.

#### **5) Technical Advice**

- 1) CPCs should not employ consultants who cannot illustrate their capacity to prepare accurate construction cost estimates.
- 2) To improve livelihood outcomes sustainability, performance and construction cost should be considered when developing designs.
- 3) All wells and bores to be located at least 20 metres away from uphill latrines or animal pens.
- 4) Investigate developments in the supervision of small-scale commune infrastructure throughout Viet Nam to ensure the programs activities are consistent with and support a national approach to the issue.
- 5) Review the adequacy of the of the current supervision fee once the guidelines for developing supervision procedures have been drafted.

# 1 Introduction

The role of the infrastructure component of the QNRDP is to contribute to the identification, funding, construction and maintenance of small-scale community driven commune level infrastructure that enhances livelihood and facilitates income generation. The Program aims to achieve this goal principally by raising awareness and capacity at the commune level, relating to sustainable infrastructure planning and development. The primary role of infrastructure development activities in the Program is to provide an opportunity to build capacity at the commune level with infrastructure construction being a secondary objective.

The primary responsibilities of the Infrastructure Specialist are:

- 1) Inspect infrastructure works and advise on quality of work, procedures adopted and standard of contractors employed.
- 2) Prepare guidelines for specifying, designing and inspecting of infrastructure works funded by the Program.
- 3) Establish inspection and check lists for infrastructure quality assurance to meet GOV and GOA requirements.
- 4) Prepare contract formats for infrastructure works with relevant penalty clauses for timeliness and quality of the work and other considerations.
- 5) Examine the quality and implementation of Operations and Maintenance Plans by the communes and communities.

The infrastructure activities are aimed at addressing the key result area of improved livelihoods. In planning and implementing the infrastructure activities the impact on livelihoods on poor households should always be considered. In this program livelihood improvements through infrastructure will principally occur by developing the capacity of communes to plan, fund, manage and maintain social infrastructure that address high priority problems of poor households.

The infrastructure development activities of the Program have been extended by attracting additional funding through the Australian Small Assistance Scheme (ASAS) managed by the Australian Embassy in Hanoi. Although application for funding of commune infrastructure are made direct by Communes the Program assists by providing advice on drafting applications. While the additional funding increases the opportunity for capacity building the quality assurance workload of the Infrastructure & Environmental Officer (IEO) has been increased. This has the potential to reduce his time available for capacity building. Information on the ASAS funded infrastructure has been included where appropriate.

## 2 Implementation Processes

Annex 1 summarises the implementation procedure steps and organisations responsible.

A summary of the main infrastructure undertaken to date by QNRDP is given below and the important lessons learned.

### 2.1 Design and Specification of Infrastructure

The design and specification of the following infrastructure has been completed:

- 1) Water Filters, Duc Phong Commune
- 2) Bathrooms and Toilets, Duc Phong Commune
- 3) Health Centre, Duc Phong Commune (ASAS)
- 4) Wells and Bathrooms, Son Hai Commune (ASAS)
- 5) Road Bridge, Tinh Tho Commune (ASAS)
- 6) Health Centre Upgrade, Tinh Tho Commune (ASAS)

This review of the implementation process begins after the communes have identified the scope and function of the infrastructure through a participatory process. In some instances where identifying the solution to a commune problem is not immediately evident some form of external technical assistance may be justified. However for the purpose of this program it is assumed that communes will identify infrastructure programs without assistance from outside technical consultants.

#### 2.1.1 Compliance with GOV Regulations

The design and specification of small value commune infrastructure under the Government of Viet Nam (GOV) regulations is undertaken in two steps. The scoping of the program and initial cost estimate is prepared as part of the **Investment Report**. The detailed construction drawings are prepared in the **Design Report**. However due to the small construction cost and simple form of construction the design of the infrastructure for this program has been prepared almost entirely as part of the Investment Report.

Key GOV regulations concerning the design of small commune infrastructure that are pertinent to this program are:

- 1) All designs must be prepared by competent organisations **licensed** to perform the service.
- 2) Commune People's Committees (CPC) are responsible for **managing consultants** involved in the preparation of Investment and Design Reports.
- 3) District People's Committees (DPC) are responsible for **approving** Investment Reports.
- 4) CPCs are responsible for **approving** Design Reports.
- 5) All investment and design reports must be **independently appraised** by relevant government agencies.
- 6) **Standard** GOV material and workmanship specifications and building codes must be incorporated into all designs.

The appointment of the IEO has strengthened compliance with relevant GOV infrastructure regulations. The IEO has improved the transparency of implementation and strengthened the rigour of the appraisal functions. Areas that have been strengthened are the performance of the design appraisal and incorporation of the GOV workmanship and materials specification. Design appraisals are considered critical in ensuring an appropriate set of construction documents are prepared. Workmanship and material specification will be made more readily available to the construction contractor or supervisors. Contractors and supervisors seem to rely on following conventional practices that is leading to a reduction in quality. The difficulty with applying the GOV standards is their complexity and size, which makes them difficult to apply on small-scale contracts. The absence of a simplified standard that is incorporated into the contract documents makes it difficult to ensure adequate supervision is provided.

### **2.1.2 Compliance with GOA Regulations**

A direct comparison between the design and building codes of Australia and Viet Nam is not possible due to their complexity and size. Australian building codes have been developed for use in Australia and therefore their use on a program where the socio-economic and physical environment and type of infrastructure involved are so different to Australia is not recommended. The use of Australian building codes on this program is even more problematic due to the nature of the works and the financial constraints. Viet Nam has developed and currently uses, a complex system of design and material codes based on the certification of materials, licensing of operators and employment of checks and balances in the design process. The strict compliance with Viet Nam building codes and regulations is appropriate for the type of infrastructure found in this program and is similar to what other donors and projects have adopted in other Provinces.

The strong justification for using Viet Nam building regulations and codes is to: build capacity in infrastructure planning and development at the commune level (using foreign codes would weaken the very functions the program is aimed at strengthening); and the cost of the infrastructure would be increased using foreign codes. Increased construction costs would limit livelihood improvements.

### **2.1.3 Lessons Learned from Infrastructure Implemented to Date**

The lessons learned from these early activities will be collected by the IEO and included as a basis to the manuals and procedures to be developed for infrastructure implementation. As further lessons are learned these will be regularly included in updating the manuals.

#### Health Centres

Planning for the two health centres designed to date is based on the demand for beds and services based on actual demand over the previous 12 months. Once the number of beds and types of services have been selected, buildings are designed using design criteria provided by the Department of Health. Generally the health centre designs prepared to date are fit for purpose and scoped to suit expected demand. At the ASAS-funded Tinh Tho health centre, decisions concerning works to be deleted from the contract due to cost escalations can be questioned as high priority functions. For example, medical waste disposal and store rooms were deleted with preference given to a masonry boundary fence. The design of the boundary fence and entrance does not appear to be an appropriate use of scarce construction funds. *There is a need for tighter supervision of design and implementation by the CPC and activity groups.*

### Water Filters

The filter has a capacity to operate satisfactorily at peak demand for a household of 10 persons. Assuming average daily per capita demand of 60 litres and peak hourly demand of 20% of daily demand then the velocity of water through the filter will be within the optimum operating conditions. Operational performance would be enhanced if a valve was provided on the discharge into the treated water storage tank so the flow could be modified to suit the condition of the sand filter. Operational performance would also be enhanced if sifted sand with optimum characteristics was used. To ensure optimum impact to the householders the increased cost of treating the sand against improvements in performance should be assessed in field trials. As the average household size in Quang Ngai Province is 4.8 persons and the filters are designed to accommodate 10 persons the size and therefore the cost of the filters could have been significantly reduced. *There is a need to make sure the design is appropriate to the number of users.*

### Wells and Bores

The design of wells and bores are fit for purpose and generally match wells and bores constructed by households using their own funds. The main difference is the program is lining the wells to reduce contamination. The use of the more expensive wells in preference to bores is limited to those areas where rock makes bore construction difficult if not impossible. The main well design features of a concrete surface slab and lining and barricade wall relate to reducing contamination and improving safety. An important design parameter is the siting of wells to limit contamination from sanitation facilities and animals. The rule of thumb of providing at least 20 metres from uphill latrines and animal pens is sometimes difficult to achieve in hilly areas where suitable aquifers are difficult to locate.

