



TRAINING CONTRACTORS FOR TARGETED INTERVENTIONS ON LOW-VOLUME ROADS IN MOZAMBIQUE



DRAFT FINAL REPORT

MAY 2011

Scott Wilson Mozambique Lda
Av.: Emilia Dausse, no 83R/C
Tel +258 21 312 878
Fax +258 21 304 870
Email: info@scottwilsonmozambique.co.mz

URS

Scott
Wilson

TRAINING CONTRACTORS FOR TARGETED INTERVENTIONS ON LOW-VOLUME ROADS IN MOZAMBIQUE

Contract n°

SUMMARY OF CONTRACT DETAILS

EMPLOYER		CONSULTING ENGINEER
		
Administração Nacional de Estradas		Scott Wilson Mozambique Lda
File Ref:		File ref: M1024
Contract Commencement Date	1 January 2011	
Contract Period	4 months	
Contract Completion Date	31 May 2011	
Extension of Time Granted	None	
Extended Contract Completion Date	None	
Anticipated Contract Completion Date	31 May 2011	

Contents

List of Tables	iii
List of Figures.....	iii
Abbreviations and Acronyms	iv
Executive Summary	v
1 Background	1
2 Introduction.....	1
3 Project Objective	2
4 Scope of Work.....	2
5 Approach and Methodology	2
5.1 Formal Training Workshops.....	2
5.2 On-Site Training.....	3
5.3 Training Needs Assessment.....	3
5.4 Preparation of Training Materials	3
5.5 Work Plan	4
5.6 Project Team	4
6 Formal Training Workshops.....	5
6.1 Provincial Workshop in Zambezia	5
6.2 Regional Workshop in Beira	5
6.3 Workshop for Supervisors (“Fiscais”) and Contract Managers	5
6.4 Tender Preparation and Pricing Seminar	6
6.5 Seminar for Provincial Consultant’s Supervisors (“Fiscais”)	6
6.6 Seminar for Contractors in Nampula Province	8
7 On-Site Visits and Training	8
7.1 Training Carried Out.....	8
7.2 Achievement of Training.....	10
7.3 Issues and Problems Encountered.....	11
8 Quality Assurance	13
9 Recommendations	14
10 Conclusion.....	16
Appendix 1: List of Projects in Programme.....	18
Appendix 2: Project Descriptions and Progress.....	20
Appendix 3: On-Site Visit and Training Record	23
Appendix 4: Achievement of Training	53
Appendix 5: Assessment of Contract Performance	57
Appendix 6: List of Meetings	63

Appendix 7: Terms of Reference64
 Appendix 8: RRIP Contractor Training Project Programme68
 Appendix 9: Project Pictures69

List of Tables

Table 5.1: Topics of Training Materials 4
 Table 6.1: Topics of Project Supervisors Workshop Presentations 6
 Table 6.2: Topics for Provincial Supervisors Seminar 7
 Table 7.1: Achievement of Training 10
 Table 9.1: Basic Contractor’s Project Equipment 15

List of Figures

Figure 5.1: Training Implementation Process 2
 Figure 8.1: Project Liaison Process 14

DRAFT

Abbreviations and Acronyms

AFCAP	African Community Access Programme
ANE	Administração Nacional de Estradas (National Roads Administration) of Mozambique
BD	Bitumen Distributor
BOQ	Bills of Quantities
CFE	Centro de Formação de Estradas (Chimoio Roads Training Centre)
CSIR	Council for Scientific and Industrial Research, South Africa
DFID	Department for International Development
DIMAN	Direcção de Manutenção (Directorate of Maintenance), ANE
DPANE	Delegação Provincial (Provincial Delegation), ANE
ETB	Emulsion Treated Base
FME	Federação Moçambicana dos Empreiteiros
RRIP	Regional Roads Investment Programme
TOR	Terms of Reference
TRL	Transport Road Laboratory (UK)

DRAFT

Executive Summary

Background

The National Roads Administration (ANE) of Mozambique has embarked on a Regional Roads Investment Programme (RRIP) whose objective is to improve the standard of important unpaved low-volume roads through the “targeted interventions” (spot improvements) approach, with an overall budget of US\$10 million over three years starting in 2008.

The programme is being managed by ANE Directorate of Maintenance (DIMAN) in Maputo. Projects are being administered by provincial delegations of ANE (DPANE) together with provincial consultants in the various provinces. Technical support is being provided to ANE by TRL Limited of UK. Scott Wilson Mozambique was engaged as the Training Consultant to Support the Execution of Targeted Interventions on Low Volume Rural Roads in Mozambique.

The pilot projects and the current contractor training are financed by the Swedish International Development Agency (SIDA) through the SDMRR-2 Project. The African Community Access Programme (AFCAP), a DFID-funded programme, is assisting ANE with the implementation of the pilot projects.

The list of projects and contractors in the programme is shown in Appendix 1: List of Projects in Programme.

Training activities carried out by the consultant are described in this report.

Introduction

The Contractor Training Project was implemented in two phases:

Phase 1: From November 2009 to August 2010, funded by DFID through AFCAP

Phase 2: From September 2010 to May 2011, funded by SIDA.

Phase 1 commenced with identification and assessment of training needs among contractors and consultants working on the pilot projects, which formed the basis of the training programme and development of training materials. The training needs that were identified were contract management and administration aspects, materials specifications and testing, and road construction operations. These are detailed in section 5.3.

Phase 2 concentrated more on site training of contractors and consultants’ staff. This involved frequent visits by the training team to projects under construction and giving instruction on-site as work proceeded. Activities that were in progress and in which training was given were mainly:

- Earthworks
- Dumping, spreading and compaction of pavement materials
- Construction of structures
- ETB construction
- Surfacing

Assessment of the achievement and impact of the training and contract performance was done, with reference to the original assessed needs. This report describes these issues.

Scope of Work

The Scope of Work of the project is summarised as follows:

1. Undertake theoretical and on-site training of local road contractors in all provinces of Mozambique.
2. Undertake project-specific training needs assessment of the contractors involved in on-going pilot project construction works.
3. Prepare training materials required for site training in appropriate format.

Draft Final Report	May 2011	v
--------------------	----------	---

4. Organise a three-day Regional Workshop in Beira to be attended by contractors from the central region, particularly, the successful bidders for works contracts under the RRIP Pilot Projects.

The full Terms of Reference (TOR) are given in Appendix 7: Terms of Reference.

Approach and Methodology

The approach adopted for the execution of the project, in accordance with the stated approach and methodology presented at project inception, was as in four main parts as follows:

- Holding of formal training workshops
- Carrying out on-site training
- Further training needs assessment, if any, during site visits
- Preparation of supplementary training materials

The training of contractors in the programme was carried out by two Training Engineers, the Lead Trainer and Team Leader, Eric Gumbie, who was based in Maputo, and Engineer Kenneth Makubika was based in Nampula.

Formal Training Workshops

- 1) Provincial Workshop, Quelimane, Zambezia from 15 to 17 September 2010

The workshop was well-attended, the attendance being 62 people. Some key issues related to contract management that came up during discussion were, as had come up in previous workshop starting in Xai-xai in March 2010:

- Lack of basic appropriate equipment for road maintenance
- The possibility of the client guaranteeing contractors work for a period of say two years.
- The need for contractors to have qualified technical and administration personnel
- The need for contractors to visit sites before submitting tenders.

- 2) Regional Workshop, Beira, 28 to 30 September 2010

The workshop was well-attended, the attendance being 51 people. Key issues related to contract management that came up during discussion at this and other workshops were the tendering procedure and award based on the lowest price.

- 3) Workshop for Supervisors (“Fiscais”) and Contract Managers

A workshop for consultants’ supervisors and contract managers was held in Chimoio from 6-7 October 2010, with the objective of teaching them their duties and responsibilities in supervising and managing projects. There were 37 participants at the workshop.

Important issues that came up during discussion at this workshop were:

- Compilation of work measurements and payments
- Level of authority for site instructions made by junior fiscais
- The need to think of solutions on how to use marginal materials
- Challenges of inexperienced contractor staff and inadequate equipment faced by fiscais in their daily work, and the responsibility of contractors

- 4) Tender Preparation and Pricing Seminar

A half-day seminar on Tender Preparation and Pricing was held in Maputo on 10 December 2010. Attendance was poor, being only 10, and only 4 being from 3 contracting companies.

- 5) Seminar for Provincial Consultant’s Supervisors (“Fiscais”)

A training seminar was held in Nampula from 25 to 27 February 2011 for supervisors from Nampula and Cabo Delgado provinces. A total of 55 people attended the seminar – 20 junior and 4 senior supervisors from Cabo Delgado province, 25 junior and 4 senior supervisors from Nampula province,

Draft Final Report	May 2011	vi
--------------------	----------	----

and the Team Leaders from the two provinces. The seminar was meant to equip supervisors with basic technical knowledge required for the proper execution of their duties and responsibilities on site.

6) Seminar for Contractors in Nampula Province

A seminar was held in Nampula on 28 April 2011 for contractors in Nampula province, called for by the Nampula Provincial Director of Public Works. The Director's concern was low production levels and poor quality of work on projects. The seminar was attended by the Director of Public Works, ANE Delegate and staff, all contractors in Nampula province and Scott Wilson. The total number of attendants was 49, including ANE and Scott Wilson staff.

On-Site Training

1) Training Carried Out

Visits that were made to sites and training activities carried out were outlined in weekly reports that were submitted throughout the project. A record of on-site visits and training is given in Appendix 3: On-Site Visit and Training Record.

Important aspects that were covered during on-site training that was done included the following:

- Construction programming, cashflow projections
- Selection of material in borrow pit, ensuring best quality material on the road
- Compaction – equipment, techniques, moisture requirements, testing
- Basics of ETB – mixing, time, moisture control, compaction
- Concrete mix design, water control and production
- Compilation and keeping of site records
- Surfacing operations and calculations
- Equipment needs – road and concrete construction,
- Duties and responsibilities of contractor's site manager

2) Achievement of Training

While there have been improvements in contract management and performance on some projects, there has not been much improvement on aspects in which training was given on other projects. The achievement of the training is illustrated in Appendix 4: Achievement of Training. Key issues related to on-site training are outlined and presented in Appendix 5: Assessment of Contract Performance. Areas in which there were visible improvements on some projects are:

- Preparation of reasonable and realistic construction programmes and revisions to reflect actual progress of work as the project progressed
- Reasonable site establishment; this has been a welcome development and enables better site management.
- Reasonable site records
- Acceptable compaction achievement
- Requests for tests by the contractor site staff, thereby establishing good materials testing routine
- Good adherence to specifications

3) Issues and Problems Encountered

Areas of the biggest concerns were:

- Lack of preparation of realistic construction programmes, due to lack of interest and effort
- Delays in contract implementation
- Inadequate attention to project management requirements
- Lack of qualified and experienced personnel on sites
- Poor quality work and failure to adhere to specifications
- Inadequate testing and control of concrete

Quality Plan

Quality assurance of the project was achieved by implementing the relevant management aspects of the company's Quality Management System, particularly understanding the Client's scope of work and expectations, carrying out the project in accordance with the TOR and Liaising with the Client, contractors and consultants regularly.

An important aspect of our Quality Plan was having regular internal project team reviews of the project as it progressed to ensure that high quality work was produced.

Recommendations

Recommendations were made to contractors and consultants during the site visits and these were included in the site visit reports prepared after each site visit. A summary of the recommendations made is as follows:

- Realistic construction programmes must be prepared and monitored
- Contractors can and should set up simple systems of site records
- Contractors should have qualified and experienced key staff to supervise projects
- Site staff should continue to be aware of the importance of compaction, proper method of construction and adherence to specifications
- Contractors should call for compaction and other materials tests as often as necessary to ensure proper monitoring and quality control of work
- Consultants should prepare and provide all the required project construction details and information

Despite the extensive training given, some contractors still failed to set-up and implement the necessary aspects of contract and project management. It is felt and recommended that further and continued training be offered to all contractors and consultants in some aspects of contract management and administration, project supervision as well as technical aspects.

Continued and future training for both contractors' and consultants' staff could be done by a consultant, with provincial consultants being required to have their provincial engineers participate in the presentation of courses at workshops and seminars. Consulting companies would thus be expected to have a training component in their fees to cover the training input. Some of such training can perhaps be offered at the CFE, with the necessary liaison with both CFE and the FME during preparation and presentation of training courses.

Conclusion

The training of contractors had some visible benefits as follows:

- Raising awareness among contractors of their contractual obligations
- Ability to prepare works programmes by some contractors, leading to better project management
- Better site establishment on most Phase 3 contracts, enabling better site management
- Increase in quantity of good quality work produced

However, there continued to be problems on some project, particularly:

- Failure to prepare construction programmes
- Delays in project implementation
- Lack of qualified and experienced staff on projects
- Lack of site support
- Poor quality work and failure to adhere to construction specifications

The main reason for this was simply a lack of interest and effort by the affected contractors to do what was required and necessary to do things right.

On the consultants' side, although the problem of poor supervision by some of the consultants' supervisors still exist, many are now aware of their duties and responsibilities and know what they need to do to effectively supervise their projects.

Despite the problems that still exist, the level of awareness among all concerned of the correct way of planning, managing and implementing projects was raised through the training that was carried out, and the project is considered to have been successful.

DRAFT

1 Background

The National Roads Administration (ANE) of Mozambique has embarked on a Regional Roads Investment Programme (RRIP) whose objective is to improve the standard of important unpaved low-volume roads through the “targeted interventions” (spot improvements) approach, with an overall budget of US\$10 million over three years starting in 2008.

The programme is being managed by ANE Directorate of Maintenance (DIMAN) in Maputo. Projects are being administered by provincial delegations of ANE (DPANE) who, together with provincial consultants in the various provinces, are also responsible for design and supervision of the works. Support is being provided for the design of the road sections and technical monitoring of the performance of the roads by TRL Limited of UK. Scott Wilson Mozambique was engaged as the Training Consultant to Support the Execution of Targeted Interventions on Low Volume Rural Roads in Mozambique.

The pilot projects and the current contractor training are financed by the Swedish International Development Agency (SIDA) through the SDMRR-2 Project. The African Community Access Programme (AFCAP), a DFID-funded programme, is assisting ANE with the implementation of the pilot projects.

The list of projects and contractors in the programme is shown in Appendix 1: List of Projects in Programme.

Training activities carried out by the consultant are described in this report.

2 Introduction

The Contractor Training Project was implemented in two phases:

Phase 1: From November 2009 to August 2010, funded by DFID through AFCAP

Phase 2: From September 2010 to May 2011, funded by SIDA.

Phase 1 commenced with identification and assessment of training needs among contractors and consultants working on the pilot projects in all the provinces of Mozambique. These training needs formed the basis of the training programme and development of training materials that were given in workshops held in all the three regions and ten provinces of the country, and on-site training. The training needs that were identified, detailed in section 5.3, are as follows:

- Works specifications, contract documentation and drawings
- Materials specifications and testing
- Construction Operations - gravel extraction and stockpiling, hauling and dumping gravel, Compaction
- Surfacing (surfacing types and specifications, equipment requirements)
- Surveying basics – setting out, level control
- Equipment management and use
- Works programming & resource planning
- Progress monitoring and control
- Quality Assurance
- Work measurement and claiming, cashflow implications

Phase 2 concentrated more on site training of contractors and consultants’ staff. This involved frequent visits by the training team to projects under construction and giving instruction on-site as work proceeded on how things were supposed to be done. Activities that were in progress and in which training was given were mainly:

- Earthworks
- Dumping, spreading and compaction of pavement materials
- Construction of structures
- ETB construction
- Surfacing

Notes were made during visits to site by the training engineers, and recommendations of management and technical aspects that were necessary for contractors and consultants' staff to note were made.

Assessment of the achievement and impact of the training and contract performance was done, with reference to the original assessed needs. This report describes all these issues.

3 Project Objective

The overall objective of the project is capacity building in the local construction industry for the construction of targeted interventions on low traffic roads, including earthworks, pavement layers, drainage works, bitumen stabilised road bases and thin bituminous seals. It is expected that tangible improvement in the quality of works will be the major output of this assignment.

4 Scope of Work

The Scope of Work of the project is summarised as follows:

1. Undertake theoretical and on-site training of local road contractors in all provinces of Mozambique.
2. Undertake project-specific training needs assessment of the contractors involved in on-going pilot project construction works.
3. Prepare training materials required for site training in appropriate format.
4. Organise a three-day Regional Workshop in Beira to be attended by contractors from the central region, particularly, the successful bidders for works contracts under the RRIP Pilot Projects.

The full Terms of Reference (TOR) are given in Appendix 7: Terms of Reference.

5 Approach and Methodology

The approach adopted for the execution of the project, in accordance with the stated approach and methodology presented at project inception, was as in four main parts as follows, and as illustrated in the diagram below:

- Holding of formal training workshops
- Carrying out on-site training
- Further training needs assessment
- Preparation of supplementary training materials

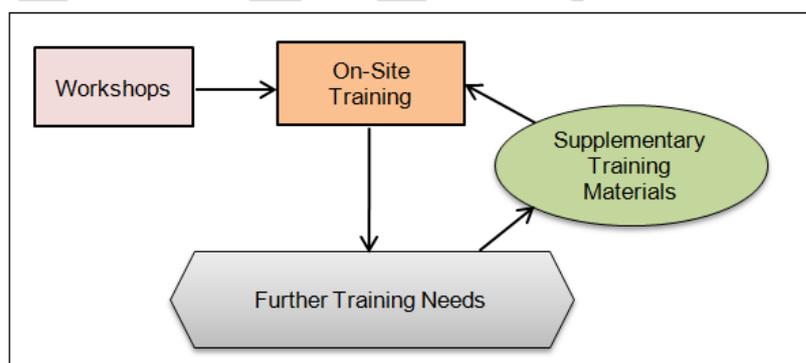


Figure 5.1: Training Implementation Process

5.1 Formal Training Workshops

Regional and provincial workshops were held in all provinces during the first phase of the training project, between March and August 2010, except Zambezia and Sofala provinces. Consequently

training workshops were conducted in these two provinces to provide training materials to contractors' and consultants' staff, similar to previous workshops. These and other workshops and seminars were carried out as follows:

- i). Provincial workshop in Zambezia from 15 to 17 September 2010
- ii). Regional workshop in Beira from 28 to 30 September 2010
- iii). Workshop for supervisors and contract managers in Chimoio from 6-7 October 2010
- iv). A half-day seminar on Tender Preparation and Pricing in Maputo on 10 December 2010
- v). A training seminar for supervisors from Nampula and Cabo Delgado provinces in Nampula from 25 to 27 February 2011
- vi). A seminar for contractors in Nampula province in Nampula on 28 April 2011

5.2 On-Site Training

It was planned at commencement of this second phase of the project that more time would be spent on on-site training, within the limits of logistical and practical realities of the project. This was even more so from the beginning of the year 2011, following the conclusion of "classroom" training done at several workshops throughout in 2010. A record of site visits and training is given in Appendix 3: On-Site Visit and Training Record and a description of the training done in detailed in section 7.