### Bridges

Viet Nam has road and bridge design standards based on road classification. The standards ensure consistent and appropriate design standards across the nation. These design standards have been incorporated into the bridge constructed using ASAS funding in Tinh Tho Commune. The design of this bridge provides a good illustration of the need for independent checking of design consultants' work. In this case the Department of Transport significantly amended the design provided by the design consultant. The width of the deck and the design load of the design consultant's design did not comply with the relevant standard. The bridge deck width was increased from 3metres to 3.5 metres and the design load increased from 8 tonnes to 13 tonnes. The increased design load required the insertion of an additional pier. *The need to ensure design consultants apply and comply with GOV standards.*

### Bathrooms and Latrines

There are no formal design standards for bathrooms and latrines therefore the design was undertaken to suit the requirements of the householders. The bathrooms and latrines are constructed of durable materials although the design provides a higher utility than existing facilities. The main difference is the provision of a fully enclosed room. It is quite for commune latrines and bathrooms to consist of a low wall and no roof. The provision of a roof and full height walls increases construction costs. The design could have considered the cost of construction as the construction cost of these buildings exceeds the target costs for sanitation facilities in Viet Nam set by UNICEF in 2000. For more information on this see Section 2.2.2. *The need to check unit prices with other similar projects and GOV specifications and standard units.*

## 2.1.4 Institutional Capacity

The quality of designs prepared for this program have varied in quality. A problem that arises quite frequently is the quality of the designs exceeds the functional requirements of the infrastructure. This leads to reduced impact arising from the funds expended.

There are a number of government and private sector institutions involved in the preparation, appraisal and approval of designs and specifications. The key institutions however that have the greatest impact on performance and quality are the CPC and the design appraisal organisations. The CPC identifies the functional requirements of the infrastructure through a participatory process and appointing and managing the various technical consultants and organisations. The DPC approves the Investment Report, selects the contractor and approves the supervision methods. The CPC has the biggest impact on quality with programs of this size and complexity. While it is not appropriate, feasible or sustainable to develop the capacity of CPCs to be technically competent in all aspects of infrastructure design it is important that CPCs develop the skills to manage consultants efficiently. CPCs need to develop the skills to manage consultants so their requirements are incorporated into the constructed infrastructure and livelihood outcomes are maximised for the funds available.

The other key deliverers of quality are the appraisal organisations. Where infrastructure relates to normal government services than the relevant government technical agency is a suitable appraiser of functional suitability. Examples of such services are health, education, roads, electricity and irrigation. Where infrastructure relates to infrastructure for individual households or hamlets finding a suitable appraiser can be difficult. Examples of such services are latrines, bathrooms and wells. In addition to appraisal by technical agencies there is a need for a check of compliance with commune requirements and the economy of design. The review of economy of design on aid funded programs is important to ensure facilities are fit for purpose and make best use of the available funds.

## 2.1.5 Key Findings

The key findings relating to design and specification of infrastructure for communes are:

- 1) Adequate infrastructure design capacity exists in Quang Ngai to service communes.
- 2) Appropriate government procedures exist to manage the design process.
- 3) GOV design codes and standards are the most appropriate for commune infrastructure.
- 4) GOV design codes and standards need to be simplified for use on small-scale commune programs.
- 5) Independent appraisal of all designs is essential.
- 6) CPCs are the key organisation in developing sustainable commune infrastructure.
- 7) Communes need to improve their capacity to manage technical consultants.
- 8) Operational performance of infrastructure should be assessed to ensure infrastructure performance is optimised under local conditions.
- 9) Selecting the site of wells and bores should consider adjacent sanitation facilities and animal pens.
- 10) Improved design of household sanitation facilities are needed to provide a good future model. The incorporation of a roof and high walls is not necessary; they increase construction costs and therefore reduce affordability.
- 11) Redesign of the water filters is needed, as the current design provides twice the required capacity.

## **2.1.6 Key Recommendations**

Recommendations concerning the design process are:

- 1) Develop guidelines and manuals for CPCs in managing technical consultants and train them in their use. The documents should address selecting, briefing and managing consultants, basics of project management and identify useful resources.
- 2) Raise the awareness of CPCs on the importance of the design process in achieving their objectives.
- 3) Only GOV standards, codes and procedures should be used on the Program. A set of simplified codes need to be developed for use on small scale commune programs.
- 4) To improve livelihood outcomes sustainability, performance and construction cost should be considered when developing designs.
- 5) Where appropriate operational performance of infrastructure should be assessed to ensure compatibility with local conditions. The need for and design of the assessment should be defined as part of the design process. Funding for the assessment should be provided by QNRDP.
- 6) All wells and bores to be located at least 20 metres away from uphill latrines or animal pens.
- 7) The IEO should check all designs for consistency and economy.
- 8) CPCs should be strengthened to use the guidelines and manuals for managing consultants.

## **2.2 Determination of Cost Estimates**

### **2.2.1 GOV Cost Estimation Procedures**

The cost plan for an infrastructure development program is determined at the Investment Report phase and confirmed during the design and appraisal phases. The consultant or officer developing the report will prepare a schedule of quantities based on the scope of the program using standard item descriptions and methods of measurement. Costs for materials, labour and equipment are then calculated by applying Government determined unit rates. Final estimates for labour and equipment are then determined using indices that consider geographic location and time based cost escalation. The final cost of materials is determined by calculating the quantity of each material and then comparing the assumed cost and the actual local current procurement cost for each item. Finally the cost of transport is calculated using current transport rates. Project specific expenses, for example traffic management for a bridge construction project, are then included as a percentage of construction cost. Design and supervision fees are set as a fixed percentage of construction cost while site investigation costs are based on the actual work to be undertaken.

For small value projects, like those found on this program, the investigation, design and supervision consultants and the construction contractor will then be selected from appropriately licensed and qualified organisations. These organisations will then receive 97% of the fee or amount as set out in the approved report and included in the notification of DPC's approval decision.

## 2.2.2 Adequacy of Cost Estimates on this Program

Cost estimates have been received on all six projects (ASAS and QNRDP) currently being constructed. The presentation and completeness of the cost estimates varied depending on the capacity of the organisation preparing the report. The most comprehensive and best-presented cost estimate was prepared by the Department of Transport and related to the Tinh Tho Bridge. All cost estimates were reasonably consistent regarding standard items. E.g. fees for preparing reports, design, supervision and labour and equipment escalation rates. Most cost estimates included a maintenance charge of 5% while the Tinh Tho Health Centre included a maintenance charge of 10%. VAT was rated as zero in all cost estimates. Two of the three projects with repetition incorporated a full fee for the design of the first item and a nominal design fee for all subsequent repetitions of the infrastructure.

Generally the completeness of the cost estimates varied considerably between sub-projects. An incomplete cost estimate would underestimate the cost of the works due to the deletion of real costs. Items omitted from some of the cost estimates included transport of materials, insurances, supervision fees, mine clearance and contingency sum. As the contractors are required to work within the approved cost budget any error in preparing the cost estimates would result in some of the works being deleted from the scope of work or the contractor will be liable to reduce the quality of the construction if not adequately supervised. Due to cost escalations the CPC at Tinh Tho agreed with the contractor to delete certain parts of the scope of work. Information on the quality of construction is provided in Section 2.4.2.

While comparisons of cost rates for small scale construction of this nature between countries is not meaningful, the percentage fees for design and supervision is reasonable as the nature of the work is similar and the fee is expressed as a percentage of actual construction cost. The percentage fee for design and supervision used in Viet Nam is approximately 40% of the equivalent rate in Australia. Generally the cost of institutional buildings on this program is within the budget allocations of donors used on other similar projects. A comparative analysis of construction costs on donor-funded projects is provided in Table 1. The higher construction cost for QNRDP latrines is due to the higher design standard employed.

**Table 1: Construction Costs on Donor Funded Projects**

Description	Unit	UNICEF 2000	QN Rural Infrastructure Project (2002)	QNRDP
Double pit pour flush latrine	No	A\$108	-	A\$228 <sup>(1)</sup>
Health Centre	Sq m		A\$200	A\$128

(1) Cost based on 60% of Bathroom and Latrines at Duc Phong

## 2.2.3 Capacity Building Implications

Construction cost estimates are prepared by technical organisations and approved by the CPCs and DPC. A poorly prepared cost estimate arises when the consultant fails to include all costs and the approving authority, which is principally the CPCs, fails to identify the shortcomings. While the strengthening of consultants to prepare cost estimates is outside the scope of this

Program, the sources of error in cost estimates are manageable by CPCs. To improve the accuracy of cost estimates CPCs should only appoint consultants who can prove they have the capacity to prepare accurate cost estimates and should develop the capacity to assess the completeness of cost estimates. While the ability to review the accuracy of the schedule of construction quantities would not be feasible the CPCs should be able to check that all inflation factors and administration and overhead charges have been included.

### 2.2.4 Findings

- 1) The accuracy of a cost estimate can greatly affect the success of the construction activity.
- 2) The quality of the cost estimates prepared for the program construction activities varies considerable between sub-projects.
- 3) The CPC is the best supervising organisation with the power to improve the quality of cost estimates.

### 2.2.5 Recommendations

- 1) CPCs should not employ consultants who cannot illustrate their capacity to prepare accurate construction cost estimates.
- 2) Prepare guidelines for assessing the completeness of cost estimates and include in the guidelines described in Section 2.1.6(1).
- 3) CPCs should receive training in the review of construction cost estimates.
- 4) The IEO should review cost estimates for accuracy and value for money.

## 2.3 Contracting

The implementation process requires the procurement of a number of services of varying value and complexity. The services procured can be classified into two groups, Professional Services and Construction. **Professional services** includes site investigation (survey and geotechnical), design, documentation, design appraisal and construction supervision. **Construction** includes the supply of materials and construction of a range of infrastructure from latrines to health centres and kindergartens.

### 2.3.1 Preparation of Tender Documents

#### Professional Services

Current tender documents for small value professional services contracts are very simple, as fees and scope of services are fixed and based on government regulations. To be eligible for appointment companies must be licensed by the government to provide the service.

#### Construction

Once again, tender documents are very simple but in this case construction drawings are provided along with contract conditions that tenderers should accept. These contract conditions include the use of local labour, construction period, quality standards and warranty.

## **2.3.2 Tendering Arrangements**

### Professional Services

To date all contracting has been undertaken using the GOV procedure for small value contracts. There is no price competition as fees are set by government decree and companies are selected on their technical competence. Due to the limited number of appropriately licensed organisations, companies normally submit a willingness to undertake the work and the CPC selects who they feel is the most suitable. The appointment of professional services consultants does not require approval of the DPC.

### Construction

The Commune Project Management Board (PMB) with assistance from the Commune Contact Group (CCG) selects a preferred tenderer based on submissions received and submits their recommendation to the PMU for appraisal and finally to the DPC for approval to appoint the preferred contractor. The PMB should submit all tender submissions to the DPC along with their recommendation and must consider at least three tenders.

## **2.3.3 Preparation of Contract Documents**

### Professional Services

Contract documents have only been sighted for construction supervision services. No contract documents have been sighted for the design and documentation or design appraisal. The construction services contract documents included the following information:

- 1) Details of enabling legislation.
- 2) Name and contact details for both parties.
- 3) Name and location of the program.
- 4) Duties of both parties. Only a very broad statement is provided on duties.
- 5) Contract value.
- 6) Project commencement and completion date.
- 7) Method of payment.
- 8) Agreement to renegotiate fees if the scope of services changes.
- 9) Method to notify problems.
- 10) Date of effectiveness of Contract.

### Construction

The contract documents used on the Program to date include the following information.

- 1) Details of enabling legislation.
- 2) Name and address of both parties to the agreement.
- 3) Name and location of project.
- 4) Contract value.
- 5) Method of payment.
- 6) Commencement and completion date.
- 7) Duties of both parties.
- 8) Terms of payment.
- 9) Method to notify problems.

### **2.3.4 Adequacy of Contracting on this Program**

#### Professional Services

The appointment and management of professional services consultants to date has been handled almost exclusively by the CPCs with little information on the process being made available to the PMU. From the limited information provided, the following improvements to current procedures are recommended:

- 1) Improve transparency in the evaluation and selection of consultants.
- 2) While tendering may not be appropriate due to the small number of eligible companies in Quang Ngai, a procedure to consider previous performance in the selection process would improve the quality of outcomes.
- 3) Applicants for design services should be provided the opportunity to comment on the need for investigation services. This is necessary so design specialists have all the required information they need to successfully design the infrastructure.
- 4) Quality mechanisms need to be defined more definitively in contract documents. This would facilitate monitoring by the Employer.
- 5) The scope of services need to be defined more definitively. In addition to technical aspects like deliverables and standards management issues like reporting requirements, approval processes and scheduling should be defined.
- 6) Provision to recoup cost escalations due to poor performance by the contractor should be included. The most normal procedure is to include provision for a predetermined financial charge for late completion.
- 7) Provision for recouping the cost of non-compliance with the scope of services should be included. That is, consultants should be responsible for any design errors they commit.
- 8) A penalty for breach of the contract by the Employer should be provided. The most common breach by Employers is late payment of invoices and failure to respond to requests for information or provide access to site.
- 9) A procedure for resolving disputes should be included to provide some comfort to both parties that problems will be resolved equitably.

#### Construction

There are some important issues affecting the management and construction of infrastructure that are not addressed on the form of construction contracts being used on this Program. The following are issues that should be addressed on the construction tender and contract documents to improve management of the process by the infrastructure owner, the quality of construction and efficiency of delivery.

- 1) Improve transparency in the evaluation and selection of contractors.
- 2) As an indication of their ability to successfully complete the works contractors should provide details of similar projects they have successfully completed. As proof of the success of their previous projects Contractors should be asked to provide contact details of referees.
- 3) To ensure contractors have the capacity to undertake construction it is important that contractor advise the equipment they propose to utilise and provide proof that they can supply the equipment from their current resources. Similarly contractors should be required to provide details of the experience of their senior staff and the financial resources available to the company.

- 4) A weighted scoring system should be used that considers technical capacity and experience as well as price. Only companies that can achieve a minimum technical ranking should be considered.
- 5) Quality mechanisms need to be defined more definitively in contract documents. This would facilitate monitoring by the Employer.
- 6) The contract documents should clearly define the contractors and employers responsibility for the holding or regular meetings to manage the program and the contractor's reporting requirements. A communication system between the parties should be defined in the contract to improve efficiency.
- 7) The scope of work needs to be defined more definitively. In addition to technical aspects like construction drawings, work methods and specifications management issues like approval processes and scheduling should be defined in the contract documents.
- 8) Provision to recoup cost escalations due to poor performance by the contractor should be included. The most normal procedure is to include provision for a predetermined financial charge for late completion. To ensure the process is equitable the contract documents should give the contractor the right to apply for an extension to the time for completion where the contractor is not the cause of the delay.
- 9) Provision for recouping the cost of non-compliance with the scope of work should be included.
- 10) A penalty for breach of the contract by the Employer should be provided. The most common breach by Employers is late payment of invoices and failure to respond to requests for information or provide access to site.
- 11) A procedure for resolving disputes should be included to provide some comfort to both parties.
- 12) Warranty requirements upon completion of construction should be defined in the contract documents.
- 13) The staging and value of progress payments based on work completed need to be clearly defined in the contract documents.
- 14) Contractors should be given the opportunity to query the suitability of the cost estimate prepared for the program. Should contractors feel that a significant expense has not been included they should have the right to substantiate their claim before the contract is signed so a fair and reasonable contract sum can be negotiated. If need be a cost saving in other areas of the program may be necessary to ensure the program budget is not exceeded.