5.3 Training Needs Assessment

Training needs that were assessed during Phase 1 of the project were considered comprehensive enough and cover all the necessary training needs. These are reproduced below for reference:

- 1) Contractors' Site Staff
 - Works specifications and drawings (pavement specifications, gravel specifications, road cross-section details, drains, slopes)
 - Materials specifications (gravel grading, PI)
 - Construction Operations:-
 - Gravel extraction and stockpiling –control of operations
 - Hauling and dumping gravel
 - Materials blending techniques
 - Compaction – meaning, importance and techniques
 - Testing of materials
 - Surfacing (surfacing types and specifications, equipment requirements)
 - Surveying basics – setting out, level control
 - Equipment management and use
- 2) Management Staff
 - Contract documentation
 - Works programming & resource planning
 - Progress monitoring and control
 - Quality Assurance
 - Work measurement and claiming, cashflow implications
 - Equipment availability and utilisation
 - Construction regulations and policies

Further training needs were identified during visits to sites and appropriate training given on site at the time, or on subsequent visits after preparation of necessary training materials.

5.4 Preparation of Training Materials

Training Materials prepared in Phase 1 of the project were also considered comprehensive and sufficient for Phase 2, and these are listed in Table 5.1: Topics of Training Materials below. Supplementary training materials were prepared in accordance with further needs identified during visits to sites as mentioned above.

Draft Final Report	May 2011	3
--------------------	----------	---

Table 5.1: Topics of Training Materials

Module	Topics
I – Contract Administration and Management	<ul style="list-style-type: none"> ▪ Administration and Management Principles ▪ Construction Programming ▪ Construction Progress Monitoring and Control ▪ Procurement Process
II – Construction Materials and Testing	<ul style="list-style-type: none"> ▪ Road Construction Materials Specifications ▪ Emulsion Treated Base Construction ▪ Materials Testing and Demonstration of Equipment
III – Concrete Production and Construction	<ul style="list-style-type: none"> ▪ Concrete Properties and Production ▪ Reinforcement ▪ Concrete Mix Design
IV - Construction Operations	<ul style="list-style-type: none"> ▪ Hauling and Dumping of Gravel ▪ Materials Blending Techniques ▪ Cement Stabilised Bases ▪ Compaction – meaning, importance and techniques ▪ Surfacing Types and Construction Methods (Otta, Sand, Slurry, Premix) ▪ Drainage Structures
V - Basic Site Surveying	<ul style="list-style-type: none"> ▪ Survey Equipment ▪ Setting Out of Works ▪ Construction Level Control ▪ Levelling
VI - Tender Preparation and Pricing	<ul style="list-style-type: none"> ▪ Tender Preparation ▪ Bill Item Rate Calculation ▪ Plant Rate Calculation

5.5 Work Plan

The training of contractors in the programme was carried out by two Training Engineers. The Lead Trainer and Team Leader, Eric Gumbie, was based in Maputo, and covered projects in Maputo, Gaza, Inhambane, Manica and Tete provinces. An assistant engineer, Emmanuel Munatsi, helped with covering training requirements in Tete province.

The second Training Engineer, Kenneth Makubika, was based in Nampula and covered projects in Nampula, Niassa, Cabo Delgado, Zambezi and Sofala provinces.

5.6 Project Team

The project team was as follows:

- Project Manager: Washington Mupazviriwo
- Team Leader: Eric Gumbie
- Trainer 2: Kenneth Makubika
- Training Assistant: Emmanuel Munatsi
- Project Assistant: Leonel Bomba-Pedro



6 Formal Training Workshops

Formal training workshops and seminars were held during the project period as follows:

- i. Provincial workshop in Zambezia from 15 to 17 September 2010
- ii. Regional workshop in Beira from 28 to 30 September 2010
- iii. Tender Preparation and Pricing Seminar in Maputo on 10 December 2010
- iv. Seminar for Contractors in Nampula Province on 28 April 2011

6.1 Provincial Workshop in Zambezia

A provincial workshop was held for Zambezia province in Quelimane from 15 to 17 September 2010. The workshop was well-attended, the attendance being 62 people.

The topics covered in this workshop, as in the other provincial workshops, are listed in Table 5.1: Topics of Training Materials.

Some key issues related to contract management that came up during discussion were, as had come up in previous workshop starting in Xai-xai in March 2010:

- Lack of basic appropriate equipment for road maintenance, such as motor graders as opposed to towed graders
- The possibility of the client guaranteeing contractors work for a period of say two years, in order to facilitate provision of financial assistance for leasing and purchasing equipment from commercial banks.
- The need for contractors to have qualified technical and administration personnel
- The need for contractors to visit sites before submitting tenders, and perhaps making this mandatory and disqualifying those that fail to do so from the bidding process.

Deliberations at this workshop were detailed in the “Workshops Report” that was prepared and submitted in February 2011.

6.2 Regional Workshop in Beira

A regional workshop was held in Beira from 28 to 30 September 2010. The workshop was well-attended, the attendance being 51 people.

The topics covered in this workshop were the same as those presented at the Zambezia provincial workshop and given in Table 5.1: Topics of Training Materials.

Key issues related to contract management that came up during discussion at this and other workshops were:

- Tendering procedure
- Award based on the lowest price.

Deliberations at this workshop were also detailed in the “Workshops Report” that was prepared and submitted in February 2011 referred to above.

6.3 Workshop for Supervisors (“Fiscais”) and Contract Managers

In addition, a workshop for consultants’ project supervisors and contract managers was held in Chimoio from 6-7 October 2010. The workshop was aimed mainly at consultants’ senior and junior supervisors, and contractors’ contract managers and site agents, with the objective of teaching them their duties and responsibilities in supervising and managing projects. There were 37 participants at the workshop. The topics covered at the workshop were as follows:

Draft Final Report	May 2011	5
--------------------	----------	---

Table 6.1: Topics of Project Supervisors Workshop Presentations

Module	Topics
I – Contract Administration and Management	<ul style="list-style-type: none"> ▪ Case Studies in Contract Management ▪ Duties and Responsibilities of “Fiscais” ▪ Duties and Responsibilities of Contract Managers ▪ Project and Site Records ▪ Project Supervision ▪ Measurement of work ▪ Compilation of progress reports ▪ Compilation of payment claims ▪ Site records
II – Construction Materials and Testing	<ul style="list-style-type: none"> ▪ Road Construction Materials Specifications ▪ Importance of Quality Control ▪ Materials Testing and Monitoring ▪ Demonstration of Equipment
III – Concrete Production and Construction	<ul style="list-style-type: none"> ▪ Concrete Properties and Production ▪ Reinforcement ▪ Concrete Mix Design
IV - Construction Operations	<ul style="list-style-type: none"> ▪ Compaction of pavement layers ▪ BOQ items and description with reference to Normas de Execução
V - Basic Site Surveying	<ul style="list-style-type: none"> ▪ Survey Equipment ▪ Setting Out of Works ▪ Construction Level Control ▪ Levelling

Some issues that came up during discussion at this workshop were:

- Compilation of work measurements and payments
- Level of authority for site instructions made by junior fiscais
- The need to think of solutions on how to use marginal materials, such as the mixing of soils
- Use of the DCP to determine layer thickness
- Challenges of inexperienced contractor staff and inadequate equipment faced by fiscais in their daily work, and the responsibility of contractors

Deliberations at this workshop were also detailed in the “Workshops Report” that was prepared and submitted in February 2011 referred to earlier.

6.4 Tender Preparation and Pricing Seminar

Following considerable demand during earlier workshops, a half-day seminar on Tender Preparation and Pricing was held in Maputo on 10 December 2010. Topics covered were as follows:

- Tender Preparation
- Bill Item Rate Calculation
- Plant Rate Calculation

However, notification of the seminar was not well-done and consequently attendance was poor, with only 10 people attending, this including only 4 people from 3 contractors.

6.5 Seminar for Provincial Consultant’s Supervisors (“Fiscais”)

A training seminar was held in Nampula from 25 to 27 February 2011 for supervisors from Nampula and Cabo Delgado provinces. The seminar was aimed at junior supervisors, although senior supervisors were invited to attend also. A total of 55 people attended the seminar – 20 junior and 4

senior supervisors from Cabo Delgado province, 25 junior and 4 senior supervisors from Nampula province, and the Team Leaders from the two provinces.

Training materials were presented in the following topics:

Table 6.2: Topics for Provincial Supervisors Seminar

Part	Topics
A. Technical Knowledge	<ul style="list-style-type: none"> • Basic algebra and arithmetic for site calculations • Sizing of drainage structures • Setting out of structures • Soil classification and selection of materials for road works
B. Construction Methods	<ul style="list-style-type: none"> • Compaction of road embankments and pavements • Routine maintenance activities – definition, execution and quality control • Concrete construction – materials, mix design, curing, testing and quality control • Concrete reinforcement – drawings, cutting, bending and fixing • Surfacing
C. Contract Administration	<ul style="list-style-type: none"> • Duties and Responsibilities of the Fiscal • Measurement of and payment for work • Project and Site Records

This seminar was meant to equip supervisors with basic technical knowledge required for the proper execution of their duties and responsibilities on site.

At the end of the seminar, a brief account on problems faced on site and further training required was presented by each junior supervisor, and these were as follows:

- Variation of soils
- Improper preparation of base soils
- Lack of technical staff of contractors.
- BOQ work items and quantities not corresponding to work on site.
- Poor quality of gravel
- Long distance travelled by supervisors to cover their projects
- Occurrence of accidents at work
- Lack of equipment by contractors •
- Long haul distance for construction water
- Poor communication between consultant’s staff
- Lack of compliance with instructions
- Delay in issuing contract documents
- Late payment of contractors

On training, the supervisors felt that they needed more training in the following areas:

- Reinforcement – drawings and fixing
- Calculation of quantities and materials for structures
- Road surfacing and surfacing materials
- Classification and testing of soils
- Soil-cement base – specifications and construction

- Structures
- Concrete mix design, production and construction
- Surveying

6.6 Seminar for Contractors in Nampula Province

A seminar was held in Nampula on 28 April 2011 for contractors in Nampula province, called for by the Nampula Provincial Director of Public Works. The Director's concern was low production levels and poor quality of work on projects. The seminar discussed the following:

- Training of contractors
- Tendering process
- Classification of contractors
- Quality control and testing
- Project implementation and funding
- Project inspection

Messrs Kenneth Makubika and Gerard Kabwibwi of Scott Wilson made presentations to the seminar on quality control and testing, evaluation of transitability, project mobilisation and planning, and project inspection. One of the major problems affecting quality of work was that contractors do not put much effort into sourcing of good materials. Presentations on the other topics were done by ANE staff.

The seminar was attended by the following:

- Director of Public Works
- ANE Delegate and staff
- All contractors in Nampula province
- Scott Wilson

The presentation started at 9:00 hours and lasted till 12:00 hours. The total number of attendants was 49, including ANE and Scott Wilson staff.

7 On-Site Visits and Training

Visits that were made to sites and training activities carried out were outlined in weekly reports that were submitted throughout the project. A record of on-site visits and training is given in Appendix 3: On-Site Visit and Training Record, and this is summarised in the next section. In addition, site visit reports were written detailing the observations and recommendations made on issues of project construction and management for each site visit. These site visit reports were submitted in monthly reports submitted at the end of each month.

7.1 Training Carried Out

On-site training that was done during site visits is summarised below.

- 1) Marracuene-Macaneta
 - Selection of fill material
 - Method of achieving clay/sand mix proportions
 - Construction planning
 - Construction to specification
 - Compaction – equipment, techniques, testing
 - Calculation of required quantity of emulsion to achieve specified application rate
 - Basics of ETB – mixing, time, moisture control, compaction
 - Final road surface finish
- 2) Macaneta-Machubo
 - Selection of material in borrow pit, ensuring best quality material on the road
 - Matching of dumping and compaction operations

- 3) Chinhacanine-Nalazi
 - Construction programming – contract period, time required for the various activities
 - Embankment construction method- building-up in 150mm layers
 - Compaction - moisture requirements and testing
 - Layer thickness and width control
 - Equipment needs
 - Setting out of culvert inverts
 - Concrete mix design, water control and production
 - Selection of material in borrow pit
 - Curve setting out
 - Need to clean steel reinforcement
 - Compilation and keeping of site records
- 4) Cumbana-Chacane
 - Aggregate application calculations
 - BD operation – road edge lining, spraying observation, speed control
 - Aggregate application – application observation, control of tipper speed, dust alleviation
 - Recording of spraying data
 - Surfacing corrective measures
 - Construction programming – contract period, time required for the various activities
 - Layer thickness and width control
 - Compaction moisture requirements
- 5) Inhacufera-Machaze
 - Construction programming – contract period, time required for the various activities
 - Selection and stockpiling of gravel
 - Dumping of gravel
 - Site records
- 6) Beira-Savane
 - ETB construction
- 7) Gracio-Milhana
 - Bridge site hydrology and hydraulics,
 - Culvert setting-out and determination of invert and finished road levels – their relationship with flood discharge and importance of correct level setting out and control
 - Production of bridge working drawings.
 - Embankment construction method- build-up in 150mm layers, embankment control points
 - Construction levelling
 - Compaction and testing,
 - Equipment needs – road and concrete construction,
 - Materials stock level maintenance.
 - Forced curve setting out,
 - Construction to engineer's drawings without deviation,
 - Steel fixing, supporting of reinforcement cages to have enough cover and correction of steel bending errors made
 - Formwork support system and concrete finishes
 - Keeping site records (e.g. of rain days)
 - Planning of activities, programming and cashflow projections – income and expenditure forecasts
 - Earthworks volume and production computations
 - Control of wastage and pilfering of fuels and oils.
- 8) Xitaxi-Mueda
 - Priming procedure including test blocks for penetration,

- Preparations for application of tack coat,
 - Application of road stone
 - Rolling of the surfacing.
 - Control of soil, water, cement and bitumen application rates in bases to meet the specifications.
- 9) Montepuez-Namuno
- Duties and responsibilities of contractor’s site manager
 - Compaction, standards
 - Programming preparation
 - Foundation dewatering techniques
 - Taking-off quantities from drawings and determination of materials requirements

7.2 Achievement of Training

While there have been improvements in contract management and performance on some projects, there has not been much improvement on aspects in which training was given on other projects. The achievement of the training is illustrated in Appendix 4: Achievement of Training. Key issues related to on-site training are outlined and presented in Appendix 5: Assessment of Contract Performance. Areas in which there were visible improvements are outlined in the table below.

Table 7.1: Achievement of Training

Aspect	Projects that Achieved Acceptable Level
1. Preparation of construction programmes	<ul style="list-style-type: none"> ▪ Chinhacanine-Nalazi ▪ Xitaxi-Mueda ▪ Gracio-Milhana
2. Site establishment	<ul style="list-style-type: none"> ▪ Marracuene-Macaneta ▪ Macaneta-Machubo ▪ Chinhacanine-Nalazi ▪ Inhacufera-Machaze ▪ Xitaxi-Mueda ▪ Montepuez-Namuno
3. Site records	<ul style="list-style-type: none"> ▪ Chinhacanine-Nalazi ▪ Xitaxi-Mueda ▪ Montepuez-Namuno ▪ Gracio-Milhana
4. Compaction	<ul style="list-style-type: none"> ▪ Chinhacanine-Nalazi ▪ Xitaxi-Mueda ▪ Chinhacanine-Nalazi ▪ Xitaxi-Mueda
5. Material Testing	<ul style="list-style-type: none"> ▪ Chinhacanine-Nalazi ▪ Xitaxi-Mueda
6. Adherence to specifications	<ul style="list-style-type: none"> ▪ Zero-Mopeia ▪ Inhacufera-Machaze ▪ Xitaxi-Mueda

The projects listed in the table above achieved acceptable levels of implementation of the aspects listed. Preparation of construction programmes was done reasonably well and submitted to the consultants, and even revised to reflect actual progress of work as the project progressed. Programmes were also given to site foremen and were available on site.

Contractors in Phase 3 of the RRIP have constructed site camps that are adequate for the projects being executed. This has been a welcome development and enables better site management in terms of equipment control, keeping of site records, provision of materials storage and security and workers' facilities.

There are also reasonable site records on some projects, with the availability on site of construction drawings and details, works specifications and information on daily activities and equipment situation in some cases.

The listed projects achieved acceptable compaction. Tests were requested and carried out by ANE provincial laboratories. Initially compaction densities were low and below specification in most cases. After raising awareness on the problem and training, there was marked improvement in the contractors' performance. Compaction done was tested and there was a huge increase in results that passed and were accepted by the Engineer.

A number of contractors have started to make requests for testing of work done, e.g. concrete, thereby establishing a good materials testing routine. This is the desired testing culture that every contractor must develop.

Construction and surfacing operations on some projects showed reasonable adherence to specifications. For example, the Otta seal on Zero-Mopeia and Inhacufera-Machaze was done well. The assistance and input of TRL in these projects must be mentioned and acknowledged.

7.3 Issues and Problems Encountered

Areas of the biggest concerns were:

- Lack of preparation of realistic construction programmes, due to lack of interest and effort
- Delays in contract implementation
- Inadequate attention to project management requirements
- Lack of qualified and experienced personnel on sites
- Poor quality of work and failure to adhere to specifications
- Inadequate testing and control of work
- Poor project supervision by consultants
- Lack of skilled machine operators

The process of preparing construction programmes and cashflows was extensively covered in the regional and provincial workshops, as well as in on-site training visits and in some cases individually with company management. The continued lack of preparation of programmes by some contractors is really because of lack of interest and lack of effort on the part of the contractors. Similarly, minimising delays to contract implementation and achieving acceptable management requirements such as site support and provision of proper equipment only needs dedication and commitment to work by the contractors' management.

The lack of qualified and experienced site staff is a considerable problem that has come up in discussions in several forums and is a problem faced by many contractors. It has been said that there is a shortage of properly trained people in the industry. However, there have also been sentiments that if contractors paid the right kind of salaries, they would attract the right people. In the long term, contractors must have on-going training programmes for their staff. This could perhaps be done through the contractors' federation, the FME.

Poor quality of work and failure to adhere to specifications is largely a result of carelessness and again lack of effort by site staff and lack of adequate and firm supervision by consultants. This can and should be easy to rectify. ANE should insist on consultants doing a better job.

Supervising consultants should insist on contractors requesting and liaising with ANE provincial laboratories and carrying out the required and necessary tests on materials and work done. This is not difficult, and again ANE should insist on consultants ensuring this is done.

The level of competency of consultants' supervision staff ("fiscais") was also found to be below desired standards. Some of them did not seem to have basic road construction knowledge and experience necessary for them to supervise the contracts correctly and effectively. A lot of the problems noted on projects could have been avoided with effective and decisive supervision.

Some projects lacked skilled and grader operators. A grader is the machine that does the bulk of pavement construction work, and the final road finish on which surfacing is laid. If the grader operator is not skilled and experienced enough, the final finish would not come out nicely, and this would result in a road that does not look as good as it should. The same applies, but to a lesser extent, to roller and BD operators.

A summary of the issues that arose on each of the projects is given below.

- 1) Marracuene-Macaneta
 - Lack of transport to deliver materials due to breakdown of ferry
 - Inadequate testing and control of concrete
 - Lack of programme, drawings and other site records
 - Improper construction and compaction of road embankment
 - Lack of guidance on mixing clay and sand in the specified proportions
 - Poor site support in terms of materials supplies, inadequate equipment and an inadequate number of visits by management
 - Poor ETB work, lack of planning, wrong emulsion proportions, poor moisture control and poor compaction, inappropriate equipment
 - Lack of adequately qualified and experienced staff on site
 - Work seriously behind schedule
- 2) Macaneta-Machubo
 - Delay in identification of adequate quantities of suitable borrow and base material
 - Delayed resumption of work following rainy season
 - Work seriously behind schedule
- 3) Chinhacanine-Nalazi
 - Dumping contaminated material on the road
 - Contractor constructing embankment without compacting and without layer control
 - Inadequate testing and control of concrete
 - Mixing concrete on the ground instead of on an acceptable surface
 - Delays in testing of fill compaction due to unavailability of transport
 - Delay in identification of sources of pavement and surfacing materials
- 4) Cumbana-Chacane Phase 2
 - None of the contractor's site staff had previous experience in surfacing work, and were not listening to advice given
 - BD spray bar was clogging frequently in between sprays, delaying progress of work and leading to daily production that was lower than normal; this also resulted in uneven sprays
 - There was a lot of spilt bitumen which posed a hazard to chickens and small domestic animals.
- 5) Cumbana-Chacane Phase 3
 - Inadequate gravel thickness
 - Inadequate compaction moisture
 - Lack of site records
 - Progress behind schedule
- 6) Inhacufera-Machaze
 - Contamination of gravel material in stockpiling and on road
 - Lack of road and construction signs
 - Lack of site records

- 7) Beira-Savane
 - Frequent rain delays seriously hampering ETB work
 - Lack of sufficient flexibility by the contractor leading to delay in work progress
 - Poor ETB work
 - Lack of appropriate equipment
 - Lack of adequately qualified and experienced staff on site
- 8) Structure at 30km on Matema-Furancungo Road (Meno Construções)
 - Foundation details not clear
 - Lack of construction programme
- 9) Structure at 40km on Matema-Furancungo Road (ECMEP)
 - Long delay in commencement
- 10) Structure at 55,5km on Matema-Furancungo Road (Econil)
 - Long delay in commencement
- 11) Structure at 181km on Madamba-Mutarara Road (EREPTZ)
 - Working underwater during rains
 - Inadequate specification of works by the consultant
 - Inadequate steel reinforcement specified
- 12) Structure on Madamba-Mutarara Road (VICTORIA Construções)
 - Long delay in commencement
- 13) Structure over River Chikata, 84km on Bene-Fingoé Road (EREPTZ)
 - Working underwater during rains
 - Inadequate specification of works by the consultant
 - Inadequate steel reinforcement specified
- 14) Gracio-Milhana
 - Constructing embankment without controlling layer thickness
 - Inadequate compaction equipment
 - Lack of surveying equipment on site
 - Failure to work to design levels
 - Poor off-shutter finish
 - Work falling behind schedule
 - Cashflow problems
- 15) Xitaxi-Mueda
 - Absence of the contractor's general foreman and the consultant's supervisor on site sometimes
- 16) Montepuez-Namuno
 - Compaction not being done on detour
- 17) Niassa Provicne Projects
 - Non-completion of approaches to structures

8 Quality Assurance

Quality assurance of the project was achieved by implementing the relevant management aspects of the company's Quality Management System, namely:

- Understanding the scope of work
- Clearly defining the project team's roles and responsibilities
- Establishing clear lines of communication
- Executing the project in accordance with the approach outlined in the Inception Report
- Project progress monitoring and review through regular meetings

- Frequent liaison with the Client and other stakeholders

Frequent consultative meetings and discussions were held with ANE DIMAN and TRL, as well as ANE Provincial delegates, provincial consultants and contractors involved in the programme, in order to ensure that the project objectives would be met. This liaison process is illustrated in the diagram below. Monthly project progress review meetings were held with ANE DIMAN and DM. A record of meetings held is given in Appendix 6: List of Meetings.

An important aspect of our Quality Plan was holding regular internal project team reviews of the project as it progressed to discuss issues arising on the project, and in the process formulate solutions that were necessary to achieve effective training.

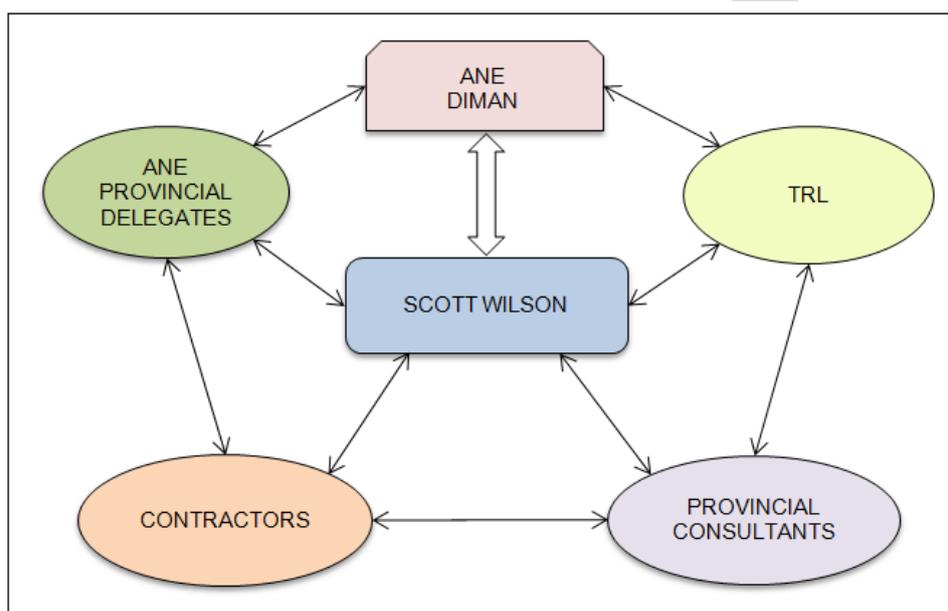


Figure 8.1: Project Liaison Process

9 Recommendations

1) Operational Issues

Recommendations were made to contractors and consultants during the site visits and these were included in the site visit reports prepared after each site visit. A summary of the recommendations made is as follows:

- 1) Realistic construction programmes must be prepared for all projects
- 2) Construction progress must be monitored
- 3) Contractors can and should set up simple systems of site records– box files of Bills of Quantities, construction programme, drawings, correspondence, site diaries, plant and labour returns, materials test results etc.
- 4) Contractors should have qualified and experienced key staff to supervise projects
- 5) Contractors should provide all the required resources – appropriate equipment, labour and materials – to carry out the work
- 6) Site staff should continue to be aware of the importance of compaction, proper method of construction and adherence to specifications
- 7) Contractors should call for compaction and other materials tests as often as necessary to ensure proper monitoring and quality control of work

8) Consultants should prepare and provide all the required project construction details and information

2) Equipment

Lack of site support was mentioned as one problem on many projects, provision of equipment being the main issue. It is recommended that contractors have the following basic equipment on projects to ensure a reasonable chance of success:

Table 9.1: Basic Contractor’s Project Equipment

Main	Accessories	Surfacing
Grader	Fuel trailer	Bitumen Distributor
TLB (Tractor Loader Backhoe)	Tipper trailer	Chip spreader
Tractor	Water trailer	Bitumen hand sprayer (lance)
Tipper truck	Disc harrow	
Vibratory roller	Plate compactor	
Pneumatic roller	Poker vibrator	
Water bowser	Compressor	
Concrete Mixer	Jack hammer	
Lorry	Generator set	
Pedestrian roller		
Water pump		

3) Further Training

Despite the extensive training given, some contractors still failed to set-up and implement the necessary aspects of contract and project management. It is felt and recommended that further and continued training be offered to all contractors, particularly in the following areas:

- Works planning and construction programming
- Construction control and progress monitoring
- Resource utilisation planning
- Concrete materials, mix proportions and production
- Testing and quality control
- ETB construction – computation of emulsion proportion, method of mixing, moisture control and compaction
- Interpretation of construction drawings, taking-off quantities and determination of quantities of materials required for the work
- Setting and keeping site records
- Surfacing work
- Materials testing
- Works setting out
- Surveying techniques
- Operating machines

As stated in the report, consultants’ staff also need training. In addition to some of the topics listed above, “fiscais” need to be trained in the following areas:

- Basic algebra and arithmetic for site calculations
- Sizing of drainage structures

- Setting out of structures
- Soil classification and selection of materials for road works

Preparation of some of these training materials had not yet been completed at the time the project was completed. Also, improvements are required to a lot of the other materials previously prepared.

4) *Way Forward*

The way in which such continued training could be offered has been discussed. There are three possible options:

- i. Each provincial consultant training their own staff
- ii. ANE continuing the training through a training consultant
- iii. Preparation of training modules by ANE or a consultant and giving provincial consultants to training their staff

It is felt that consulting companies would not implement the training effectively, even if they have training modules prepared for them. Option (ii) is therefore recommended. Continued and future training for both contractors' and consultants' staff would be done by a consultant, with provincial consultants being required to have their provincial engineers participate in the presentation of courses at workshops and seminars. On-site training would be done by senior supervisors under the guidance of the training consultant. This would mean that senior supervisors must be properly qualified and experienced to be able to do this.

It is also recommended that at commencement of their contracts, provincial consulting companies be required to hold a seminar for all their "fiscais" at which they would give the "fiscais" all the necessary documentation required for project supervision, and go through their duties and responsibilities. The companies would thus be expected to have a training component in their fees to cover the training input.

Some of such training can perhaps be offered at the CFE, definitely for machine operators, and participants be given certificates for attending courses at various levels. The training consultant would be expected to liaise with both the CFE and FME at all stages of preparation and presentation of training courses.

10 Conclusion

The contractor training project resulted in visible improvements in the performance and quality of work by some of the contractors. Benefits of the project were as follows:

- Raising awareness among contractors of their contractual obligations
- Ability to prepare works programmes by some contractors, leading to better project management
- Better site establishment on most Phase 3 contracts, enabling better site management by contractors
- Increase in quantity of good quality work produced

There continued to be problems on some project, however, particularly:

- Failure to prepare construction programmes
- Delays in project implementation
- Lack of qualified and experienced staff on projects
- Lack of site support
- Poor quality work and failure to adhere to construction specifications

The main reason for this was simply a lack of interest and effort by the affected contractors to do what was required and necessary to do things right. A lot of the issues, e.g. preparation of construction programmes and provision of experienced staff, could have been easily done.

On the consultants' side, although the problem of poor supervision by some of the consultants' supervisors still exist, many are now aware of their duties and responsibilities and know what they need to do to effectively supervise their projects.

Despite the problems that have been encountered, the level of awareness among all concerned of the correct way of planning, managing and implementing projects was raised through the training that was carried out, and the project is considered to have been successful and worthwhile. It is necessary to continue raising such awareness and knowledge amongst project supervisors and contractors staff, and it is recommended that similar training be continued in future.

DRAFT

Appendix 1: List of Projects in Programme

Project	Phase	Contractor	Start Date	Completion
Southern Region				
Maputo Province:				
Marracuene - Macaneta	2	ECMEP Sul	Aug 2009	Terminated
Marracuene - Macaneta	3	SEMPRE	Oct 2010	Mar 2011
Calanga - Checua	1	Adilson Construções		Complete
Cruz Km16/ Boane	1	Infra Engineering		Complete
Macaneta-Machubo	3	PROBRA	May 2010	
Gaza Province:				
Guija-Chicualacuala	1	Max Construções		Dec 2009
Guija-Chicualacuala)	2	Adilson Construções	Sept 2009	
R441 Chinhacanine-Nalazi	3	BRIDE Construções	Jul 2010	Nov 2010
Inhambane Province:				
Cumbana-Chacane	2	SINOHYDRO	Dec 2009	Mar 2010
Cumbana-Chacane	3	CBC Construções	Feb 2011	
Central Region:				
Manica Province:				
Inhacufera - Machaze	2	Tarcon	Jul 2009	Complete
Inhacufera - Machaze	3	EREPTZ	Feb 2011	
Sofala Province:				
Cruz N6 - Savane	2	TCO	Jan 2010	Jan 2011
Marromeu-Caia	3	ECMEP Centro		
Tete Province:				
Drift de Nhimbe	1	ECMEP Centro	Sept 2008	Feb 2009
Subida de Cachombo	3	Nhango Construções	Mar 2011	
Calçada da km 55+700	2	ZIAD Construções	Jun 2009	Complete
Subida de Furancungo; Revestimento com pedra	2	Repairs; No funding in 2011		
N302 Matema-Furancungo: 1 No. Calçada at 40km	3	ECMEP Centro	Mar 2011	

N302 Matema-Furancungo: 1 No. Calçada at 30km	3	Meno Construções	Mar 2011	
N302 Matema-Furancungo: 1 No. Calçada at 55,5km	3	ECONIL Construções		
N322 Madamba-Mutarara: 3 span bridge	3	EREPTZ	Dec 2010	Feb 2011
N322 Madamba-Mutarara Calçada	3	VICTORIA CONSTRUÇÕES	Mar 2011	
Bridge(3 span) at Chikata Km 84 (Bene-Fingoé Road)	3	EREPTZ	Dec 2010	Feb 2011
Ruas da Sede Distrital Marávia	3			In progress
Zambezia Province:				
Zero - Mopeia	2	CETA	Dec 2009	Complete
Zero - Mopeia	3	EREPTZ Construções	Sept 2010	Complete
Northern Region				
Cabo Delgado Province:				
Xitaxi – Muidumbe - Mueda	2	Construção A Varinda	Feb 2010	Complete
Montepuez - Namuno Structure	3	Sinobell		
Nampula Province:				
Nagema - Chocas Mar	2	SMS Construções	Sept 2009	Complete
R1159 Mecane - Pilivili	2	BLM Construções	Aug 2009	Complete
R1159 Mecane - Pilivili	2	SMS Construções	Sept 2009	Complete
R698 Grácio-Milhana – Cruz R696: 2 No. bridges	3	ECRAM Construções	Jul 2010	
Niassa Province:				
Mavago – M’sawize	2	Piramide	Jul 2009	Complete
Mavago – M’sawize	2	Acol	Jul 2009	Complete
Cuamba - Lichinga	1			Complete
R725 Nipepe–CheiaCheia: 3 No. bridges	3	EREP Construções	Jul 2010	Complete
R725 Nipepe–CheiaCheia: 2 No. bridges	3	Tumbine Empreendimentos Lda	Jul 2010	Complete
Mavago-M’sawise Stone paving	3	AC Construções	Jul 2010	Complete
Mavago-M’sawise Otta Seal	3	Construções CASAMA	Jul 2010	Complete

Appendix 2: Project Descriptions and Progress

Project	Description of Works	Progress to May 2011
Maputo Province:		
Marracuene – Macaneta SEMPRE	Project commenced on 27 September 2010. Project involves red sand base and slurry seal in the first section, and embankment construction and pavement of sand/clay blend in the section after Incomáti river.	Embankment - 50% Structures – 80% Pavement – 10% Slurry – 0%
Macaneta – Machubo PROBRA	Contract commenced in May 2010; Project involves embankment construction, culverts, pavement of sand/clay blend and concrete block paving in last 1,5km to Machubo administrative post.	Embankment - 90% Structures – 40% Pavement – 0%
Gaza Province:		
Chinhacanine - Nalazi BRIDE Construções	Contract commenced on 6 August 2010; Project involves embankment construction, pavement and various surfacing options over a 2km trial section.	Embankment – Complete Culverts - Complete; Pavement – 0%.
Inhambane Province:		
Cumbana - Chacane SINOHYDRO	The project commenced in December 2009 and was scheduled to complete in March 2010. The project involved construction of a calcrete/sand (50-50) blended base from 18km to 27km and Otta seal over 2km	Project completed in December 2010
Cumbana - Chacane CBC Construções	Contract commenced in October 2010. The project involves construction fill, a sand base and a sand seal from 11,8km to 18km.	Embankment – Complete Pavement – 0% Surfacing – 0%
Manica Province:		
Inhacufera - Machaze EREPTZ	The contract for Phase 3 commenced in September 2010. The project involves pavement construction and Otta seal for a length of 5 kilometres.	Base construction - 30%; OTTA Seal - 0%.