### **2.3.5 Capacity Building Implications**

The organisation with responsibility for the contracting of consultants and contractors is the CPCs. While the DPC must approve the selection of contractors the organisation that has the biggest impact on quality is the CPCs. There are two steps to building the contracting capacity of CPCs. The first step is to develop improved procedures and standard documents to be used in contracting, with the second step being to transfer the skills to use these procedures and documents to the CPCs. The development of the procedures and documents needs to consider the technical capacity within CPCs, the nature of the services provided and the type and scale of work undertaken. The procedures and documents should address the significant contracting issues but not be too complicated or imposed requirements that will be difficult for any party to meet.

### **2.3.6 Findings**

- 1) Tendering procedures need to be more transparent and include a thorough comparison of the suitability of all applicants.
- 2) Contract documents need to address all aspects of the relationship between contractors and employers.
- 3) Previous performance and capacity should be considered when selecting contractors.
- 4) Additional safeguards for all parties should be incorporated into contract documents.
- 5) Additional management tools to aid project management should be incorporated into contract documents.
- 6) Tendering procedures and contract documents should be kept as simple as possible and only be amended to accommodate significant quality, financial and technical issues.
- 7) CPCs are the primary deliverers of quality into the contracting function.

### **2.3.7 Recommendations**

- 1) In conjunction with CPCs draft new tendering procedures that are consistent with GOV regulations and address current shortcomings.
- 2) Draft new contract documents that address current weaknesses.
- 3) Develop a Users Manual for tendering and contracting consultants and contractors.
- 4) Develop capacity with CPCs to use the modified procedures and documents in a sustainable manner.

## **2.4 Construction Supervision**

### **2.4.1 GOV Construction Supervision Regulations**

The supervision process begins with the preparation of the supervision procedures by the PMB and approval by PMU and DPC. The appointment of supervision consultants (SC) is the responsibility of CPCs through the PMB. The SC are contracted by the CPC. To be eligible, the SC should be licensed by the GOV to provide construction supervision services although to date non-technical organisations/individuals have been contracted to provide construction supervision services of simple construction activities on the Program. Construction supervision is the joint responsibility of CPCs, recipients and inspection consultants. While the inspection consultants provide the technical expertise the recipients and CPC members are charged with the responsibility of both assisting the SC and monitoring their performance.

The SC performs the construction supervision in accordance with the approved supervision procedures approved for the program. Officers from the District Contact Group (DCG) and the commune have an informal role to check on the CS and directly supervise construction. The CS must approve all construction materials before they are incorporated into the works, prepare a defects list after construction is completed and undertake a final inspection when the defects have been rectified. The CS also verifies the value of progress claims submitted in accordance with the construction contract. If the supervisors agree the works have been constructed in accordance with the construction contract the CPC, Contractor, CCG, PMU and DCG undertake a final inspection of the works. CS are paid in accordance with GOV set fees. The normal fee paid to CS for small value projects is approximately 1.5% of the construction cost.

As the programs are physically distant from Quang Ngai city; have a low value; and are being constructed by small contractors with limited capacity, the 1.5% fee may not adequately compensate the SC if they are to provide an acceptable service.

#### **2.4.2 Adequacy of Inspections on this Program**

CS have been appointed on all QNRDP and ASAS funded sub-projects in accordance with GOV regulations. To date, no supervision procedures have been drafted or approved on any of the six sub-projects implemented. The quality of the supervision services provided on all sub-projects needs to improve. Since the IEO has been working on the Program he has identified faulty workmanship on all three projects that he has been involved in. In all cases the GOV appointed inspector has failed to identify the faulty workmanship. In all three cases the IEO has suggested remedial work to rectify the defects in collaboration with the contractor. Anecdotal evidence from commune or recipients of the infrastructure indicates that inspection contractors rarely visit the works and fail to adequately supervise the construction. To date no construction progress reports have been provided for any projects from inspection contractors or CPCs.

While CS cannot always be present there appears to be a consistent and ongoing trend of poor quality services from them. Recommendations on how to improve this situation are provided below.

It is essential for the sustainability of the infrastructure provided through QNRDP and ASAS that an adequate construction supervision regime is developed quickly and maintained during all construction. There are a number of options available to immediately provide the additional resources needed to maintain an adequate supervision regime. Three options that are both feasible and have the potential to resolve the problem quickly are.

- 1) Mobilise commune personnel through activity groups to support and monitor the CS.
- 2) Combine the supervision contracts for all QNRDP and ASAS projects for a fixed period of say one year and appoint a suitably qualified Viet Nameese company.
- 3) Appoint a second IEO to the QNRDP whose primary task will be to supervise all construction activities.

A precondition to improving construction supervision is the development of simplified specifications and a supervision plan for each project. The possibility of the current QNRDP IEO being used to directly supervise construction has been investigated and rejected for a number of reasons. While the IEO should continue to undertake occasional inspections of construction to monitor the performance of the CPCs and their contractors, the IEO should concentrate on capacity building related to infrastructure planning, development and maintenance within communes and CPCs. To use the IEO to take over primary responsibility for construction supervision, while well within his capacity, would not deliver the livelihood improvements that are the primary goal of Component 2.

#### **2.4.3 Capacity Building Implications**

There is a poor appreciation within virtually all the organisations responsible for the various aspects of construction of the need for and importance of construction supervision. While

contractors are in the best position to ensure the quality of construction there is ample evidence to date on this program that they cannot be relied on to diligently comply with building standards. The development of simplified specifications would assist contractors by providing more information on their responsibilities. It is outside the scope and resources of this program to strengthen the capacity of contractors in this area. Therefore the scope for capacity building in quality management in construction is limited to CPCs, recipients and inspection consultants as they jointly have responsibility for supervision of contractors. CPCs have a number of roles in construction supervision. Through the PMB CPCs are responsible for the design and approval of supervision procedures for each sub-project. CPCs are also directly responsible for the selection, appointment, management, and monitoring of inspection consultants. During the construction phase they are potentially responsible for complementing the supervision roles of the consultants and the recipients. Based on the experience to date CPCs need capacity building in the design of supervision procedures, selecting and managing competent consultants. To ensure the sustainability of the capacity it is suggested that initially CPCs awareness of the need for adequate construction supervision on infrastructure projects should be increased.

#### **2.4.4 Findings**

- 1) There is a need for an adequate quality management system on QNRDP and ASAS funded infrastructure projects due to the poor track record of contractors to deliver quality construction.
- 2) The quality of construction supervision systems and personnel is inadequate and the physical sustainability of infrastructure is being affected.
- 3) Develop a simplified building specification to assist contractors and CS to understand their responsibilities.
- 4) Institutional responsibility for construction supervision lies with CPCs.
- 5) CPCs do not have the current capacity to ensure a quality management system is developed and implemented on small infrastructure projects.
- 6) The IEO does not have the time to adequately supervise construction on all proposed QNRDP and ASAS projects if contracted supervision personnel do not improve.