Project	Description of Works	Progress to May 2011
Sofala Province:		
Beira (Cruz N6) - Savane TCO	Phase II contract start date was 11 January 2010 and the end date was 31 December 2010. Work involves base construction, ETB in most sections, and surfacing. Up until now work is still unfinished 5 months after the contract end date with very little ETB done.	Base corrections - 0,06%; ETB - 0%; Seals - 0%.
Caia - Marromeu	The contractor refused to start work during the rainy season because of inaccessibility of the road. After the rains work has not started because the contractor is cash strapped.	
Tete Province:		
N322 Madamba - Mutarara: Km 181+300 EREPTZ	Contract commenced in December 2010. Project involves construction of a 3 x 5 span small bridge over Thoera river at km 181+300 on the Madamba – Mutarara road. Initially it was intended to construct a 33m long drift on the same location but the project was later altered to the current 19m long bridge	Foundations – 100% Abutments and piers – 60% Deck – 0%
N303 Bene - Fingoé: Km 83+300 EREPTZ	Contract commenced on 10 December 2010 and had a period of 3 months and the contract end date marked for 12 March 2011. Project involves construction of a 3 x 5 span bridge over Chikata river at km 84+300 on the Bene – Fingoé road and related access ramps. Initially it was intended to construct a 40m long drift on the same location but the project was later altered to the current 19m long bridge.	Foundations – 75% Abutments and piers – 50% Deck – 0%
N302 Matema-Furancungo: Km 30+000 EREPTZ	This site was handed over to the contractor on the 3 rd of March 2011 and the contractor started mobilizing on the 11 th of March 2011. The work involves construction of a vented ford over the Ncacame River on Km 30+000 and associated access ramps earthworks.	Foundations – 40% Abutments and piers – 0% Deck – 0%
N302 Matema-Furancungo: ECMEP CENTRO	Contract commenced with site handover on 13 April 2011; Project involves construction of a 5 x 5m span bridge a river on km 40+000 and related earthworks to complete the link of the new structure and the existing road.	Foundations – 0% Abutments and piers – 0% Deck – 0%
N302 Matema – Furancungo Km 55+700.	Construction of 2 x 5m span bridge on km 55+700, on Matema – Furancungo Road. The contractor was not yet on site at the time of the last visit made in April 2011.	Foundations – 0% Abutments and piers – 0%

Project	Description of Works	Progress to May 2011
ECONIL		Deck – 0%
R603 Daca – Furancungo Steep Rise in Farancungo;	Spot improvement of a section of 1,5 Km by stone and concrete pitching on Furancungo hill to provide friction for climbing and descending vehicles. The planned work involved the preparation of the subgrade, laying a cement/sand screed, stone pitching then casting a thin layer of concrete on top.	Repairs required to defective work by PAP; Tender yet to be let.
Zambézia Province:		
Zero - Mopeia EREPTZ	The contract started in September 2010 and by 16 December 2010 the contractor had completed the works. The project involved ripping the existing base and making up deficiencies of the base with imported base, watering, mixing and compacting. The section was to be surfaced with Otta Seal. The project length was 6km.	Complete
Cabo Delgado Province:		
Xitaxi - Muidumbe – Mueda Construções Abu Varinda	The project involves spot improvements on 8 steep climbs and descents on a stretch of 7,5km from N380. The sections were reshaped, and also it is planned to have cement stabilized base in these sections and 13,2 mm single seal surfacing. Project started on 15 February 2010.	Project is complete
Montepuez – Namuno Sinobell	Contract involves construction the spot improvement of various sections of the road by raising the road levels, construction of various culverts including a 6x4,6m span box culvert at Km 19+000. Official contract start date was set as 2 March 2011, and contract period of 6 months specified.	Earthworks - Structures – Pavement -
Nampula Province:		
Grácio - Milhana ECRAM	Contract commenced on 15 August 2010. The works involve routine maintenance and spot improvements on the 55,8 Km long Grácio – Muite (Junction R696) road. The work was redesigned to focus on the Milhana Swamp where 4 large box culverts and about 13500 m ³ of fill and base materials were specified. In addition it was decided to replace the timber deck on Katamassi River Bridge with reinforced concrete.	i). Routine Maintenance works – 100% ii). Katamassi River Bridge – 100% iii). Milhana Swamp culverts – 100% iv). Earthworks – 53%

Appendix 3: On-Site Visit and Training Record

Date	Project	Contractor	Present	Activities in Progress/Training Done/ Problems and Solutions
Maputo Province				
13 Sept 2010	Macaneta -Machubo	PROBRA	Consultec: A Albano Scott Wilson: E Gumbie, L Bomba Pedro	Contractor still not yet re-mobilised and no work in progress
20 October 2010	Macaneta-Machubo	PROBRA	PROBRA: Fernando Juvenal Andre, Hilário Langa Scott Wilson: Eric Gumbie, Leonel Bomba-Pedro	1. Work in progress: <ul style="list-style-type: none"> • Loading, dumping and spreading fill 2. Training Covered: <ul style="list-style-type: none"> • Ensuring best quality material on the road • Matching of dumping and compaction operations <u>Issues/Problems:</u> <ol style="list-style-type: none"> Identification of adequate quantities of suitable borrow and base material is still an issue Compaction is falling behind and needs to catch up with dumping.
22 October 2010	Marracuene-Macaneta	SEMPRE	SEMPRE: Humberto Matos Consultec: Jorge Chissico, Carlos Alfeu Scott Wilson: Eric Gumbie, Leonel Bomba-Pedro	Meeting at Marracuene to discuss implementation of project <u>Issues/Problems:</u> The ferry is broken down and will be out of service for 30 days from 10 October 2010. Consequently the contractor is unable to get materials across the river to the other side. So the meeting was primarily to hear from the contractor how he intended to overcome this problem. Minutes of the meeting will be done and circulated by the Engineer.
16 Nov 2010	Marracuene-Macaneta	SEMPRE	SEMPRE: M Pinto (Encarregado) CONSULTEC: C Alfeu	1. Work in Progress: <ul style="list-style-type: none"> • Excavation of road side drains by hand in first section • Hauling and dumping sand in second section 2. Training Covered:



Date	Project	Contractor	Present	Activities in Progress/Training Done/ Problems and Solutions
			(Fiscal) SCOTT WILSON: E Gumbie, L Bomba-Pedro	<ul style="list-style-type: none"> • Selection of fill material • Compaction • Method of achieving clay/sand mix proportions • Construction planning <p><u>Issues/Problems:</u></p> <p>a) The following are lacking on site:</p> <ul style="list-style-type: none"> • construction programme • construction drawings • construction materials <p>b) The road embankment is not being constructed and compacted properly</p> <p>c) There is no guidance on mixing clay and sand in the specified proportions (30/70)</p> <p>d) A decision should be made whether or not the labour-based approach is acceptable</p> <p>e) The contractor's management are not visiting site frequently</p>
1 Dec 2010	Marracuene-Macaneta	SEMPRE	SEMPRE: Manuel Pinto (Encarregado) SCOTT WILSON: E Gumbie, L Bomba-Pedro	<p>1. Work in Progress:</p> <ul style="list-style-type: none"> • Hauling and dumping sand in section 5-11km • Stockpiling of sand gravel by hand for Base 1 for section 1-2km, after the river. <p>2. Training Covered:</p> <ul style="list-style-type: none"> • Compaction <p><u>Issues/Problems:</u> These are as in the previous site visit report.</p>
8 Feb 2011	Marracuene-Macaneta	SEMPRE	SEMPRE: M Pinto (Encarregado) Consultec: L A Monroy,	<p>1. Work in Progress:</p> <ul style="list-style-type: none"> • Hauling and dumping gravel in section 0-700m • Culvert construction in section 5-11km, after the river.



Date	Project	Contractor	Present	Activities in Progress/Training Done/ Problems and Solutions
			J Chissico <u>ANE DIMAN</u> : N Leta <u>Scott Wilson</u> :E Gumbie	2. Training Covered: Limited Input 3. Training Required: <ul style="list-style-type: none"> • ETB • Slurry sealing Issues/Problems: <ol style="list-style-type: none"> a) Progress is very slow and behind schedule b) Site support is poor c) There is a need to meet with the contractor and discuss: <ul style="list-style-type: none"> • A revised construction programme • Site staff • Plans for ETB and slurry seal work
8 Feb 2011	Macaneta-Machubo	PROBRA	<u>PROBRA</u> : - <u>Consultec</u> : L A Monroy, J Chissico <u>ANE DIMAN</u> : N Leta <u>Scott Wilson</u> :E Gumbie	1. Work in progress: <ul style="list-style-type: none"> • Concrete block paving Issues/Problems: <ol style="list-style-type: none"> a) Section 0-2km was overtopped, cutting off access to the project, and resulting in work stoppage. The embankment in needs to be raised in this section. b) The project is now seriously behind schedule and needs to be accelerated.
16 Feb 11	Marracuene-Macaneta	SEMPRE	ANE Maputo : Rogério Simione ANE Assessor Zona Sul : Danstan Silanda TRL : Kenneth Mukura, Andrew Otto Scott Wilson RRIP : Eric Gumbie	1. Work in Progress: <ul style="list-style-type: none"> Culvert construction in section 5-11km, after the river. 2. Training Covered: Limited Input 3. Training Required: <ul style="list-style-type: none"> • ETB • Slurry seal Issues/Problems: Same as previous – not much work in progress and contract is behind



Date	Project	Contractor	Present	Activities in Progress/Training Done/ Problems and Solutions
				schedule
9 March 2011	Marracuene-Macaneta	SEMPRE	<p><u>SEPMRE</u>: Alberto Antonio (Supervisor)</p> <p><u>Scott Wilson</u>: E Gumbie, L Bomba-Pedro</p>	<p>1. Work in Progress:</p> <ul style="list-style-type: none"> • Culvert construction in section 5-11km, after the river • Drain clearing in section 5-11km. <p>2. Training Covered: Limited Input</p> <p>3. Training Required:</p> <ul style="list-style-type: none"> • ETB construction • Slurry seal <p><u>Issues/Problems:</u></p> <p>a) The consultant should arrange to have concrete tests done to check the quality of work being produced</p> <p>b) Site support remains poor</p> <p>c) A revised construction programme is still yet to be done.</p>
9 March 2011	Macaneta-Machubo	PROBRA	<p><u>PROBRA</u>: -</p> <p><u>Scott Wilson</u>: E Gumbie, L Bomba-Pedro</p>	<p>1. Contract commenced in May 2010; Project involves embankment construction, culverts, pavement of sand/clay blend and concrete block paving in last 1,5km to Machubo administrative post.</p> <p>2. Work in progress:</p> <p>PROBRA not yet resumed work on site. Road opening in progress by Maragra bulldozer in section 0-2km, reportedly arranged by Machubo Administrator.</p> <p>3. Training Covered: N/A</p> <p><u>Issues/Problems:</u></p> <p>a. The road has been badly damaged by rains in section 0-2km, and considerable remedial work is required to be done.</p> <p>b. The Administrator of Machubo Administrative Post expressed the travelling difficulties people in the area are facing, and the need to have the road construction completed.</p>



Date	Project	Contractor	Present	Activities in Progress/Training Done/ Problems and Solutions
29, 30 & 31 Mar 11	Marracuene-Macaneta	SEMPRE	<p><u>SEMPRE</u>: A Matos (Director), M Pinto (Encarregado)</p> <p><u>Consultec</u>: J Chissico (S Fiscal), C Alfeu (J Fiscal)</p> <p><u>Scott Wilson</u>: E Gumbie, L Bomba-Pedro</p> <p>On 31 March 2011:</p> <p><u>ANE DIMAN</u>: N Leta, R Simione (Maputo Province), D Silanda</p>	<p>1. Work in Progress:</p> <ul style="list-style-type: none"> • ETB on section 1 before Incomáti river <p>2. Training Covered:</p> <ul style="list-style-type: none"> • Calculation of required quantity of emulsion to achieve specified application rate • Basics of ETB – mixing, time, moisture control, compaction • Final road surface finish <p>3. Training Required:</p> <ul style="list-style-type: none"> • ETB construction • Slurry seal <p><u>Issues/Problems</u>:</p> <p>a) ETB not being done properly – inadequate rate of production by hand and small concrete mixer, insufficient water, inadequate rolling</p> <p>b) Contractor needs to have proper equipment to execute work required</p> <p>c) Compaction tests must be done</p> <p>d) Extension of time has been applied for</p>
29, 30 & 31 Mar 11	Marracuene-Macaneta	SEMPRE	<p><u>SEMPRE</u>: A Matos (Director), M Pinto (Encarregado)</p> <p><u>Consultec</u>: J Chissico (S Fiscal), C Alfeu (J Fiscal)</p> <p><u>Scott Wilson</u>: E Gumbie, L Bomba-Pedro</p> <p>On 31 March 2011:</p> <p><u>ANE DIMAN</u>: N Leta, R</p>	<p>1. Work in Progress:</p> <ul style="list-style-type: none"> • ETB on section 1 before Incomáti river <p>2. Training Covered:</p> <ul style="list-style-type: none"> • Calculation of required quantity of emulsion to achieve specified application rate • Basics of ETB – mixing, time, moisture control, compaction • Final road surface finish <p>3. Training Required:</p> <ul style="list-style-type: none"> • ETB construction • Slurry seal



Date	Project	Contractor	Present	Activities in Progress/Training Done/ Problems and Solutions
			Simione (Maputo Province), D Silanda	<p><u>Issues/Problems:</u></p> <ul style="list-style-type: none"> a) ETB not being done properly – inadequate rate of production by hand and small concrete mixer, insufficient water, inadequate rolling b) Contractor needs to have proper equipment to execute work required c) Compaction tests must be done d) Extension of time has been applied for
21 April 2011	Marracuene-Macaneta	SEMPRE	<p><u>SEMPRE:</u> H Matos (Director), M Pinto (Encarregado)</p> <p><u>Consultec:</u> J Chissico (S Fiscal), C Alfeu (J Fiscal)</p> <p><u>ANE DIMAN:</u> N Leta</p> <p><u>Scott Wilson:</u> E Gumbie</p>	<ul style="list-style-type: none"> 1. Work in Progress: <ul style="list-style-type: none"> • Construction of road side drains by hand in section 5-14km 2. Training Covered: Limited Input 3. Training Required: <ul style="list-style-type: none"> • ETB construction • Slurry seal <p><u>Issues/Problems:</u></p> <ul style="list-style-type: none"> a) Culvert length near end of project (about 13km) is too long. Discussed with consultants determination of correct culvert lengths and reference to standard drawings b) Setting out and profile of side drains being done by hand looked alright. c) It is essential for the contractor to do ETB construction.
21 April 2011	Macaneta-Machubo	PROBRA	<p><u>PROBRA:</u> -</p> <p><u>Consultec:</u> J Chissico, A Albano (J Fiscal)</p> <p><u>ANE DIMAN:</u> N Leta</p> <p><u>Scott Wilson:</u> E Gumbie</p>	<ul style="list-style-type: none"> 1. Work in progress: <ul style="list-style-type: none"> • Excavation for additional culverts in section 0-2km. 2. Training Covered: N/A <p><u>Issues/Problems:</u></p> <ul style="list-style-type: none"> a) A vehicle was bogged down while trying to bypass the first culvert excavation on section 0-2km. There is need to make proper arrangements to accommodate traffic during construction of the culverts. b) There was no work on concrete block paving. There is no reason



Date	Project	Contractor	Present	Activities in Progress/Training Done/ Problems and Solutions
				why this cannot be resumed.
4 May 2011	Marracuene-Macaneta	SEMPRE	<p><u>SEMPRE</u>: M Pinto (Encarregado)</p> <p><u>Consultec</u>: C Alfeu (J Fiscal)</p> <p><u>Scott Wilson</u>: E Gumbie, L Bomba-Pedro</p> <p>(Mr. Nazir de Almeida of SEMPRE came to site at the time the ETB was being completed)</p>	<p>1. Work in Progress:</p> <ul style="list-style-type: none"> • ETB Construction • Dumping and spreading fill material in sections after Incomati River. • Plastering culvert head and wing walls at 8+700 <p>2. Training Covered:</p> <ul style="list-style-type: none"> • Guidelines on emulsion quantity computations • Advice on moisture control requirements <p>3. Training Required:</p> <ul style="list-style-type: none"> • ETB construction • Slurry seal <p><u>Issues/Problems:</u></p> <p>a) Emulsion quantity calculations are not being done properly. The contractor must do this, and also prepare a method statement for site staff</p> <p>b) There is still no programme of work on site. As previously stated, it is necessary to have this and ensure work is done accordingly to completion.</p>
Gaza Province				
22 Sept 2010	Chinhacanine-Nalazi	BRIDE Construções	<p>Cotop: F Canda</p> <p>BRIDE: A J Lubrino</p> <p>Scott Wilson: E Gumbie, L Bomba-Pedro</p>	<p>1. Work in Progress</p> <ul style="list-style-type: none"> • Embankment and culvert construction in progress <p>2. Training covered:</p> <ul style="list-style-type: none"> • Embankment construction method- build-up in 150mm layers • Compaction and testing • Equipment needs • Culvert invert setting-out • Concrete mix design, water control and production <p><u>Issues/Problems:</u></p>

Date	Project	Contractor	Present	Activities in Progress/Training Done/ Problems and Solutions
				a) Constructing embankment without compacting; Contractor instructed to remove and reconstruct b) Possibility of requiring pneumatic roller discussed with contractor
13 Oct 2010	Chinhacanine-Nalazi	BRIDE Construções	<u>COTOP</u> : F Canda (Fiscal), L Tamele <u>BRIDE</u> : A J Lubrino (Director da Obra) <u>ANE Gaza</u> : D Silanda, T Cossa <u>ANE DIMAN</u> : N Leta <u>Scott Wilson</u> : E Gumbie	1. Work in progress: <ul style="list-style-type: none"> • Spreading embankment fill 2. Training Covered: <ul style="list-style-type: none"> • Curve setting out <u>Issues/Problems</u> : <ul style="list-style-type: none"> • Work is seriously behind schedule and needs to be accelerated.
18 Nov 2010	Chinhacanine-Nalazi	BRIDE Construções	<u>COTOP</u> : Bento Machel, Fenorio Canda (Fiscal) <u>BRIDE</u> : Antonio José Lubrino (Director da Obra) <u>SCOTT WILSON</u> : E Gumbie, L Bomba-Pedro	1. Work in progress: <ul style="list-style-type: none"> • Construction of culvert headwalls • Loading and dumping of embankment fill 2. Training Covered: <ul style="list-style-type: none"> • Need to clean steel reinforcement • Compilation and keeping of site records <u>Issues/Problems</u> : a) Work falling behind schedule b) Need for a revised programme
9 Feb 11	Chinhacanine-Nalazi	BRIDE Construções	<u>COTOP</u> : F Canda (Fiscal), L Tamele <u>BRIDE</u> : A J Lubrino (Director da Obra) <u>ANE Gaza</u> : D Silanda, T Cona <u>ANE DIMAN</u> : N Leta	1. Contract commenced on 6 August 2010; Project involves embankment construction, pavement and various surfacing options over a 2km trial section 2. Work in progress: <ul style="list-style-type: none"> • Spreading embankment fill 3. Training Covered: <ul style="list-style-type: none"> • Curve setting out <u>Issues/Problems</u> : <ul style="list-style-type: none"> • Work is seriously behind schedule and needs to be accelerated.



Date	Project	Contractor	Present	Activities in Progress/Training Done/ Problems and Solutions
			<u>Scott Wilson</u> : E Gumbie	
17 March 2011	Chinhacanine-Nalazi	BRIDE Construções	<p><u>COTOP</u>: A C Mabongue (Chefe de Equipa), F Canda (Fiscal)</p> <p><u>BRIDE</u>: V Manuel (Directo), A J Lubrino (Director da Obra)</p> <p><u>Scott Wilson</u>: E Gumbie, L Bomba-Pedro</p>	<p>1. Work in progress:</p> <ul style="list-style-type: none"> • Embankment complete; Contractor waiting to commence stockpiling pavement materials <p>2. Training Covered: N/A</p> <p>3. Training Required:</p> <ul style="list-style-type: none"> • Base stabilisation • Surfacing operations <p><u>Issues/Problems</u>:</p> <p>a) Extension of time has been applied for.</p> <p>b) There is an urgent need to commence stockpiling and sourcing of pavement materials and surfacing</p>
Inhambane Province				
27-30 October 2010	Cumbana - Chacane	SINOHYDRO	<p><u>Stange Consult</u>: Roque Juvencio Taimo</p> <p><u>SINOHYDRO</u>: Jia Wen Guang</p> <p><u>TRL</u>: Kenneth Mukura</p> <p><u>Scott Wilson</u>: Eric Gumbie, Leonel Bomba-Pedro</p>	<p>1. Work in Progress</p> <ul style="list-style-type: none"> • Pavement construction and priming are complete, and surfacing is in progress <p>2. Training done:</p> <ul style="list-style-type: none"> • Aggregate application calculations • BD operation – road edge lining, spraying observation, speed control • Aggregate application – application observation, control of tipper speed, dust alleviation • Recording of spraying data • Corrective measures <p><u>Issues/Problems</u>:</p> <p>a) None of the contractor’s site staff had previous experience in surfacing work, and were not listening to advice given, resulting in somewhat inadequate correction of surfacing errors in a number of cases</p> <p>b) BD spray bar was clogging frequently in between sprays. It</p>

Date	Project	Contractor	Present	Activities in Progress/Training Done/ Problems and Solutions
				<p>appeared it was not the right type of bar. A lot of cleaning was needed to be done in the morning, delaying commencement of surfacing work and leading to daily production that was lower than normal.</p> <p>c) There was a lot of spilt bitumen which paused a hazard to chickens and small domestic animals.</p>
1 November 2010	Cumbana - Chacane	SINOHYDRO	<p><u>Stange Consult</u>: Roque JuvencioTaimo <u>SINOHYDRO</u>: Jia Wen Guang <u>TRL</u>: Kenneth Mukura <u>Scott Wilson</u>: Eric Gumbie, Leonel Bomba-Pedro</p>	<p>1. Work in Progress</p> <ul style="list-style-type: none"> • Pavement construction and priming are complete, and surfacing is in progress <p>2. Training done:</p> <ul style="list-style-type: none"> • BD operation – road edge lining, spraying observation, speed control • Aggregate application – application observation, control of tipper speed, dust alleviation • Recording of spraying data • Corrective measures <p><u>Issues/Problems</u>:</p> <p>a) BD spray bar nozzles were clogging resulting in uneven sprays. b) The chip spreader also got clogged with stones on two occasions blocking aggregate from flowing evenly onto the surface</p>
22 & 25 March 2011	Cumbana - Chacane	CBC Construções	<p><u>Stange Consult</u>: Roque JuvencioTaimo (Fiscal) <u>CBC</u>: Tomás Jeque Junior (Director da Obra) José Alfabeto Banze (Encarregado) Dádivo David (Encarregado) <u>Scott Wilson</u>: Eric</p>	<p>1. Works in progress:</p> <ul style="list-style-type: none"> • Dumping and compaction of fill <p>2. Training:</p> <ul style="list-style-type: none"> • Construction programming – contract period, time required for the various activities • Layer thickness and width control • Compaction moisture requirements <p><u>Issues/Problems</u>:</p> <p>a) Gravel thickness was inadequate b) Compaction moisture was also inadequate; more water would be required for proper compaction.</p>

Date	Project	Contractor	Present	Activities in Progress/Training Done/ Problems and Solutions
			Gumbie, Leonel Bomba-Pedro	c) A simple system of site records can easily be put in place – box files of Bills of Quantities, construction programme, drawings, correspondence, site diaries, plant and labour returns, materials test results etc. Consultants should insist on this. d) An extension of time is probably going to be required
Manica Province				
23 March 2011	Inhacufera – Machaze Phase 3		<p><u>COTOP</u>: Venâncio Salato (Fiscal)</p> <p><u>EREPTZ</u>: Tony Tomé Matende (Director da Obra)</p> <p>Joshua Goshe (Encarregado)</p> <p><u>Scott Wilson</u>: Eric Gumbie, Leonel Bomba-Pedro</p>	<p>1. Works in progress:</p> <ul style="list-style-type: none"> • Gravel stockpiling • Construction of detour • Dumping of pavement gravel <p>2. Training:</p> <ul style="list-style-type: none"> • Construction programming – contract period, time required for the various activities • Site records <p><u>Issues/Problems:</u></p> <p>a) Contamination of gravel material in stockpiling</p> <p>b) Clay lumps must be removed from the dumped heaps of gravel before and during spreading.</p> <p>c) A simple system of site records can easily be put in place – box files of Bills of Quantities, construction programme, drawings, correspondence, site diaries, plant and labour returns, materials test results etc. Consultants should insist on this.</p> <p>d) There are presently no detour signs and this must be addressed.</p> <p>e) An extension of time may be required.</p>
Sofala Province				
20 Dec 2010	Cruz N6 Savane	TCO	<p>Técnica: J Munyanyi, T Mbatsana</p> <p>Scott Wilson: K Makubika</p>	ETB trial interrupted by rain after only 10m had been done. No further work was done subsequently.

Date	Project	Contractor	Present	Activities in Progress/Training Done/ Problems and Solutions
10 March 2011	Cruz N6 Savane	TCO	<p><u>ANE Sofala</u>: Agapito da Cruz, Mateus Espirito Santos</p> <p><u>Scott Wilson</u> : Kenneth Makubika</p>	<p>1. Work in Progress: Work stopped due to rain</p> <p>2. Training Covered: N/A</p> <p>3. Training Required:</p> <ul style="list-style-type: none"> • ETB construction <p><u>Issues/Problems:</u></p> <p>a) ETB on trial section done by disc harrow was sub-standard. The mix was not homogeneous, some areas having no bitumen completely and others with lumps of bitumen. The concrete mixer had been said to produce small quantities of ETB and hence was not used.</p> <p>b) The contractor has no one on site capable of handling the work required. If the project is to be done at all, it is necessary for the contractor to dedicate people to the project capable of implementing the project.</p> <p>c) A new programme has been drawn-up, with project completion at the end of May 2011.</p> <p>d) It is essential for the consultant to contact Scott Wilson to assist with the ETB work when it resumes.</p>
30 Mar – 1 Apr 11	Cruz N6 Savane	TCO	<p><u>TCO</u>: Antonio Carvalho (Contract Manager), Manuel Matias (Foreman)</p> <p><u>Tecnica</u>: Mercio Leonel, Tenorio Mbatsana, Enoque Firmino, Mateus Manuel</p> <p><u>TRL</u>: K Mukura</p> <p><u>Scott Wilson</u> : Kenneth</p>	<p>1. Work in Progress: ETB construction in progress</p> <p>2. Training Covered:</p> <ul style="list-style-type: none"> • ETB construction <p>3. Training Required:</p> <ul style="list-style-type: none"> • ETB construction <p><u>Issues/Problems:</u></p> <p>a) Progress was slow and disrupted by rain once again.</p> <p>b) The contractor does not have proper equipment to spray the</p>



Date	Project	Contractor	Present	Activities in Progress/Training Done/ Problems and Solutions
			Makubika	emulsion. A 1,4m ³ bowser is being used but it is inappropriate. A nigger roller is also needed on site. c) Moisture control is not being done properly d) Appropriate equipment and better work management is required. e) A proposed work procedure will be issued by Scott Wilson.
Tete Province				
08 Feb 11	N322 Madamba-Mutarara: Construction of a three span small bridge over Thoera River; km 181+300	EREPTZ	Técnica: Carlos Ernesto Barama, Samuel Kamuendo. EREPTZ: Banito Herculano ANE Tete: Jona Arão Zacarias. Scott Wilson: Emmanuel Munatsi, Leonel Bomba -Pedro	1. Work in Progress: <ul style="list-style-type: none"> • Construction of two abutments and two piers in masonry (<i>Stone and cement mortar</i>). • Material stockpiling for the construction of the deck slab. 2. Training Covered: <ul style="list-style-type: none"> • Concrete production and construction 3. Training Required: <ul style="list-style-type: none"> • Works planning and progress monitoring • Interpretation of construction drawings. • Site records • Quality control. <u>Issues/Problems:</u> a) Working in rivers during the rainy season b) Inadequate specification of works by the consultant. (<i>Refer to slab thickness, size and spacing of reinforcing steel</i>). c) Insufficient detail on foundation drawings. d) Progress is very slow and apparently behind schedule, there is no schedule anyway to compare with. e) Materials supply and warehousing. f) There is a need to meet with the contractor and discuss:

Date	Project	Contractor	Present	Activities in Progress/Training Done/ Problems and Solutions
				<ul style="list-style-type: none"> • Production and approval of a works program. • Site staff and their responsibilities. • Materials and final product quality control. • Extension of contract duration.
09 Feb 11	N303 Bene-Fingoé: Construction of a piped drift over Chikata River; km 84+000	EREPTZ	<p>Técnica: Carlos Ernesto Barama, Jorge Joaquim Redondo, Joaquim Vaz.</p> <p>EREPTZ: Raimundo Bernardo (director da obra), Cardoso Diguissani,</p> <p>ANE Tete: Jona Arão Zacarias.</p> <p>Scott Wilson: Emmanuel Munatsi,</p> <p>Leonel Bomba -Pedro</p>	<p>1. Work in Progress:</p> <ul style="list-style-type: none"> • Construction of two abutments and two piers in masonry (<i>Stone and cement mortar</i>). • Material stockpiling for the construction of the deck slab. <p>2. Training Covered:</p> <ul style="list-style-type: none"> • Concrete production and construction <p>3. Training Required:</p> <ul style="list-style-type: none"> • Works planning and progress monitoring • Interpretation of construction drawings. • Site records • Quality control. <p><u>Issues/Problems:</u></p> <p>a) Working in rivers during the rainy season</p> <p>b) Inadequate specification of works by the consultant. (<i>Refer to slab thickness, size and spacing of reinforcing steel</i>).</p> <p>c) This structure is founded on rock. Foundation detail different from that on “Typical drawing”. No revised edition issued.</p> <p>d) Progress is very slow and apparently behind schedule, there is no schedule anyway to compare with.</p> <p>e) Materials supply and warehousing.</p> <p>f) There is a need to meet with the contractor and discuss:</p> <ul style="list-style-type: none"> • Production and approval of a works program. • Site staff and their responsibilities. • Materials and final product quality control. • Extension of contract duration.

Date	Project	Contractor	Present	Activities in Progress/Training Done/ Problems and Solutions
28 Apr 2011	N302 Matema-Furancungo: Construction of a small bridge over a river at km 40+000 Phase 3	ECMEP Centro	<p><u>ECMEP Centro:</u> Constantino Armando, Quilino Salicuchepa Salpai</p> <p><u>Scott Wilson :</u> Emmanuel Munatsi, Leonel Bomba Pedro,</p> <p><u>Técnica:</u> Milione João Milione</p>	<p>1. Work in Progress</p> <ul style="list-style-type: none"> • Mobilization, with the Camp construction underway on the day of visit. <p>2. Training Covered</p> <ul style="list-style-type: none"> • N/A <p>3. Training required</p> <ul style="list-style-type: none"> • Works planning and programme preparation • Drawing interpretation and taking off quantities. • Setting out • Concrete mix design and volume batching. <p><u>Issues / Problems</u></p> <p>a) Contract duration of sixty days may not be sufficient for the planned works</p> <p>b) A works programme should be prepared and approved by the consultant.</p> <p>c) The consultant's representative said they would review clarify details on foundation drawings.</p> <p>d) The contractor was advised to collect and send material to the laboratory for mix designs and testing.</p>
28 Apr 2011	N302 Matema-Furancungo: Construction of a vented Ford over Ncacame River on km 30+000 Phase 3	MENO Construções,	<p><u>MENO Construções:</u> Nhatua Capasseco Domingos</p> <p><u>Scott Wilson :</u> Emmanuel Munatsi, Leonel Bomba Pedro</p> <p><u>Técnica:</u></p>	<p>1. Work in progress</p> <ul style="list-style-type: none"> • Foundation construction (1.90m deep, 1.40m wide for abutment footings and 1.2m wide pier footings), each footing has a thickness of 600mm in mesh reinforced concrete sitting on top of a 500mm thick rock fill, the mesh is not specified but is located 200mm from the bottom. • Construction of abutments and the central pier on top of the said foundations. <p>2. Training Covered:</p> <ul style="list-style-type: none"> • Concrete production and construction

Date	Project	Contractor	Present	Activities in Progress/Training Done/ Problems and Solutions
			Milione João Milione	3. Training Required <ul style="list-style-type: none"> • Works planning and programme preparation • Drawing interpretation and taking off quantities. • Setting out • Concrete mix design and volume batching Issues / Problems: a) Foundation detail on the drawing is not clear b) A works programme needs to be prepared and approved.
Zambézia Province				
16 Dec 2010	Zero - Mopeia	EREPTZ	Tarcon: 2 Machine Operators Scott Wilson: M.K. Makubika	1. Work in progress <ul style="list-style-type: none"> • All OTTA seal work complete. • Contractor in mid of demobilization. 2. Training: N/A Issues / Problems: <ul style="list-style-type: none"> • The contractor worked to specifications on the layer-works and Otta seal and completed the work within the contract period. However the otter seal surfacing was done by a sub-contractor called Tarcon.
Cabo Delgado Province				
20 Sept 2010	Xitaxi-Mueda	Construção A. Varinda (CAV)	CAV: Momed Ferroz SWM Cabo: Sanlí Armando, SWM AFCAP:M.K. Makubika [ON SITE]	1. Works in progress <ul style="list-style-type: none"> • Curing of cement stabilised base on the first and second ramp. • Preparation for priming of the first and second ramps. • Cement stabilization of the base for the third ramp. 2. Training covered: <ul style="list-style-type: none"> • The priming procedure including test blocks for penetration, • Preparations for application of tack coat, • Application of road stone, • Compaction of the surfacing. Issues/ Problems: a) The contractor does not keep a record of site events and

Date	Project	Contractor	Present	Activities in Progress/Training Done/ Problems and Solutions
				<p>instructions given are not registered.</p> <p>b) The consultant is not in the habit of writing instructions in the site diary.</p> <p>c) There was a bit of confusion as to the rates of application of the prime and tack coat because the engineer's works order does not indicate these rates and rates given to the contractor were not written down.</p> <p>d) Because of the steep slopes on the ramps the possibility of using a pneumatic roller was discussed with contractor but indications were that it may be more reasonable to use loaded tippers for this exercise.</p>
21 Sept 2010	Xitaxi-Mueda	Construção A. Varinda (CAV)	<p>SWM Cabo: Nedson Kaunda,</p> <p>SWM AFCAP:M.K. Makubika</p> <p>[AT THE PROVINCIAL CONSULTANT'S OFFICE]</p>	<p>1. Training covered:</p> <ul style="list-style-type: none"> • The priming procedure including test blocks for penetration discussed, • Preparations for application of tack coat discussed, • Application of road stone, • The issue of the use of laden tippers fro compaction. <p><u>Issues/ Problems:</u></p> <p>a) Lack of site records.</p> <p>b) The consultant is not writing instructions in the site diary.</p> <p>c) The confusion as to the rates of application of the prime and tack coat because of lack of documented instructions.</p>
21 Sept 2010	Xitaxi-Mueda	Construção A. Varinda (CAV)	<p>CAV: Momed Bachir</p> <p>SWM Cabo: Pedro Isaías,</p> <p>SWM AFCAP:M.K. Makubika</p> <p>[AT THE PROVINCIAL</p>	<p>1. Training covered:</p> <ul style="list-style-type: none"> • The priming procedure including test blocks for penetration discussed, • Preparations for application of tack coat discussed, • Application of road stone, • The issue of the use of laden tippers for compaction. <p><u>Issues/ Problems:</u></p> <p>a) Lack of site records.</p> <p>b) The consultant is not writing instructions in the site diary.</p> <p>c) The confusion as to the rates of application of the primer and tack</p>

Date	Project	Contractor	Present	Activities in Progress/Training Done/ Problems and Solutions
			CONSULTANT'S OFFICE]	coat because lack of documented instructions
11 October 2010	Xitaxi-Mueda	Construção A. Varinda (CAV)	CAV: Nobody on site SWM Cabo: Sanlí Armando, SWM AFCAP:M.K. Makubika [ON SITE]	1. Works in progress <ul style="list-style-type: none"> • The first and second ramps were surfaced during the last week of September to an acceptable quality, • Ramps 3 and 4 shall not be surfaced. They were designed as 150mm bases compacted to 95% Mod AASHTO density. • Cement stabilization on Ramp No 5 was done and curing was in progress. • Ramps 6, 7 and 8 still had the soil for the bases heaped along the road in readiness for construction of the bases. 2. Training covered: <ul style="list-style-type: none"> • Control of soil, water, cement and bitumen application rates in bases to meet the specifications. <u>Issues/ Problems:</u> <ul style="list-style-type: none"> • During this visit, it was noted that the absence of the contractor's general foreman and the consultant's supervisor paralysed the progress of the works because the contractor does not have personnel trained for the type of work on this project.
22 October 2010	Xitaxi-Mueda	Construção A. Varinda (CAV)	CAV: Nobody on site <u>ANE C Delgado:</u> Sobrinho Lemos <u>ANE DIMAN:</u> I Simões, N Leta <u>SWM Cabo:</u> R Guchari, Sanlí Armando, <u>SWM AFCAP:</u> M.K. Makubika [ON SITE]	1. Works in progress: <ul style="list-style-type: none"> • Section 7+00 - 6+800: Priming by hand • Section 6+800 – 6+500: Preparing Base 1 for cement stabilisation. <u>Issues/Problems:</u> <ol style="list-style-type: none"> a) Contractor's foreman was not on site. Only general hands were on site. b) Priming was of poor quality. Hand spray was broken down and priming was being done using cans. There was no proper control of work.