#### **2.4.5 Recommendations**

- 1) Investigate developments in the supervision of small-scale commune infrastructure throughout Viet Nam to ensure the programs activities are consistent with and support a national approach to the issue.
- 2) Develop guidelines for developing supervision procedures. The guidelines should cover the full range of supervision activities and address the nature and frequency of inspections, testing schedules, reporting and record keeping requirements. A sample supervision procedure for the construction of sand filters is provided in Annex 5.
- 3) Increase the awareness of commune personnel and CPCs in the need for adequate construction supervision.
- 4) Develop guidelines for the selection, appointment and management of construction supervisors. These guidelines should include a draft contract for construction supervisors.
- 5) Review the adequacy of the of the current supervision fee once the guidelines for developing supervision procedures have been drafted.

- 6) Ensure adequate construction supervision of QNRDP and ASAS infrastructure projects by mobilising commune based personnel to support and monitor the activities of the CS. Closely monitor the effectiveness of the supervision regime and review the need for further action to maintain an adequate supervision regime.

## 2.5 Quality of Construction

Construction quality should always be measured relative to the standards defined in the construction documents. In the case of this program the construction drawings are the principal definers of construction standards. The relative quality of construction on the program relative to other comparable infrastructure construction was also undertaken.

On the program to date the quality of construction varies considerably between sub-projects. A contributing factor to the variability of the quality of construction has been the poor quality of the inspection services. While most construction appears to be of a similar standard to recent construction on other similar projects there have been a number of instances of sub-standard work. In all cases mentioned below, remedial work has been completed or is under preparation. Instances of substandard work found to date includes:

- 1) **Nam Bridge, Tinh Tho**

Inadequate concrete compaction has been undertaken when casting the abutment walls. There is evidence of patching of honeycomb arising from this poor compaction. It is difficult to assess the depth of the honeycombing to see if the structural adequacy of these abutments has been significantly reduced. The performance of the bridge should be monitored over time to assess the scope of the problem.

- 2) **Health Centre, Tinh Tho**

The following defects need to be fixed: water supply pipes jointing and fixing, leaks in the water storage tank, size and thickness of the circular columns on the front verandah, construction of pedestrian gate, rusting on fence and structural columns, front door construction, water supply to hand basins in wards, bore construction, electrical wiring to water pump and floor drain in toilet/bathroom.

- 3) **Wells and Bathrooms, Son Hai**

Construction of the slab around the well was too thin and inadequately constructed.

- 4) **Bathrooms, Duc Phong**

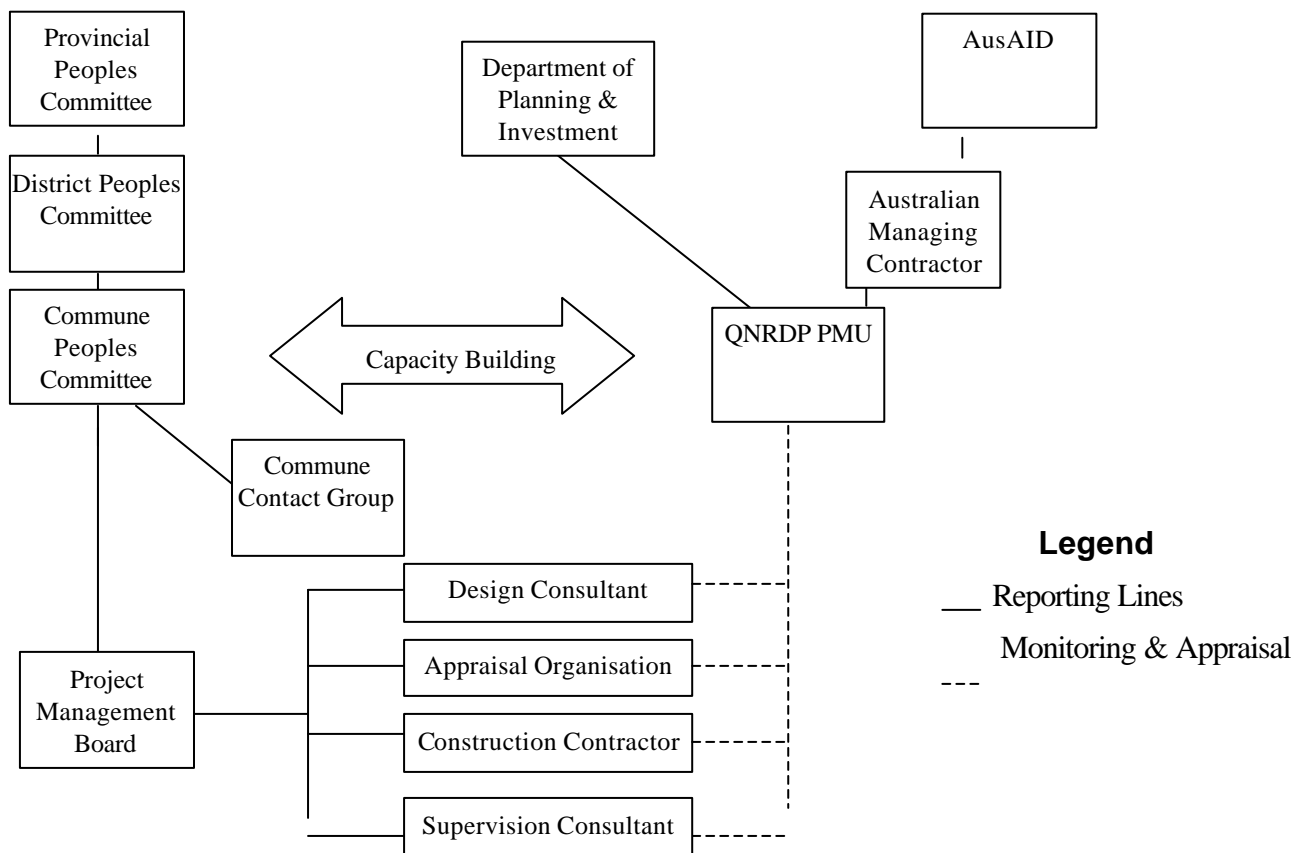
The jointing of the sewerage pipes was defective.

There are a number of local practices that need to be improved through improved inspection services. Instances of poor workmanship that need to be addressed are: non compliance with concrete mix design proportions, use of large coarse concrete aggregate, inadequate mixing of concrete, poor compaction of concrete in slabs and walls and improper concrete mixing surfaces.

## 3 Project Management

The successful implementation of an infrastructure program of any size requires the development and use of an appropriate Project Management system. Based on the number of sub-projects under consideration for funding through QNRDP and ASAS there may possibly be up to 20 sub-projects being implemented at any one time.

It is therefore proposed that an integrated project management system (PMS) be developed and operated by the IEO covering planning, scheduling, monitoring, record management and reporting. Financial controls will be maintained within the URS BMS System already in use on the program. The PMS will address institutional responsibilities, scheduling, cost budgeting, record keeping, lessons learned and reporting through an integrated approach in accordance with task descriptions provided in an operational manual. The PMS will be managed by the IEO with support from the Infrastructure Adviser. A key feature of the PMS will be the identification of responsible organisations for each task development of an implementation plan and a methodology to identify and eliminate planning and implementation bottlenecks. This will support the capacity building activities as institutional weaknesses will be identified quicker and sub-project implementation schedules complied with. Information on the institutional arrangements for sub-projects are provided in the organogram provided in Figure 1.



**Figure 1: Infrastructure Implementation Organisational Structure**

Scheduling will be undertaken using Microsoft Project and will include all sub-project preparation and implementation activities. Refer to Annex 2 for descriptions of these tasks. Cost budgeting will include the preparation of cost estimates and monitoring of contractual financial limits. Information will be stored in a network of paper and electronic files that will facilitate the retrieval of information for management and reporting. To ensure transparency all documents in Annex 3 that relate to key steps in the implementation process will be stored in the sub-project files. The reporting framework will be integrated with the program’s Monitoring and Evaluation Plan and ASAS reporting requirements. Details of the reporting framework and database files are provided in Annex 4.