Date	Project	Contractor	Present	Activities in Progress/Training Done/ Problems and Solutions
9 Dec 2010	Xitaxi-Mueda	Construção A. Varinda (CAV)	CAV: Nobody on site SWM Cabo: Nobody on site SWM RRIP:M.K. Makubika [ON SITE]	1. Works in progress <ul style="list-style-type: none"> • No work going on. • Construction works substantially complete 2. Training covered: <ul style="list-style-type: none"> • The training engineer communicated by cell phone with the Senior Supervisor to get a summary of what was the status of the project. Issues/ Problems: <ul style="list-style-type: none"> • During this visit, it was noted that the contractor had demobilised his major pieces of equipment but still requires to clean up the drains to remove soil deposits due to construction works.
9 Dec 2010	Montepuez - Namuno Bridge	Sinobell		1. Work has not yet started. According to the project consultant, the contractor is waiting for an advance payment before work can start. 2. ANE must expedite the payment of advance payment to the contractor if he has submitted all the requisite documentation.
20 Jan 2011	Montepuez - Namuno Bridge	Sinobell	Sinobell: Samuel Pedro Calege, Sidónio T Machango Scott Wilson: K Makubika, S Takuva	1. Works in progress <ul style="list-style-type: none"> • No work going on. • Construction works substantially complete 2. Training covered: <ul style="list-style-type: none"> • Works programming • Resource planning • Cost estimation • Invoice forecasting • Site organization and reporting structure • Site documentation Problems/Issues: <ol style="list-style-type: none"> a) The advance had now been paid b) The Senior Fiscal should obtain the necessary contract documents and drawings from the Delegation and send to site.

Date	Project	Contractor	Present	Activities in Progress/Training Done/ Problems and Solutions
4 March 2011	Montepuez - Namuno Structure	Sinobell	<p>Sinobell: Orlando Saidi (Capataz- Charge hand)</p> <p>Scott Wilson Cabo Delgado: J Nyirongo (S Fiscal)</p> <p>Scott Wilson Trainer: K Makubika</p>	<p>1. Work in Progress:</p> <ul style="list-style-type: none"> • Dumping gravel, spreading and shaping road profile on detour (0.5km long). • Site establishment: <ol style="list-style-type: none"> i. 2 containers on site for offices and cement storage ii. Chain-linked fence compound iii. All reinforcement steel on site ex South Africa iv. Cement on order ex Nacala <p>2. Training:</p> <ul style="list-style-type: none"> • Ran charge-hand through duties and responsibilities of contractor's site manager <p><u>Issues/Problems:</u></p> <ol style="list-style-type: none"> a) Compaction not being done on detour; This will be rectified, as well as adherence to specifications b) The Engineer needs to give clear instructions and drawings for flood damage spot improvement works prior to commencement of work c) Some aspects of site works planning have been done properly, e.g. supply of steel reinforcement well ahead of time
26 March 2011	Xitaxi-Mueda	Construção A. Varinda (CAV)	<p>ANE DPCD:</p> <p>Delegado: Eng^o Correia</p> <p>ANE DIMAN Advisor: N. Leta,</p> <p>ANE Monitoring Dept: F. Manheche</p> <p>Scott Wilson:</p> <p>Inspector: R Guchari</p> <p>Scott Wilson Trainer: K Makubika</p>	<p>Complete.</p> <p>However the surfacing quality is showing problems which indicate problems in the method used for the surfacing.</p> <p>It appears that the primer did not penetrate the base in many instances and the tack and seal coats were sprayed on dusty surfaces. Monitoring should be done continuously by the province.</p>
25 March	Namuno-Montepuez Multi-Cellular Box	SINOPELL	SINOPELL:	<p>1. Contract involves construction of a 6x4,3m span box culvert at 19km. Official contract start date is 2 March 2011, and contract</p>

Date	Project	Contractor	Present	Activities in Progress/Training Done/ Problems and Solutions
2011	Culvert		Director da Obra: S. P. Calege, ANE DIMAN Advisor: N. Leta, ANE Monitoring Dept: F. Manheche Scott Wilson: Supervisor: E António Scott Wilson Trainer: K Makubika	period is 6 months 2. Work in Progress: <ul style="list-style-type: none"> • Compaction of base on detour (0.5km long). • Site establishment: <ul style="list-style-type: none"> v. 2 containers on site for offices and cement storage vi. All reinforcement steel on site ex South Africa 3. Training: <ul style="list-style-type: none"> • Compaction, standards • Programming preparation. <u>Issues/Problems:</u> a) The contractor had problems acquiring a compactor; This will be rectified b) Supply of steel reinforcement well ahead of time but cement which was said to be on order in the first week had not been received.
12 May 2011	Montepuez - Namuno Multi-Cellular Box Culvert	SINOPELL	<u>SINOPELL:</u> Director da Obra: Sidónio Tristão Machango Encarregado: Mussa Lagima João <u>Scott Wilson:</u> Senior Fiscal: James Nyirongo, Junior Fiscal : Eugénio Mário António <u>Scott Wilson Trainer:</u> K Makubika	1. Work in Progress: <ul style="list-style-type: none"> • Dumping gravel in some sections of the road. • Construction of structure has commenced with work on excavation and toe wall 2. Training: <ul style="list-style-type: none"> • Foundation dewatering techniques • Taking-off quantities from drawings and determination of materials requirements <u>Issues/Problems:</u> a) The contractor should prepare a construction plan b) The contractor should also provide sufficient resources – equipment and materials - to execute the project
Nampula Province				
13-14 Sept	R698 Gracio-	ECRAM	SWM NPL: Shadreck	1. Training covered: <ul style="list-style-type: none"> • Bridge site hydrology and hydraulics,

Date	Project	Contractor	Present	Activities in Progress/Training Done/ Problems and Solutions
2010	Milhana – Cruz R696	Construções	Takuva, SWM AFCAP:M.K. Makubika [AT THE REGIONAL TRAINING CONSULTANT'S OFFICE]	<ul style="list-style-type: none"> • Culvert setting-out and determination of invert levels, • Production of bridge working drawings. <u>Issues/ Problems:</u> <ol style="list-style-type: none"> a) Probably inadequate analysis of the Milhana swamp river basin hydrology and bridge site hydraulics. b) Delay in issuing engineering drawings for structures. c) Project staff require extensive training on engineering design and construction procedures.
25 Sept 2010	R698 Gracio-Milhana – Cruz R696	ECRAM Construções	ECRAM: Baptista João, Alfredo Pedro, Mauro José Marques SWM NPL: Shadreck Takuva, SWM AFCAP:M.K. Makubika [ON SITE]	<ol style="list-style-type: none"> 1. Works in progress <ul style="list-style-type: none"> • Embankment and culvert construction at Km 41+500 (Baixa de Milhana), • Curing of the deck slabs for the Katamassa River on Km 54+600. 2. Training covered: <ul style="list-style-type: none"> • Embankment construction method- build-up in 150mm layers, • Compaction and testing, • Equipment needs, • Culvert setting-out and invert levels, • Materials stock level maintenance. <u>Problems:</u> <ol style="list-style-type: none"> a) Constructing embankment without controlling layer thickness; Contractor instructed to work with layers which do not exceed 15cm after compaction. b) The contractor had a towed cylinder for compaction. He was informed by the Training Engineer that he has to get a proper vibratory roller. c) Possibility of requiring pneumatic roller discussed with contractor but indications were that he did not have resources to acquire such a roller.
04 October	R698 Grácio-Milhana – Cruz	ECRAM	ECRAM: Faizal Norbeto Salé, Baptista João,	<ol style="list-style-type: none"> 1. Works in progress: <ul style="list-style-type: none"> • Embankment and culvert construction at Km 41+500 (Baixa de

Date	Project	Contractor	Present	Activities in Progress/Training Done/ Problems and Solutions
2010	R696	Construções	Alfredo Pedro, Mauro José Marques SWM NPL: Shadreck Takuva, Jamal Mussa SWM AFCAP: M.K. Makubika [ON SITE]	Milhana), 2. Training covered: <ul style="list-style-type: none"> • Forced curve setting out, • Culvert setting-out and invert levels, • Construction to engineer's drawings without deviation, • Steel fixing and correction of steel bending errors made, • Materials stock level maintenance, • The contractor was instructed by the Trainer to reinstate the removed embankment control points. Problems: <ol style="list-style-type: none"> a) The contractor changed the plan size and invert level of the 2 x 5m x 3,5m culvert in order to construct a smaller and thinner foundation slab so as to use less steel and concrete. b) The control points for the embankment were all removed because they had been placed in the work area. c) The contractor does not have any surveying equipment, not even a scientific calculator.
10 October 2010	R698 Gracio-Milhana – Cruz R696	ECRAM Construções	ECRAM: Faizal Norbeto Salé, Baptista João, Alfredo Pedro, Mauro José Marques, Martin Armando, Amido Viola, Rosário Damião SWM NPL: Shadreck Takuva, Jamal Mussa SWM AFCAP: M.K. Makubika	1. Works in progress <ul style="list-style-type: none"> • Embankment and culvert construction at Km 41+500 (Baixa de Milhana), <ol style="list-style-type: none"> i. The contractor was almost finished with the steel fixing for the foundation slab of Culvert no 3 (2x5mx3,2m), ii. Not much was going on with the embankment construction, iii. The contractor correctly set out the first and second culverts on the first curve. iv. Concrete stone accumulation. 2. Training covered: <ul style="list-style-type: none"> • Culvert invert levels, • Construction to engineer's drawings without deviation, • Supporting of reinforcement cages to have enough cover, • Materials stock level maintenance, • Equipment necessary for concreting. The contractor indicated

Date	Project	Contractor	Present	Activities in Progress/Training Done/ Problems and Solutions
			[ON SITE]	<p>that he had 2 vibrators.</p> <p><u>Problems:</u></p> <ol style="list-style-type: none"> The contractor changed again the plan size of culvert in order to construct a smaller foundation slab so as to use less steel and concrete. This time it was Culvert No 2 (1x5mx3,5m). The contractor attributed the change to an error in interpretation of the dimensions which was not plausible. The control points for the embankment had been reinstated but the pegs had not been concreted. The contractor does not have any surveying equipment, not even a scientific calculator. Stock levels for concrete stone were very low however the contractor had calculated the quantities required for each culvert and discovered that his hand knapping gangs would not be able to produce sufficient quantities. He therefore opted to buy from Namialo 160km away.
21 October 2010	R698 Grácio-Milhana – Cruz R696	ECRAM Construções	<p>ECRAM: Faizal Norbeto Salé, Baptista João Bernado Martin Armando, Amido Viola, Rosário Damião ANE Nampula: P Mavila, M Mangue ANE DIMAN: I Simões, N Leta SWM NPL: Shadreck Takuva, Jamal Mussa SWM AFCAP:M.K. Makubika</p> <p>[ON SITE]</p>	<ol style="list-style-type: none"> Works in progress <ul style="list-style-type: none"> Fixing foundation slab steel for one culvert Concreting on another culvert Training Done <ul style="list-style-type: none"> Reading and understanding engineer's drawings Cutting and bending of reinforcement Laying of reinforcement, lap lengths and spacer blocks <p><u>Issues/Problems:</u></p> <ol style="list-style-type: none"> Compaction work awaiting laboratory results. Change of work scope to be confirmed to contractor by the consultants. Concrete cubes to be taken for testing. Concreting to be done in presence of consultant's personnel

Date	Project	Contractor	Present	Activities in Progress/Training Done/ Problems and Solutions
6 Dec 2010	R698 Gracio-Milhana – Cruz R696	ECRAM Construções	<p>ECRAM: Baptista João, Alfredo Pedro,</p> <p>SWM NPL: ShadreckTakuva, Jamal Mussa</p> <p>SWM RRIP:M.K. Makubika</p> <p>[ON SITE]</p>	<p>1. Works in progress Section CH 41+000 - Ch 42+000:</p> <ul style="list-style-type: none"> • Construction of the 1 x 5m x 3,5m masonry walled box culvert (Structure No. 01) <ul style="list-style-type: none"> • Abutment walls completed and waiting for the caps, • Backfilling behind the walls in progress, • Abutment caps and deck slab still to be constructed. • Construction of the 1 x 5m x 3,5m masonry walled box culvert (Structure No. 02) <ul style="list-style-type: none"> • Abutment walls completed and waiting for the caps, • Backfilling behind the walls in progress. • Construction of the 2 x 5m x 3,5m masonry walled box culvert (Structure No. 03) <ul style="list-style-type: none"> • Abutment walls completed and caps cast on 05/12/2010, • Backfilling behind the walls in progress. • Abutment caps and deck slab still to be constructed • Construction of the 1 x 2m x 1,5m masonry walled box culvert (Structure No. 04) <ul style="list-style-type: none"> • Abutment walls and backfill behind the walls completed, • Deck slab still to be constructed. • Earthworks for the embankments <ul style="list-style-type: none"> • Very little going on due to compaction equipment failure. <p>2. Training covered:</p> <ul style="list-style-type: none"> • Culvert invert and finished road levels – Their relationship with flood discharge and importance of correct level setting out and control • Construction levelling • Formwork support system and concrete finishes • Materials stock level maintenance <p>Issues/ Problems:</p>



Date	Project	Contractor	Present	Activities in Progress/Training Done/ Problems and Solutions
				a) Embankment <ul style="list-style-type: none"> • On the day of the site visit, there was evidence that the contractor had not been working on the embankment for some time although he had received all information regarding finished road levels. There was still some work to be done as detailed in the visit report b) Culvert Finished Road Levels <ul style="list-style-type: none"> • The contractor made an error on the finished road level on Structure No 3 so structures 01 and 02 had to wait for the engineer to set out the top level. • Whilst setting out levels, it was discovered that firstly, the as built FRL for the third structure was 500mm below the engineer’s design FRL and secondly, the abutment wall top levels of Structure 01 were a bit high and did not give enough space for the abutment caps by 50mm.
29 Jan 2011	R698 Gracio-Milhana – Cruz R696	ECRAM Construções	Scott Wilson NPL: S Takuva Scott Wilson Trainer: K Makubika	1. Works in progress: Section CH 41+000 - Ch 42+000: <ul style="list-style-type: none"> • Construction of the 1 x 5m x 3,5m masonry walled box culvert (Structure No. 01) • Construction of the 1 x 5m x 3,5m masonry walled box culvert (Structure No. 02) • Construction of the 2 x 5m x 3,5m masonry walled box culvert (Structure No. 03) • Construction of the 1 x 2m x 1,5m masonry walled box culvert (Structure No. 04) • Earthworks for the embankments 2. Training covered: <ul style="list-style-type: none"> • Reiteration of aspects previously covered – level determination and control, concrete formwork <u>Problems/Issues:</u> <ul style="list-style-type: none"> • Site staff still need to be checked to ensure that they follow

Date	Project	Contractor	Present	Activities in Progress/Training Done/ Problems and Solutions
				instructions
17 Feb 11	R698 Gracio-Milhana – Cruz R696	ECRAM Construções	ECRAM: Baptista João SWM RRIP: M.K. Makubika	No work in progress. Work suspended for 15 days due to rain. Visit was made to verify site status and plans.
3 March 2011	R698 Gracio-Milhana – Cruz R696	ECRAM Construções	ECRAM: Alfredo Pedro Scott Wilson Nampula: S Takuva Scott Wilson Trainer: K Makubika	<ol style="list-style-type: none"> 1. Works in progress: <ul style="list-style-type: none"> • Construction of parapets; • Contractor not yet re-mobilised for earthworks 2. Training: <ul style="list-style-type: none"> • Keeping site records (e.g. of rain days) • Planning of activities and cash-flow projections – income and expenditure forecasts <p><u>Issues/Problems:</u></p> <ol style="list-style-type: none"> a) Off-shutter finish on the parapets is not being achieved, because previous instructions are not being followed b) Contractor is facing some cash-flow problems due to delays in invoicing and sharp increases in prices of cement and steel reinforcement.
17 March 2011	R698 Gracio-Milhana – Cruz R696	ECRAM Construções	ECRAM: Faizal N Salé (Director das Obras), Baptista João (Encarregado), Alfredo Pedro (Encarregado) Scott Wilson Nampula: S Takuva Scott Wilson Trainer: K Makubika	<ol style="list-style-type: none"> 1. Works in progress: No work in progress; Parapets to structures were completed. 2. Training: N/A <p><u>Issues/Problems:</u></p> <ol style="list-style-type: none"> a) Work stopped due to rain. b) The Minister of Public Works visited the project, accompanied by the Director of Public Works, ANE Delegate and ANE Provincial Technical Department Head.
25 March	R698 Gracio-Milhana – Cruz	ECRAM	ECRAM: Director da Obra:	<ol style="list-style-type: none"> 1. Works in progress: <ul style="list-style-type: none"> • Plastering of parapets completed during the week;

Date	Project	Contractor	Present	Activities in Progress/Training Done/ Problems and Solutions
2011	R696	Construções	Faizal Encarregado: Baptista Adjunto: Alfredo Pedro, ANE DPNPL: Eng ^o Rachid ANE DIMAN Advisor: N. Leta, ANE Monitoring Dept: F. Manheche Scott Wilson: Inspector: S Takuva Supervisor: Jamál Scott Wilson Trainer: K Makubika	<ul style="list-style-type: none"> • Contractor not yet re-mobilised for earthworks 2. Training: <ul style="list-style-type: none"> • Construction programme vs. cash flow <u>Issues/Problems:</u> <ol style="list-style-type: none"> a) Because of poor off-shutter finish the contractor had to plaster the parapets. b) Contractor is facing some cash flow problem due to delays in invoicing and now the Road Fund is said to be undergoing an audit so disbursement of funds is temporarily on hold. c) The contractor insisted that invoicing monthly was not an option for him since the financial progress for one month would not provide sufficient funds to pay for debts.
10 & 11 May 2011	R698 Gracio-Milhana – Cruz R696	ECRAM Construções	<u>ECRAM:</u> Adjunto: Alfredo Pedro <u>Scott Wilson:</u> Inspector: S Takuva Scott Wilson Trainer: K Makubika	1. Works in progress: None 2. Training: <ul style="list-style-type: none"> • Calculations to: <ul style="list-style-type: none"> ○ determine the volume of the remaining earthworks, ○ determine the production rates for earthworks activities ○ estimate the production time for available equipment ○ quantify the fuels and oils necessary for a day's earthworks production • Control of wastage and pilfering of fuels and oils. <u>Issues/Problems:</u> <ol style="list-style-type: none"> a) There has been no work in progress for some time and this is cause for concern. In a meeting on 11 May 2011, the contractor indicated that this was mainly due to breakdown of the excavator, and that this was being repaired. One tipper and the lorry are also broken down. b) Due to the amount of work outstanding, the contractor was advised to apply for an extension of time.

Date	Project	Contractor	Present	Activities in Progress/Training Done/ Problems and Solutions
Niassa Province				
1 to 4 Dec 2010	R725 Nipepe–Cheia Cheia: 3 No. bridges	EREPEP Construções		1. Structures completed, but approaches yet to be done 2. Hand-over of the work was done this week. The contractor will be required to complete the approaches.
	R725 Nipepe–Cheia Cheia: 2 No. bridges	Tumbine Empreendimentos Lda		1. Structures completed, but approaches yet to be done 2. Hand-over of the work was done this week. The contractor will be required to complete the approaches.
	Mavago-M'sawise Stone paving	AC Construções		Stone ramps: 1,2km done in sections
	Mavago-M'sawise Otta Seal	Construções CASAMA		Otta seal: 200m done; Looking good
23 March 2011	R725 Nipepe–Cheia Cheia: 3 No. bridges	EREPEP Construções	ANE DPNSA: Eng ^o Zezela ANE DIMAN Advisor: N. Leta, ANE Monitoring Dept: F. Manheche STANGE Consult: Inspector: Eng ^o Apolinário Scott Wilson Trainer: K Makubika	Structures completed and provisional hand-over of the work done. Compaction of approaches was not done at the initial stage and the contractor demobilized without carrying out this activity. The contractor will be required to complete the approaches. The trainer stressed to the inspector the need for proper supervision and not to certify payments before the contractor has done the work in accordance with the project specifications.
23 March 2011	R725 Nipepe–Cheia Cheia: 2 No. bridges	Tumbine Empreendimentos Lda	ANE DPNSA: Eng ^o Zezela ANE DIMAN Advisor: N. Leta, ANE Monitoring Dept:	Structures completed and provisional hand-over of the work done. Compaction of approaches was not done at the initial stage and the contractor demobilized without carrying out this activity. The contractor will be required to complete the approaches.

Date	Project	Contractor	Present	Activities in Progress/Training Done/ Problems and Solutions
			F. Manheche STANGE Consult: Inspector: Eng ^o Apolinário Scott Wilson Trainer: K Makubika	The trainer stressed to the inspector the need for proper supervision and not to certify payments before the contractor has done the work in accordance with the project specifications.
22 March 2011	Mavago-M'sawise Stone paving	AC Construções	ANE DPNSA: Eng ^o Zezela ANE DIMAN Advisor: N. Leta, ANE Monitoring Dept: F. Manheche STANGE Consult: Inspector: Eng ^o Apolinário Scott Wilson Trainer: K Makubika	Project complete; Stone ramps: 1,2km done in sections
22 March 2011	Mavago-M'sawise Otta Seal	Construções CASAMA	ANE DPNSA: Eng ^o Zezela ANE DIMAN Advisor: N. Leta, ANE Monitoring Dept: F. Manheche STANGE Consult: Inspector: Eng ^o Apolinário Scott Wilson Trainer: K Makubika	Otta seal: 200m done. Due to very little traffic, the Otta seal will take a long time to mature. Some areas of the surface are not even being trafficked.

Appendix 4: Achievement of Training

Training Topic/Project	Marracuene-Macaneta	Macaneta-Machubo	Chinhacanine-Nalazi	Cumbana-Chacane	Cumbana-Chacane	Inhacufera-Machaze	Cruz. N6-Savane
RRIP Phase	2	3	3	2	3	3	2
Contractor:	SEMPRE	PROBRA	BRIDE	SINOHYDRO	CBC	EREPTZ	TCO
1. Contract Administration							
• Construction programming	Partly Compliant ¹	Partly Compliant	Compliant	Partly Compliant	Not Yet ²	Not Yet	Not Compliant ³
• Site Establishment	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Partly Compliant
• Site office	Not Compliant	Partly Compliant	Compliant	Compliant	Compliant	Compliant	Not Compliant
• Documents on site	Not Compliant	Partly Compliant	Compliant	Compliant	Not Compliant	Not Compliant	Not Compliant
• Works programme on site	Not Compliant	Not Compliant	Compliant	Not Compliant	Not Compliant	Not Compliant	Not Compliant
• Site records	Not Compliant	Not Compliant	Compliant	Partly Compliant	Not Yet	Not Yet	Not Compliant
• Progress monitoring and control	Not Compliant	Not Compliant	Limited Input ⁴	Limited Input	Not Yet	Not Yet	Not Compliant
2. Construction Operations							
• Gravel extraction	Partly Compliant	Compliant	Compliant	Limited Input	Limited Input	Compliant	Limited Input

¹ Partly compliant refers to achievement of some level of implementation, while compliant is achievement of an acceptable level of implementation

² Not Yet refers to items that are not yet done, or that have just commenced and cannot be assessed yet

³ The contractor has not responded positively to training requirements and advice

⁴ Limited input by the trainer refers to cases where the contractor is doing the right thing or the training team did not get involved

Training Topic/Project	Marracuene-Macaneta	Macaneta-Machubo	Chinhacanine-Nalazi	Cumbana-Chacane	Cumbana-Chacane	Inhacufera-Machaze	Cruz. N6-Savane
RRIP Phase	2	3	3	2	3	3	2
Contractor:	SEMPRE	PROBRA	BRIDE	SINOHYDRO	CBC	EREPTZ	TCO
• Compaction knowledge and control	Not Compliant	Partly Compliant	Compliant	Limited Input	Not Yet	Not Yet	Compliant
• Materials Testing	Partly Compliant	Partly Compliant	Compliant	Limited Input	Not Yet	Not Yet	Partly Compliant
• Dumping control	Partly Compliant	Compliant	Compliant	Limited Input	Not Yet	Compliant	Limited Input
• Adherence to specifications	Not Compliant	Compliant	Compliant	Limited Input	Not Yet	Not Yet	Compliant
• Materials blending procedure	Not Compliant	Not Compliant	N/A ⁵	Limited Input	N/A	N/A	N/A
• ETB	Partly Compliant	N/A	Not Yet	N/A	N/A	N/A	Partly Compliant
• Knowledge of surfacing – Otta, slurry seal etc	Not Yet	N/A	Not Yet	Not Compliant	Not Yet	Not Yet	Not Yet
• Concrete knowledge and control	Partly Compliant	Partly Compliant	Partly Compliant	Limited Input	Not Yet	Not Yet	Limited Input
3. Resources							
• Adequacy and experience of key personnel to carry out required work	Partly Compliant	Compliant	Compliant	Not Compliant	Compliant	Compliant	Partly Compliant
4. Construction Output							
• Progress Achieved	Not Compliant	Not Compliant	Compliant	Limited Input	Not Yet	Not Yet	Partly Compliant

⁵ N/A refers to items that are not specified in the particular project

Achievement of Training– cont'd

Training Topic/Project	N322 Structure	Chikata Structure	N302 Culvert at 40km	N302 Culvert at 30km	Xitaxi- Mueda	Montepuez Structure	Gracio-Milhana
RRIP Phase	3	3	3	3	2	3	2
Contractor:	EREPTZ	EREPTZ	ECMEP Centro	Meno Construções	CAV	SINOHELL	ECRAM
1. Contract Administration							
• Construction programming	Not Compliant	Not Compliant	Not Yet	Not Yet	Compliant	Compliant	Compliant
• Site Establishment	Compliant	Compliant	Not Yet	Partly Compliant	Compliant	Compliant	Compliant
• Site office	Partly Compliant	Partly Compliant	Not Yet	Not Yet	Compliant	Compliant	Compliant
• Documents on site	Not Compliant	Not Compliant	Partly Compliant	Partly Compliant	Compliant	Compliant	Compliant
• Works programme on site	Not Compliant	Not Compliant	Not Yet	Not Yet	Compliant	Not Compliant	Not Compliant
• Site records.	Not Compliant	Not Compliant	Not Yet	Not Yet	Compliant	Compliant	Compliant
• Progress monitoring and control	Not Compliant	Not Compliant	Not Yet	Not Yet	Compliant	Compliant	Compliant
2. Construction Operations							
• Gravel extraction	N/A	N/A	N/A	N/A	Compliant	Compliant	Compliant
• Compaction knowledge and control	N/A	N/A	N/A	N/A	Compliant	Compliant	Compliant
• Materials Testing	Partly Compliant	Partly Compliant	Not Yet	Partly Compliant	Compliant	Compliant	Compliant
• Dumping control	N/A	N/A	N/A	N/A	Compliant	Compliant	Compliant
• Adherence to specifications	Partly Compliant	Partly Compliant	Not Yet	Partly Compliant	Compliant	Compliant	Compliant
• Materials blending procedure	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Training Topic/Project	N322 Structure	Chikata Structure	N302 Culvert at 40km	N302 Culvert at 30km	Xitaxi- Mueda	Montepuez Structure	Gracio-Milhana
RRIP Phase	3	3	3	3	2	3	2
Contractor:	EREPTZ	EREPTZ	ECMEP Centro	Meno Construções	CAV	SINOHELL	ECRAM
• ETB	N/A	N/A	N/A	N/A	N/A	N/A	N/A
• Knowledge of surfacing – Otta, slurry seal etc	N/A	N/A	N/A	N/A	Compliant	N/A	N/A
• Concrete knowledge and control	Partly Compliant	Partly Compliant	Compliant	Limited Input	Compliant	N/A	Compliant
3. Resources							
• Adequacy and experience of key personnel to carry out required work	Compliant	Partly Compliant	Partly Compliant	Compliant	Compliant	Partly Compliant	Compliant
4. Construction Output							
• Progress achieved	Partly Compliant	Partly Compliant	Not Yet	Not Yet	Partly Compliant	Partly Compliant	Partly Compliant

Appendix 5: Assessment of Contract Performance

Item/Project	Marracuene-Macaneta	Macaneta-Machubo	Chinhacanine-Nalazi	Cumbana-Chacane	Cumbana-Chacane	Inhacufera-Machaze	Cruz. N6-Savane
RRIP Phase	2	3	3	2	3	3	2
Contractor:	SEMPRE	PROBRA	BRIDE	SINOHYDRO	CBC	EREPTZ	TCO
1. Contract Administration							
• Construction programming	Poor; Needs attention by contractor	Has improved after further training	Fair but can improve	Poor	Poor; Needs attention by contractor	Poor; Needs attention by contractor	Poor; Needs attention by contractor
• Site Establishment	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Poor
• Site office	None	None	Shed	Good	Shed	Shed	None
• Documents on site	None; Requirements indicated	Some drawings and specifications on site	Fair	Fair	None; Requirements indicated	None; Requirements indicated	None; Requirements indicated
• Works programme on site	None; Requirements indicated	None; Requirements indicated	Acceptable	None seen; Requirements indicated	None; Requirements indicated	None; Requirements indicated	None; Requirements indicated
• Site records.	None; Requirements indicated	None; Requirements indicated	Fair	None seen; Requirements indicated	None yet; Requirements indicated	None; Requirements indicated	None; Requirements indicated
• Progress monitoring and control	Very poor; No system; Requirements indicated	Poor; No system; Requirements indicated	Fair, but no system observed	Reasonable	Poor to date; No system; Requirements indicated	Poor to date; No system; Requirements indicated	Poor; Requirements indicated
• Head Office support	Poor; Needs attention by contractor	Contractor makes effort	Fair	Good	Fair	Good	Very good
2. Construction Operations							
• Gravel extraction	Poor control; Needs attention	Fair control; Areas of improvement indicated	Fair control; Areas of improvement indicated	Good – simple source	Good – simple source	Fair control; Areas of improvement indicated	Fair
• Compaction knowledge and	Poor; Needs attention by	Fair after training	Improved after training in Nov 2010	Good	Poor start; Contractor made	Not yet commenced	Fair

Item/Project	Marracuene-Macaneta	Macaneta-Machubo	Chinhacanine-Nalazi	Cumbana-Chacane	Cumbana-Chacane	Inhacufera-Machaze	Cruz. N6-Savane
RRIP Phase	2	3	3	2	3	3	2
Contractor:	SEMPRE	PROBRA	BRIDE	SINOHYDRO	CBC	EREPTZ	TCO
control	contractor				aware		
• Materials Testing	Not frequent enough	Not frequent enough	Good –requests done by site	Good	Not yet required	Not yet required	Poor; Requirements indicated
• Dumping control	Poor; Needs attention	Fair	Fair	Good	Poor start; Site staff made aware	Fair but can improve; Discussed on site	Good
• Adherence to specifications	Very poor; Needs attention by contractor	Has improved since beginning	Has improved since beginning	Good	Project just commenced	Project just commenced	Fair
• Materials blending procedure	Poor; Recommendations given on site in Nov 2010	Poor; Discussed on site	N/A	Acceptable	Not yet required	N/A	N/A
• ETB	Poor; Discussed on site and recommendations made in March 2011	N/A	N/A	N/A	N/A	N/A	Poor; Discussed on site and recommendations made
• Performance of surfacing – Otta, slurry seal etc	Poor	N/A	Contractor considering subletting	Poor; Not done well but completed	Not yet discussed	Contractor considering subletting as done on other project	
• Concrete knowledge and control	Fair knowledge but poor control	Poor control	Poor control; Requirements indicated	N/A	Not yet assessed; Project just commenced	Not yet assessed; Project just commenced	
3. Resources							
• Adequacy of equipment on site	Very poor; Using labour approach which may not be appropriate	Fair, but problem of “stop-start”	Good, but sometimes taken off-site for no apparent reason	Good but surfacing equipment poor; Had to hire pneumatic roller	Good so far	Very good	Ok for now; Poor for ETB
• Equipment maintenance capability on site	Reasonable for little equipment on site	Reasonable – manages to keep equipment	Reasonable – manages to keep equipment	Good	Project just commenced	Reasonable arrangements for access to mechanic	Good

Item/Project	Marracuene-Macaneta	Macaneta-Machubo	Chinhacanine-Nalazi	Cumbana-Chacane	Cumbana-Chacane	Inhacufera-Machaze	Cruz. N6-Savane
RRIP Phase	2	3	3	2	3	3	2
Contractor:	SEMPRE	PROBRA	BRIDE	SINOHYDRO	CBC	EREPTZ	TCO
		operational	operational				
<ul style="list-style-type: none"> Adequacy and experience of key personnel to carry out required work 	Inadequate; Temporary assistance obtained for ETB	Fair	Fair	Poor surfacing knowledge	Fair; Surfacing capability to be discussed	Fair	Good for road works but poor for ETB
4. Construction Output							
<ul style="list-style-type: none"> Progress achieved 	Very poor; Discussed with contractor	Poor; Discussed with contractor	Behind schedule but reasonable	Completed	Late commencement	Late commencement	Fair initially, but fallen seriously behind
<ul style="list-style-type: none"> Effort of contractors' staff 	Site staff make effort	Site staff make effort	Site staff make effort	Complete	Project just commenced	Project just commenced	Fair to good

DRAFT

Assessment of and Contract Performance – cont'd

Item/Project	N322 Structure	Chikata Structure	N302 Culvert at 40km	N302 Culvert at 30km	Xitaxi- Mueda	Montepuez Structure	Gracio-Milhana
RRIP Phase	3	3	3	3	2	3	2
Contractor:	EREPTZ	EREPTZ	ECMEP Centro	Meno Construções	CAV	SINOHELL	ECRAM
2. Contract Administration							
• Construction programming	Poor; Needs attention by contractor	Poor; Needs attention by contractor	Poor; Needs attention by contractor	Poor; Needs attention by contractor	Fair; Needed too much coercion from the Trainer	Good, but still lacking coordination with management	Fair; Project manager does all planning without involving the Foremen
• Site Establishment	Acceptable	Acceptable	Underway	Not quite as desirable	Good; Rented premises	Good; Rented premises	Fair; Constructed out of pole and grass
• Site office	Shed	Shed	Still mobilising	None	Good; Rented premises	Good; Rented premises	Fair; Constructed out of pole and grass
• Documents on site	None; Requirements indicated	None; Requirements indicated	Have drawings from consultant, need updating	Have drawings from consultant, need updating	Parts of contract document, the BOQ	Parts of contract document, the BOQ	Parts of contract document, the BOQ
• Works programme on site	None; Requirements indicated	None; Requirements indicated	None; Requirements indicated	None; Requirements indicated	Yes	No; Project Manager keeps the programme	No; Project Manager keeps the programme
• Site records.	None; Requirements indicated	None; Requirements indicated	None; Requirements indicated	None; Requirements indicated	Keeps a site record book and a file for letters and instructions	Keeps a site record book and a file for letters and instructions	Keeps a site record book and a file for letters and instructions
• Progress monitoring and control	Poor; No system; Requirements indicated	Poor; No system; Requirements indicated	Poor; No system; Requirements indicated	Poor; No system; Requirements indicated	Fair	Fair	Fair
• Head Office support	Fair	Fair	Fair	Good	Good	Good	Good
2. Construction Operations							
• Gravel extraction	N/A	N/A	N/A	N/A	Good; Used retro excavators and 5 ten tonne tippers	Good; Used retro excavators and 2 ten tonne tippers	Good; Used retro excavators and 2 ten tonne tippers