## 4 Operation and Maintenance of Infrastructure

The objective of the program is to establish appropriate Operation and Maintenance (O&M) Plans for infrastructure provided through the program. To achieve this objective individual O&M Plans will be developed that are consistent with GOV regulations, available funding and the type of infrastructure. The capacity of the CPCs to undertake the maintenance will also be considered. To ensure adequate funding is available a five-year plan will be developed and a cash flow calculated based on expected user charges and availability of funding from commune and district maintenance funds in accordance with GOV regulations.

### 4.1 Relevant GOV Maintenance Regulations

Maintenance of commune-based infrastructure is the responsibility of CPCs. The CPC is charged with responsibility of preparing and implementing a maintenance plan for all infrastructure under their control using funds collected from users or from consolidated accounts. To assist the CPCs maintain new infrastructure adequately the Design Report prepared by the design consultant provides details of the type of maintenance activities required and their frequency of application.

### 4.2 Structure of Maintenance Plans

The complexity and nature of the infrastructure will affect the structure and content of the Maintenance Plans. Simple infrastructure requiring little maintenance, for example wells, the operational requirements to ensure effective performance may be more important than the maintenance. Where infrastructure is more complex and of a scale that maintenance is more important, for example a Health Centre, than a more comprehensive Maintenance Plan may be justified. An example of a Maintenance Plan for simple infrastructure is provided in Annex 7. The structure and content of a Maintenance Plan for complex and larger infrastructure is provided below.

#### Section 1 Maintenance Tasks

Section 1 will explain the maintenance tasks, the resources and the equipment needed to undertake the maintenance. It will also include the cost of the maintenance.

#### Section 2 Operational Items

Section 2 will explain any operational costs involved with using the infrastructure. For example, for a building this may be the cost of electricity.

#### Section 3 Stock Control

Section 3 will explain the need to maintain a stock of spares or consumables needed for either operations or maintenance.

#### Section 4 Organisational Issues

Section 4 will explain the roles and responsibilities for all persons involved in the planning, budgeting, implementation, and supervision or financing of operation and maintenance activities. The need for specialist services by contractors will be identified in this section.

- Section 5      **Workplan**  
Section 5 will provide details of when maintenance will be required and what type of maintenance will be required.
- Section 6      **Cost Summary**  
Section 6 will provide full details of the cost of maintenance, operations and stock control summarised by quarters over a five-year period.
- Section 7      **Revenue and Cash Flow**  
Section 7 will summarise the expected revenue from existing commune and district sources and proposed user levies and charges needed to ensure adequate funds are required to operate and maintain the infrastructure. The cash flow will show the difference between revenue and expenses over the five-year time frame of the plan.

### **4.3 Capacity Building Implications**

CPCs are responsible for the maintenance and operation of all commune infrastructure. The CPCs use a number of resources within the commune to administer maintenance and operation activities. If assets are to be maintained, the capacity of CPCs to prepare and implement O&M Plans for all their infrastructure, and to ensure they have adequate funding and resources at the necessary times, will need to be strengthened.

Where infrastructure has been provided to householders they will need to be trained in its proper use and maintenance. This training should be available to other householders who already own similar infrastructure so they also have the required maintenance and operational skills.

### **4.4 Recommendations**

- 1) Individual O&M Plans to be developed for all infrastructure provided through the program.
- 2) These plans to be developed in close cooperation with CPCs and include revenue estimates and cash flows for the next 5 years.
- 3) Guidelines for preparing operation and maintenance manuals to be developed for all types of infrastructure developed through the program.
- 4) Training to be provided to commune personnel and householders on O&M in accordance with a training plan based on a training needs analysis.

## **5 Capacity Building in Communes**

Capacity building in communes will focus on PMBs and Activity Groups. Effective capacity building depends on developing a training strategy to achieve measurable clear capacity building goals based on the program Logframe. The initial activity in building capacity in the communes is to develop the curriculum and training materials. The curriculum will be based on the QNRDP Investment and Construction Management Guidelines currently being developed within the PMU. The Guidelines are based on GOV regulations and provide a clear description of the

steps involved and the roles and responsibilities of all parties. To support this procedure, the PMU will develop manuals comprising pro-forma documents, guidance notes, operational checklists for each step. These manuals will provide the content of the infrastructure capacity building activities. Capacity building will be delivered through a number of modes. Initially capacity building will be delivered through technical assistance provided by PMU staff. The technical assistance will be provided direct to activity groups and PMBs during the planning and implementation of the earlier sub-projects. Training will be delivered during all sub-projects through learning by doing. Once the manuals are developed more formal methods may be utilised to provide instruction to larger groups. The effectiveness of all these training activities will be reviewed as part of the monitoring and evaluation activities.

## **6 Preparation of ASAS Proposals**

To assist communes prepare ASAS proposals that comply with AusAID requirements, explanatory information on selecting projects and advise on how to design project and present the information in the proposal has been prepared. The notes are designed for presentation to activity groups by PMU staff and complement the ASAS guidelines provided by AusAID.

The explanatory information is provided in Annex 6.

## **Annex 1**

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# **Infrastructure Implementation Steps and Responsibilities**

## Annex 1: Infrastructure Implementation Steps and Responsibilities

Activity/Report	Management	Preparation	Appraisal	Approval	Distribution of Report
Identification of sub-projects	PMU	PMU		PPC, AusAID	
Investment Report	PMB	Professional Unit (should have design expertise)	DPI/PMU	DPC, CPC	
Design Report with costings & O&M Plan	PMB	Design Consultant	PMU	CPC, DPC	
Selection of Construction Contractor	PMB	Commune Contact Group	CPC, PMU,	DPC	
Supervision Procedures	PMB	PMB		DPC, PMU	
Selection of Supervision Consultant	PMB	PMB	PMU	DPC	
Appoint DCG Inspector	PMB	PMB			
Construction Progress Reports (M,Q,A)	PMB	PMB		DPC, PMU	DPI, PPC, Central Offices,
Final Inspection	PMB	CPC, Contractor, Inspector, CCG, PMU, DCG			
Hand-over Infrastructure	PMB	Contractor			
Hand-over Records to CPC	CPC	PMB			
Operation & Maintenance of Infrastructure	CPC	Institution Head/ Hamlet Head/ CPC			
Progress Financial Report	PMU	QNRDP, CPC, State Treasury		District Finance & Planning Office	
Final Financial Report	PMU	QNRDP	District Finance & Planning Office	PPC, Program Control Board	
CCG-Commune Contact Group, CPC-Commune Peoples Committee, DCG-District Contact Group, DPC-District Peoples Committee, DPI-Department of Planning & Investment, PMB-Commune Project Management Board, PMU-Project Management Unit, PPC-Provisional Peoples Committee.					