Item/Project	N322 Structure	Chikata Structure	N302 Culvert at 40km	N302 Culvert at 30km	Xitaxi- Mueda	Montepuez Structure	Gracio-Milhana
RRIP Phase	3	3	3	3	2	3	2
Contractor:	EREPTZ	EREPTZ	ECMEP Centro	Meno Construções	CAV	SINOHELL	ECRAM
• Compaction knowledge and control	N/A	N/A	N/A	N/A	Very Good, as shown by the quality achieved	Fair; Required a lot of coercion to bring a water bowser and compactor	Fair; Required a lot of coercion to bring a suitable compactor
• Materials Testing	No tests done yet	No tests done yet		Carried out concrete tests to check mix design	Good; Calls for ANE Laboratory for tests to confirm of quality	Good; Calls for ANE Laboratory for tests to confirm of quality	Good; Calls for ANE Laboratory for tests to confirm of quality
• Dumping control	N/A	N/A	N/A	N/A	Good; Did not have sufficient knowledge for calculations but has since been taught	Good; Did not have sufficient knowledge for calculations but has since been taught	Good; Did not have sufficient knowledge for calculations but has since been taught
• Adherence to specifications	Poor; Issue raised with consultant and contractor	Poor; Issue raised with consultant and contractor	Not yet started working	Fair; working to specification so far	Good; Tries very hard	Fair; A lot of effort still required	Fair; Did not seem to think it was important until the completion of the structures
• Materials blending procedure	N/A	N/A	N/A	N/A	N/A	N/A	N/A
• ETB	N/A	N/A	N/A	N/A	N/A	N/A	N/A
• Performance of surfacing – Otta, slurry seal etc	N/A	N/A	N/A	N/A	Fair, did not have any experience in surface dressing and it is not clear if the procedure was well understood	Has not yet done surfacing and shall be taught on the job when relevant activity starts	Has not yet done surfacing and shall be taught on the job when relevant activity starts
• Concrete knowledge and control	Poor appreciation of steel reinforcement; Recommendations given	Poor appreciation of steel reinforcement; Recommendations given	Fair	Fair	Fair	Shall be instructed during the construction of the box culvert	Knowledge from the Katamassi River Bridge applied on the Milhana Swamp structures

Item/Project	N322 Structure	Chikata Structure	N302 Culvert at 40km	N302 Culvert at 30km	Xitaxi- Mueda	Montepuez Structure	Gracio-Milhana
RRIP Phase	3	3	3	3	2	3	2
Contractor:	EREPTZ	EREPTZ	ECMEP Centro	Meno Construções	CAV	SINOHELL	ECRAM
3. Resources							
<ul style="list-style-type: none"> Adequacy of equipment on site 	Reportedly had concrete mixer	Concrete mixer on site	Still mobilising; No equipment on site	Fair; Has concrete mixer and poker vibrator, plate compactor and water pump.	Good; Had all the equipment necessary	Poor; Still struggling to bring sufficient equipment.	Had problems in the beginning but has since brought enough equipment
<ul style="list-style-type: none"> Equipment maintenance capability on the sites 	N/A	N/A	N/A	Poor storage; No system in plan	Good; Had in place a planned maintenance system and repair response	Unclear; Contract just started therefore no sufficient time to access	Good; Has no planned maintenance system but has a good response to breakdowns
<ul style="list-style-type: none"> Adequacy and experience of key personnel to carry out required work 	Not convincing	Not convincing	Average	Average	Good	Poor, the contractor has a project manager but no foremen	There is a project manager; Site foreman. assistant foremen and artisans have sufficient experience
4. Construction Output							
<ul style="list-style-type: none"> Progress achieved 	Poor and slow; Issue raised with contractor	Poor and slow; Issue raised with contractor	No assessment yet; Just starting	Still in the foundation stage; Awaiting concrete mix design results to continue.	Project complete well after the contract end date	Project started at the beginning of March; Progress is beginning to fall behind	About 85% complete with one month to go; Extension required due to increased scope of works
<ul style="list-style-type: none"> Effort of contractors' staff 	Fair	Fair	Fair	Fair	Fair	Fair	Good so far but lack of communication due to remoteness of site causes some disruptions.

Appendix 6: List of Meetings

Date	Meeting	Present
Liaison Meetings:		
10 Sep 2010	Project Progress and Coordination	ANE DIMAN: F Manheche, N Leta Scott Wilson: E Gumbie
20 Sep 2010	Project Progress and Coordination	ANE DIMAN: F Manheche, N Leta, D Patel dos Santos Scott Wilson: E Gumbie
12 Oct 2010	Project Progress Review Meeting	ANE DIMAN: F Manheche, N Leta, D Patel dos Santos Scott Wilson: E Gumbie
12 Oct 2010	Project Initiation Meeting	Consultec: J Chissico, C Alfeu SEMPRE: H Matos, N de Almeida Scott Wilson: E Gumbie
22 Oct 2010	Project Meeting at Marracuene	Consultec: J Chissico, C Alfeu SEMPRE: H Matos Scott Wilson: E Gumbie, L Bomba
27 Oct 2010	Project Coordination Meeting	ANE Southern Region Advisor: D Silanda Scott Wilson: E Gumbie, L Bomba
27 Oct 2010	Project Coordination Meeting	COTOP Gaza Chefe da Equipa: A C Mabongue Scott Wilson: E Gumbie, L Bomba
19 Nov 2010	Project Progress Review Meeting	ANE DIMAN: F Manheche, N Leta, D Patel dos Santos, R Langa, I Simões Scott Wilson: E Gumbie
16 Dec 2010	Project Progress Review Meeting	ANE DIMAN: F Manheche, N Leta Scott Wilson: E Gumbie
19 Jan 2011	Review of Montepuez Project	ANE Cabo Delgado: E Correia Scott Wilson: K Makubika
25 Jan 2011	Review of Montepuez Project Management	Sinobell: Sr. Willie Fourie Scott Wilson: K Makubika
1 Feb 2011	Project Review Meeting	ANE DIMAN: N Leta, I Simões Scott Wilson: Washington Mupazviriwo, E Gumbie, K Makubika
17 Feb 2011	Marracuene-Macaneta Project Progress Review	ANE DIMAN: N Leta ANE Maputo Province: R Simone Consultec: A J Monroy, C Alfeu SEMPRE: A Matos Scott Wilson: E Gumbie, L Bomba
18 Feb 2011	Chinhacanine-Nalazi Project Management	BRIDE Construções: B Dete Scott Wilson: E Gumbie, E Munatsi, L Bomba
21 Feb 2011	FME Contractor Training Proposals	FME: K Gunn, L A Macie Scott Wilson: E Gumbie, L Bomba
8 Mar 2011	Project Review Meeting	ANE DM: F Manheche ANE DIMAN: N Leta, I Simões Scott Wilson: E Gumbie
1 April 2011	Macaneta- Machubo Project Planning	PROBRA: H Banze Scott Wilson: E Gumbie, L Bomba
5 April 2011	Project Review Meeting	ANE DM: F Manheche, D Patel dos Santos, A Mutowo ANE DIMAN: N Leta Scott Wilson: E Gumbie
25 April 2011	Contractor Seminar Meeting	ANE: Nampula Delegate and Staff Scott Wilson: K Makubika
25 May 2011	Final Project Meeting	ANE DIMAN: I Simões, N Leta ANE DM: F Manheche, D Patel dos Santos, R Langa Scott Wilson: Washington Mupazviriwo, E Gumbie, K Makubika

Appendix 7: Terms of Reference

ANE.....

Terms of Reference

Training Consultant to Support the Execution of Targeted Interventions on Low Volume Rural Roads in Mozambique

1. Background

The Mozambican National Roads Administration (ANE) has embarked on a Regional Roads Investment Programme (RRIP). The objective of the programme is to bring important unpaved low-volume roads to an improved standard, thereby maximising transitability on the network, and reducing longer term maintenance costs. The concept of the programme is based on the “targeted interventions” (spot improvement) approach.

The programme is applying a range of road construction technologies suitable for the varying conditions found in the country. This includes areas in the coastal zone where materials suitable for the construction of low traffic roads by traditional means cannot be found within a reasonable haul distance. Stand-alone “pilot projects” are being carried out in nine of the ten provinces. The overall programme is being managed by the ANE Directorate of Maintenance (DIMAN) in Maputo. The individual projects are being administered by the provincial delegations of ANE (DPANE), with technical support from DIMAN. The design and supervision of the works is being carried out by DPANE and their provincial consultants. Works contractors are being selected through a competitive tendering process administered by each province. The overall budget is about US\$10 million over three years starting in 2008.

The Africa Community Access Programme⁶ (AFCAP) is assisting ANE with the implementation of the pilot projects. Support is being provided for the design of the road sections and technical monitoring of the performance of the roads over a two year period. This work is being carried out by TRL Limited of UK.

The programme is being carried out in three phases. The Phase 1 works, which started in 2008, have now been completed in all provinces. Phase 2 works are in progress, with almost half the projects already completed. The programme is now entering Phase 3, which covers works to be implemented in 2010/2011. Phases 2 & 3 include a significant number of projects that utilise bitumen-based solutions in the pavement design and surfacing, including emulsion stabilised sand road bases and thin bituminous seals. It was observed during phase 1 that local contractors and supervision firms lacked experience in this type of construction. Therefore the AFCAP support for phases 2 & 3 included training of local contractors engaged by ANE to undertake the works, in addition to the technical support for the design of these interventions and technical monitoring, which is being carried out by TRL.

2. Objectives

The overall objective of the project is to build capacity in the local construction industry for the construction of targeted interventions on low traffic roads, including earthworks, pavement layers, drainage works, bitumen stabilised road bases and thin bituminous seals.

⁶ AFCAP is a DFID funded programme of research, knowledge dissemination and training designed to address the challenges of providing safe and sustainable access to poor communities in Africa. The management of AFCAP has been contracted by DFID to Crown Agents.

The objective will be achieved through theoretical and on-site training of contractors engaged by ANE to undertake the works.

3. Scope of the Services

- 3.1 Undertake theoretical and on-site training of local road contractors in all provinces of Mozambique. The training for the 4-month contract extension will be carried out by two Training Engineers, who will be stationed in the south, and northern regions. The Southern Region will cover Maputo, Gaza and Inhambane, Sofala and Manica Provinces. The Northern Region will cover Tete, Zambézia, Nampula, Cabo Delgado and Niassa Provinces.
- 3.2 Undertake project-specific training needs assessment of the contractors involved in on-going pilot project construction works. The needs assessment will establish areas of weakness that could be strengthened through targeted site training inputs.
- 3.3 Prepare training materials required for site training in appropriate format. This training should build on the initial training input provided by Scott Wilson during the initial contract with AFCAP. It should be practically orientated and closely linked to the requirements of the targeted interventions works contracts. The following aspects of the works should continue to be covered:
 - General responsibilities of the contractor under the works contract
 - Planning for the implementation of the works
 - Tool and equipment requirements, procurement, operation and maintenance
 - The use of labour intensive and intermediate technology options.
 - Procurement, storage, control and safe handling of materials
 - Chemical stabilisation of materials for pavement layers
 - Bituminous binders- characteristics, applications, suppliers
 - Compaction
 - Quality control
 - Environmental management including safe disposal of hazardous materials
 - Worker safety, employment of women and HIV/AIDS awareness
 - Financial management, cash flow, etc.
 - Other subjects identified in the training needs assessment.
- 3.4 Organise a three-day Regional Workshop in Beira to be attended by contractors from the central region, particularly, the successful bidders for works contracts under the RRIP Pilot Projects. It is anticipated that both trainers will participate in the Regional Workshop to encourage a consistency of approach and to enable each trainer to contribute in areas where they have specific knowledge and experience. The theoretical training sessions will include participation by ANE staff and provincial consultants.
- 3.5 Focus will be towards providing more on-site training and guidance in all aspects of the contractors' site operations. This component of the training will be carried out through periodic visits to the work sites in each region.

4. Transfer of Knowledge

Capacity building and transfer of knowledge are key components of this assignment. The consultant is required to work in close collaboration with local partners including ANE and provincial consultants. The assignment is also a component of a set of inter-related projects across Africa as part of the AFCAP programme. The consultant will be required to share and exchange knowledge and experiences between other projects within the AFCAP programme.

It is expected that tangible improvement in the quality of works will be the major output of this assignment considering that most of the ground work was done during the first training contract. Therefore reports should indicate problematic areas that have been or in the process of being dealt with decisively.

5. Minimum Experience requirements

It is envisaged that the assignment will be carried out by a Lead Trainer (Team Leader), and a Training Engineer. The Lead Trainer and the Training Engineer will be based in Mozambique for the duration of the project.

The team must possess the following skills and experience:

- i. The design of training programmes for small road works contractors in Africa, and preferably in Mozambique
- ii. Knowledge, experience and understanding of the use of local resources, labour-based methods and intermediate technologies for the construction and maintenance of low traffic rural roads.
- iii. Construction of chemically stabilised road pavement layers
- iv. Construction of thin bituminous seals for low volume sealed roads
- v. Construction of reinforced concrete and stone masonry drainage structures.
- vi. Procedures for site supervision including quality control and site records.
- vii. Good communication skills.
- viii. Working knowledge of both Portuguese and English.

The minimum experience requirements for the core team members are as follows:

Lead Trainer: Degree in Civil Engineering (or equivalent) and a minimum of 15 years experience in the rural roads sector in Sub-Sahara Africa. Experience in the use of chemical stabilisers for road pavement layers and the construction of thin bituminous seals by both machine based and equipment based methods is essential. Some training experience is essential, including preparation of training materials, and delivery of classroom and on-site training activities. Must be able to communicate in Portuguese and English (spoken and written).

Training Engineer: Degree in Civil Engineering (or equivalent) and a minimum of 5 years experience in the rural roads sector in Sub-Sahara Africa. Experience in the use of chemical stabilisers for road pavement layers and the construction of thin bituminous seals would be an advantage. Experience in the supervision and/or training of local road works contractors is essential. Ability to communicate in Portuguese would be an advantage, but is not essential. ANE staff will work closely with the Training Engineers and will assist with translation where necessary.

6. Responsibilities of Consultants' Staff

The following are the responsibilities and inputs of the Consultant's staff

Lead Trainer:

- Liaison with ANE Management
- Planning and programming
- Design and implementation of training needs assessment
- Preparation of training materials and delivery of theoretical training
- On-site training activities
- Reporting to ANE.

Training Engineer:

- Participation in theoretical training sessions
- On-site training
- Reporting to Lead Trainer

The following are estimated time inputs by the training team (person months):

Post	Total input
Lead Trainer	4 pm
Trainer 1	4 pm

Trainer 2	0 pm
-----------	------

7. Assignment Period

The assignment is expected to take 4 months commencing in September 2010.

8. Facilities, services and resources to be provided by the consultant and the host agency

The consultant is responsible for providing all transport and accommodation required by its staff in Maputo, provincial centres and in the field. The consultant is also responsible for providing office equipment including computers, printers, copiers, etc., as well as office consumables and communications required to complete the assignment.

ANE will ensure that funding is in place for the construction works and that supervision is provided on site by their consultants in the provinces. ANE will ensure that provision is made for all necessary measurements and testing of materials. ANE will provide transport to the field for its own staff, where this cannot be shared with the consultant. ANE will provide accommodation and subsistence for its staff while in the field. Temporary office accommodation will be provided for the consultant by the DPANEs in the respective provinces.

9. Reporting

The consultant will submit the following reports:

- i. An Inception Report within two weeks of the commencement of the assignment. This should include the results of the training needs assessment (project specific & general), the proposed approach to site training & program for the outstanding Regional Workshop, and the work plan for the remainder of the assignment.
- ii. Brief weekly reports summarising activities carried out during the week and Plan of Action for the coming weeks, as well as progress on the sites. The first weekly report should be submitted one week after the submission of the draft Inception Report.
- iii. A Final Report summarising: all training activities and tangible results achieved.

Reports, design guides and work norms may be submitted in English or Portuguese. Translation of these documents from English to Portuguese (or vice versa) will be organised separately. The consultant should submit three hard copies and an electronic copy of all reports (draft and final) to ANE, except for the weekly reports, which should be submitted in electronic format only.

10. Assignment management and administration

The Training Consultant will liaise with the Director of Maintenance in the ANE Directorate for Maintenance (DIMAN) for all aspects of the implementation of the project, as well as for contractual and administrative matters.

Appendix 9: Project Pictures

<p>Beira-Savane: Application of emulsion for ETB</p>	<p>Beira-Savane: Mixing emulsion and sand gravel</p>
<p>Chinhacanine-Nalazi: Culvert Construction</p>	<p>Chinhacanine-Nalazi: Curve Setting-Out</p>
<p>Cumbana-Chacane Phase 2: Surfacing work</p>	<p>Cumbana-Chacane Phase 3: Earthworks</p>

<p>Grácio-Milhana: Culvert Construction</p>	<p>Grácio-Milhana: Culvert Construction</p>
<p>Inhacufera-Machaze Phase 2: Otta Seal (Photo courtesy of TRL)</p>	<p>Inhacufera-Machaze Phase 3: Gravel Dumping</p>
<p>Macaneta-Machubo: Sand/Clay Blending</p>	<p>Macaneta-Machubo: Culvert Construction</p>

<p>Marracuene-Macaneta: Culvert Construction</p>	<p>Marracuene-Macaneta: ETB Construction</p>
<p>Montepuez-Namuno: Culvert Foundation</p>	<p>Montepuez-Namuno: Detour</p>
<p>2x5m Structure at 30km on Matema-Furancungo Road: Foundation work</p>	<p>3x5m Structure on Chikata River at 84km on Bene-Fingoé Road: Foundation work</p>

<p>3x5m Structure at 181km on Madamba-Mutarara Road: Foundation work</p>	<p>Subida de Cachombo</p>
<p>Subida de Furancungo</p>	<p>Zero-Mopeia: Otta Seal (Photo courtesy of TRL)</p>
<p>Xitaxi-Mueda: Surfacing with SS60 emulsion and 13mm aggregate</p>	<p>Xitaxi-Mueda: Surfacing with SS60 emulsion and 13mm aggregate</p>