## **Annex 2**

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# **Infrastructure Implementation Tasks**

## **Annex 2: Infrastructure Implementation Tasks**

1. Prepare Scope of Services of Investment Report Consultant
2. Appointment of IR Consultant
3. Prepare Investment Report
4. Appraisal of Investment Report
5. Approval of Investment Report
6. Prepare Scope of Services for Design Consultant
7. Appointment of Design Consultant
8. Preparation of Design Report
9. Appraisal of Design Report
10. Approval of Design Report
11. Preparation of Construction and Supervision Tender Documents
12. Tendering for Construction Contractor
13. Evaluate Construction Tenders
14. Contract Negotiations with Construction Contractor
15. Approval of Construction Contractor
16. Appoint Construction Contractor
17. Tendering Supervision Consultant
18. Evaluate Supervision Submissions
19. Appoint Supervision Consultant
20. Construction
21. Site and Progress Meetings
22. Inspection and Handover
23. Warranty Period
24. Final Inspection

## **Annex 3**

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### **Documents to be filed**

### **Annex 3: Documents to be filed**

1. Scope of Services of Consultants (Investment Report, Design, Appraisal, Supervision)
2. Consultancy agreements (Investment Report, Design, Appraisal and Supervision)
3. Investment Report or Owners Report with CPC Evaluation Study
4. Evaluation of Investment Report by IEO
5. Investment Report Approval Decision
6. Design and Appraisal Scope of Services
7. Designer Contracting Report
8. Designer Contract Agreement
9. Design Report with Evaluation Studies
10. Evaluation of Design Report by IEO
11. Design Report Approval Decision
12. Construction Tender Evaluation Report
13. Evaluation of Tender Evaluation Report by IEO
14. Approval Decision of Construction Contract
15. Conforming Construction Contract
16. Supervision Tender Evaluation Report
17. Evaluation of Supervision Tender by IEO
18. Construction Progress Reports
19. Supervision Reports including Test Results
20. Progress Claims and Payment Certificates
21. Minutes of Site Meetings
22. Final Inspection Report
23. Handover Certificate
24. Operation and Maintenance Plan

## **Annex 4**

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# **QNRDP Program Management System Reporting Framework**

### Annex 4: QNRDP Project Management System Reporting Framework

Information	Timing	Source	PMS	Recipient	Timing	Information
♥ Sub-project approval ♥ Financial budgets	♥ Annual Plan ♥ Annual Plan	AusAID	<b>Project Information Database</b>	AusAID	♥ Six Monthly ♥ Six Monthly ♥ Six Monthly	♥ Progress status ♥ Update AP information ♥ KRAs
♥ Contract data ♥ Technical Reports ♥ Contract Progress Reports ♥ Progress claims ♥ Payment certificates	♥ Contract start ♥ As available ♥ As available ♥ As available ♥ As available	CPC/PMB		DPI	♥ Six Monthly ♥ Six Monthly ♥ Six Monthly	♥ Update AP information ♥ KRAs ♥ Progress status
				CPC/PMB		Project non-compliances
				QNRDP		Project non-compliances
♥ Task duration ♥ Progress reports	♥ Investment Report ♥ As available	CPC/PMB		<b>Gantt Chart</b>	AusAID	Six Monthly
			DPI		Quarterly	Schedule amendments
			CPC/PMB		Monthly	♥ Critical activities ♥ Revised schedule
			QNRDP		Monthly	♥ Revised schedule ♥ Resource implications

Information	Timing	Source	PMS	Recipient	Timing	Information
<ul style="list-style-type: none"> <li>♥ Problems encountered</li> <li>♥ Remedial action undertaken</li> <li>♥ Solutions developed</li> </ul>	Project progress reports	CPC/PMB	<b>Lessons Learned Database</b>	AusAID	Six Monthly	Typical problems, remedial action undertaken and solutions developed
<ul style="list-style-type: none"> <li>♥ Problems encountered</li> <li>♥ Remedial action undertaken</li> <li>♥ Solutions developed</li> </ul>	Technical reports	Appraisal Organisations		DPI	Quarterly	Typical problems, remedial action undertaken and solutions developed
<ul style="list-style-type: none"> <li>♥ Problems encountered</li> <li>♥ Remedial action undertaken</li> <li>♥ Solutions developed</li> </ul>	Ongoing during monitoring and capacity building	QNRDP		CPC/PMB	Monthly (newsletter)	<ul style="list-style-type: none"> <li>♥ Typical problems, remedial action undertaken and solutions developed</li> <li>♥ Implications for implementation</li> <li>♥ Suggestions for procedural amendments</li> </ul>
				QNRDP	Monthly	<ul style="list-style-type: none"> <li>♥ Typical problems, remedial action undertaken and solutions developed</li> <li>♥ Implications for implementation</li> <li>♥ Suggestions for procedural amendments</li> </ul>

The following database files will be used to store project information and lessons learned.



## **Annex 5**

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# **Construction Supervision Procedures for Sand Filters at Duc Phong**

## Annex 5: Construction Supervision Procedures for Sand Filters at Duc Phong

	Description	Inspection	Hold Point	Tests
1	Location and arrangement on site	1	■	
2	Inspection Prior to Base Slab Concreting		■	
	♥ Thickness of sand bed	2		
	♥ Sand is compacted and well watered	2		
	♥ Standard of water, cement and aggregate	2		
	♥ Slab is 10 cm thick	2		
	♥ Setting out	2		
	♥ Formwork is water proof and strong	2		
3	Inspection during Base Slab Concreting			
	♥ Mix design	3		
	♥ Concrete mixing equipment available (vibrator, clean mixing surface)	3		
	♥ Construction joints	3		
	♥ Concrete mixing, slump and placement	3		
	♥ Sand curing	3		
	♥ Strengthen development	3		
4	Inspection during placing bricks			
	♥ Standard of bricks, cement, sand and water	4		
	♥ Mixing of mortar	4		
5	Inspection after Brick Walls Complete			
	♥ Correct setting out and dimensions	5		
	♥ Joints filled	5		
	♥ Joints not too wide or thick	5		
	♥ Bricks overlapped at corners and joints	5		
	♥ Openings correct size and setting out	5		
	♥ Built in items correct size and setting out	5		
6	Inspection during Plastering			
	♥ Standard of cement, sand and water	6		
	♥ Mixing equipment available (clean mixing surface)	6		
	♥ Mix design	6		
	♥ Thickness of plaster	6		
	♥ Placement	6		
7	Water Retention of Chambers		■	■

	<b>Description</b>	<b>Inspection</b>	<b>Hold Point</b>	<b>Tests</b>
8	Inspection during constructing lid (Assume material tests and mix design performed during 5)			
	♥ Specification of reinforcing steel. (Type, thickness)	8		
	♥ Steel fixing (Spacing, cover & length)	8		
	♥ Concrete mixing, slump and placement	8		
	♥ Sand curing	8		
	♥ Strengthen development	8		
9	Inspection Prior to placing Pipework			
	♥ Material specification	9		
	♥ Type, diameter, length	9		
10	Inspection of Pipes prior to Backfilling		■	
	♥ Jointing	10		
	♥ Fixing	10		
11	Taps Prior to Fitting			
	♥ Material specification	11		
	♥ Type & diameter	11		
12	Taps after Fitting			
	♥ Connection	12		
13	Sand and Aggregate Filter Prior to Installation		■	
	♥ Material specification (washed sand, clean aggregate and membrane)	13		
14	Sand Filter after Installation			
	♥ Thickness	14		

## **Annex 6**

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# **Preparing Winning ASAS Proposals**

## **Annex 6: Preparing Winning ASAS Proposals**

### *1. Select Projects that match the ASAS Guidelines*

#### 1.1 Consistency with policies and strategies

Projects should be consistent and support Government of Australia (GOA) and Government of Viet Nam development cooperation policies and strategies. Current GOA development cooperation policies in Viet Nam seek to reduce poverty and improve capacity for medium and long-term development. The key strategies being used to implement the GOA development cooperation strategies are: to improve the livelihoods of the poor through support for better rural services; to improve the capacity for medium to long term development through human resource development and to support the GOV in its program of reform by increasing the effectiveness and accountability of government through capacity building, systems development, policy advice and other strategic activities. To be consistent with relevant policies and strategies it is essential that institutions making the application are not seeking to make a profit and the project is in either community health, education, small scale infrastructure, rural development or the environmental sector. **The proposal should show how it supports these policies and strategies.**

#### 1.2 High developmental impact

Projects should have a high developmental impact. Development projects should address one or more of the following: poverty, role of women, disadvantaged groups, community development. **The proposal should highlight its impact in these priority activities.**

#### 1.3 Sustainability and risks

Projects that promote sustainability are preferred. Sustainability can relate to institutional support, financial resources or environmental impact. Projects that act as a catalyst for additional development or can be easily replicated with no external assistance are seen as being sustainable. Identified risks should be detailed and risk mitigation activities described to manage them. **Proposals should illustrate the sustainability of the developments and risk management activities.**

#### 1.4 Administrative efficiency

Projects should conform to criteria designed to promote administrative efficiency. Administrative efficiency will be considered acceptable if projects have a cost budget between VND90 million to VND900 million, the implementation period is 12 months or less, AusAID funding can be provided in two payments and local financial contribution equals at least 30% of the total project budget. Applications that seek funding for conferences, down stream processing, academic training in Australia, research, recurrent expenditure (eg salaries) and large payments to consultants will not be supported. There are a number of limitations on using funds to support family planning activities. **It is important that all of these criteria are met.**

### *2 Follow good project design principles*

Projects should incorporate project design features that promote the sustainability and developmental impact objectives. Generally project designs should promote or incorporate the following:

- ❖ Beneficiary involvement in project identification, design and management. Self help activities for poor or disadvantaged groups are encouraged.
- ❖ Value for money.

- ❖ Strong institutional support.
- ❖ Adequate sources of recurrent funding.
- ❖ Effective treatment of the cross cutting issues of gender and environment.
- ❖ Integration and compliance with GOV systems and planning priorities.

### *3 Present information clearly and rationally*

#### *3.1 Objective and purpose*

Prepare a project objective and purpose that relates to the **relevant development and or GOV policies and strategies the project addresses**. The objective should concentrate on the very broad policies while the purpose should explain how the project will support the objective. The objective and purpose should each be only two sentences long and provide a clear vision of the reason for the project and be expressed in measurable terms.

#### *3.2 Description of Implementation Activities*

Set out the tasks to implement the project. Describe the expected project outputs and how the outputs will be delivered. The description should include details on the type and sources of resources needed. Measurable indicators should be provided for each output along with the means of verification. The proposal should clearly show the resources and inputs to be funded by AusAID and by others. Scheduling information, namely task timing, duration and interdependencies of major tasks should be provided in chart form. The resources and inputs required to manage the project as distinct from delivering individual outputs should be shown separately.

Organisation and responsibility for each output and the project in general should be defined.

#### *3.3 Costings*

Costings should be provided separately for construction, procurement of goods and services, personnel and training. All costings should show clearly their expected source and timing.

#### *3.4 Environmental Impact*

If there are significant environmental impacts the proposal should contain an environmental impact assessment that should ideally provide answers for the following questions:

- ❖ What are the potential environmental impacts of the project?
- ❖ Does the project impact on any environmentally sensitive areas eg wetlands, water catchments?
- ❖ Is there a clear statement of the significant beneficial and adverse environmental effects of the project? Have the risks been evaluated?
- ❖ How will any negative impacts be minimised, controlled and monitored?
- ❖ What are the likely impacts on the social or cultural environment?

#### *3.5 Poverty Analysis*

If poverty reduction is a key objective the proposal should define the poverty problem and show how the project benefits the poorer groups. To show how the project will contribute to the reduction in poverty as many as possible of the following questions should be answered:

- ❖ Who are the poor affected? Describe as much as possible of the following, location, gender and age distribution, most vulnerable communities.
- ❖ Why are they poor? Consider economic/income, social/institutional and environmental/external factors.
- ❖ What can be done to reduce their poverty?

### ***3.6 Gender and Development***

Gender is a cross cutting issue in AusAID's programs and therefore all proposals should illustrate how the project will promote equality between women and men. Project designs should at least provide gender disaggregated data but if possible should seek to address significant disparities between men and women.

### ***3.7 Monitoring and Evaluation***

The proposal should contain an appropriate monitoring and evaluation plan that relates to the key objectives of the project. If possible indicators of the effectiveness of the project should be identified and cost effective and timely project monitoring mechanisms provided. Due to the scale of these projects these monitoring mechanisms need to be easy to perform and not require a lot of resources to implement. As a minimum the project design should allow for six monthly progress reports and financial acquittal reports for all funds provided.

## **Annex 7**

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# **Operation and Maintenance Plan for Water Filters at Duc Phong**

## **Annex 7: Operation and Maintenance Plan for Water Filters at Duc Phong**

Slow sand water filters are simple devices however their performance relies on adopting sound operational practices and undertaking regular maintenance. This document defines the operational and maintenance requirements of the water filters provided by the QNRDP in Duc Phong.

### **Start up**

Once the filter is constructed it must be put into operation. Preparation of the filter takes several weeks, as the sand bed must be adequately prepared to act as a biological filter.

Step 1: Close all outlet valves in the filter system and add potable water carefully to the sand filter through orifice A. Continue adding water until the sand is completely covered.

Step 2: Pour water into the Inlet Chamber until the Operation Level is reached. The Operation Level is reached when water flows from Orifice A into the Potable Water Chamber. As soon as water starts flowing into the Potable Water Chamber stop pouring water into the Inlet Chamber.

Step 3: Allow water to flow slowly through the sand filter for two weeks. This will develop on the sand filter the biological film that purifies the water. During this time all water from the filter should not be used for drinking or boiled before drinking.

Step 4: For best operation a constant flow of water should occur through the sand filter. To achieve this partly close the tap at Orifice A so a constant rate of flow occurs.

### **Operation**

During operation the following instructions must be followed at all times:

- ❖ The sand filter should always be covered by water. The top layer of the filter should never dry out.
- ❖ The Sedimentation Chamber should be cleaned after sludge accumulates by opening Orifice B.
- ❖ If algae starts to develop in the sedimentation chamber or on the sand filter a cover should be placed over the chamber.
- ❖ When pouring water into the Inlet Chamber it is important the water is aerated. By using the slotted inlet pipes.
- ❖ The rate of water flowing into the Inlet Chamber should approximately equal the rate of flow into the Potable Water Chamber so the time spent in the Sedimentation Chamber is maximised.

The following instructions should be followed for optimum operational performance.:

- ❖ A constant flow of water should occur through the sand filter. This can be achieved by regulating the flow into the Potable Water Chamber with a partly closed tap.
- ❖ As sediment accumulates in the sand filter the tap at Orifice A should be opened slightly to maintain an adequate flow rate through the filter. Once the tap is fully opened and the rate of flow is less than the rate required to meet demand the sand filter should be cleaned.

### **Cleaning the Filter**

The sand filter should be cleaned when the flow rate is not adequate to meet demand. The following steps should be used when cleaning the filter.

Step 1: Empty the Sedimentation Chamber by opening Orifice B. Remove all accumulated sediment in the Sedimentation Chamber.

Step 2: Lower the water level in the sand filter by carefully decanting using a cup to expose the top 2 centimetres of the sand.

Step 3: Carefully scrap off any accumulated silt and the top 2 centimetres of sand.

Step 4: Replace the water in the sedimentation tank and start the flow of water through the filter.

This process can be repeated as required until the depth of sand is reduced to 30 centimetres. (That is 7.5 centimetres of sand has been removed by cleaning.) Once the depth of sand is 30 centimetres the sand should be rehabilitated.

### **Rehabilitating the Filter**

Once the depth of sand is 30 centimetres and the rate of flow is not adequate to meet demand the sand filter should be rehabilitated.

Step 1: Remove the top 2 centimetres of sand following Step 1 to 3 of Cleaning the Filter.

Step 2: Remove the water in the sand filter to the top of the gravel layer.

Step 3: Carefully remove the next 10 centimetres of sand and store in a manner so it does not get contaminated with dirt.

Step 4: Place a 10 centimetre layer of new clean sand and replace the 10 centimetres of sand previously removed from the sand filter.

Step 5: Fill the sand filter with water through Orifice A. until the sand is completely covered.

Step 6: Replace the water in the Inlet and Sedimentation Chambers.

Step 7: Provide a constant slow flow through the sand filter for 2-3 days.

Steps 1 to 5 should be undertaken as quickly as possible so the replaced sand is out of water for the shortest possible period.