

**AFRICAN DEVELOPMENT FUND**

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**REPUBLIC OF MOZAMBIQUE**

**MONTEPUEZ-LICHINGA ROAD PROJECT**

**SUPPLEMENTARY LOAN**

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**EQUIVALENTS AND ABBREVIATIONS**  
**CURRENCY EQUIVALENTS**  
**(August 2010 Exchange Rates)**

UA 1.0	=	MZM 49.83
UA 1.0	=	USD 1.49

**WEIGHTS AND MEASURES**

1.0 meter (m)	=	3.281 ft.
1.0 kilometer (km)	=	0.621 mile
1.0 square kilometer (km <sup>2</sup> )	=	0.386 square mile
1.0 hectare (ha)	=	2.471 acres

**FISCAL YEAR**

January 1st - December 31st

**ABBREVIATIONS**

AADT	-	Average Annual Daily Traffic
ACFA	-	Accelerated Co-financing for Africa
ADF	-	African Development Fund
ANE	-	Administração Nacional de Estradas (National Roads Administration)
CNCS	-	Conselho Nacional de Combate ao HIV/SIDA (National Aids Council)
DIAFI	-	Direcção de Administração e Finanças (Directorate of Administration)
DIMAN	-	Direcção de Manutenção (Directorate of Maintenance)
DIPRO	-	Direcção de Projectos (Directorate of Projects)
DNEP	-	Direcção Nacional de Estradas e Pontes (National Directorate of Roads and Bridges)
DNTT	-	Direcção Nacional de Transportes Terrestres (National Directorate of Surface Transport)
ECMEP	-	Empresa de Construção e Manutenção de Estradas e Pontes (Provincial Roads and Bridge Construction and Maintenance Enterprise)
ESRP	-	Economic and Social Rehabilitation Programme
FE	-	Fundo de Estradas (Road Fund)
GOM	-	Government of Mozambique
HIV	-	Human Immunodeficiency Virus
ICB	-	International Competitive Bidding
MICOA	-	Ministerio Para A Coordenação da Acção Ambiental (Ministry for Coordination of Environmental Affairs)
MOPWH	-	Ministry of Public Works and Housing
MPD	-	Ministry of Planning and Development
MTC	-	Ministry of Transport and Communications
PSIP	-	Public Sector Investment Programme
ROCS	-	Roads and Coastal Shipping Project
SADC	-	Southern Africa Development Community
SIDA	-	Swedish International Development Agency
UA	-	Unit of Account
UASMA	-	Unidade de Assuntos Sociais e Meio Ambiente (Environment and Social Unit)
VOC	-	Vehicle Operating Cost

**MOZAMBIQUE**  
**MONTEPUEZ-LICHINGA ROAD PROJECT SUPPLEMENTARY FINANCING**  
**RESULTS BASED MATRIX**

Hierarchy of Objectives	Expected Results	Reach	Performance Indicators Source/Method	Indicative Targets Timeframe	Assumptions/ Risks
<p><b>1. Sector Goal</b></p> <p>1.1. To stimulate the productive and social sectors of the economy through reduced transport cost and travel time, improved access to resources and economic activities; and contribute to the reduction of poverty.</p>	<p><b>Long Term Outcomes</b></p> <p>1.1 Integrated rural communities with the rest of the country.</p> <p>1.2 Improved transportation linkage between markets and areas of production.</p> <p>1.3 Improved transport services and safety on major corridors.</p>	<p>1.1 Rural population in remote areas of Mozambique.</p> <p>1.2 Business community. Exporters, and farmers.</p>	<p>1.1 Increased percentage of rural population within 2 kilometers of an all weather road</p> <p>1.2. Increased percentage of road network in fair to good condition.</p> <p>1.3 Improved connectivity of the road network to provincial capitals, ports and other important nodes.</p> <p>1.4 Reduced number of fatalities per 1000 vehicles.</p> <p><b>Sources :</b> ANE Road Management System  <b>Methods:</b> Statistics from ANE. annual traffic data; National Statistics</p>	<p>1.1 Rural Access Index improved from 31% in 2010 to 37% in 2015</p> <p>1.2 Increase the road network in fair to good condition from 67% in 2009 to 75% by the end of 2015.</p> <p>1.3 Increased length of bitumen surfaced primary roads from 87% in 2010 to 98% in 2015. Non-transitable secondary roads reduced from 8.6% in 2009 to 0% in 2015. Reduce number of fatalities per 1000 vehicles at a level of 31.1 in 2006 to 25 per 1000 vehicles in 2015.</p>	<p><b>Assumptions</b></p> <p>1.1 GOM's commitment to the full implementation of the transport sector Programs</p> <p>1.2 Political and economic stability in the region.</p> <p><b>Mitigation Measures</b></p> <p>1.1 The Bank, through Country and Sector dialogue would collaborate with GOMZ, to ensure that the transport sector reforms and its higher objectives are achieved.</p>
<p><b>2. Project Objective</b></p> <p>Improved accessibility and road transport services for the population in the zone of influence of the Montepuez-Lichinga Corridor</p>	<p><b>Medium Term Outcomes</b></p> <p>Accessibility and road transport services and safety improved.</p>	<p><b>Beneficiaries</b></p> <p>2.1 Rural communities in the zone of influence of the road.</p> <p>2.2 GOM extension officers and NGOs operating in the area.</p> <p>2.3 Small business operators and transport operators along the road</p>	<p><b>Indicators</b></p> <p>2.1 a) Reduced VOCs and travel times between key centres in the zone of influence; (b) Increased traffic on the corridor.</p> <p>2.2 Reduction of number accidents per 1000 vehicles.</p> <p>2.3 Increased economic activities at the Pemba port.</p> <p><b>Source/Method:</b> National Statistics Survey. by Consultant in charge of monitoring impact</p>	<p><b>Target Indicators</b></p> <p>2.1 Composite annual average VOCs per vehicle-.km reduced from USD0.63 in 2010 to USD0.259 in 2014. Composite annual average travel time cost/ veh-km reduced by 47% from USD0.207 in 2010 to USD0.110 in 2014.</p> <p>2.2 Reduce number of fatalities per 1000 vehicles at a level of 31.1 in 2006 to 25 per 1000 vehicles in 2014.</p> <p>2.3 Vehicle-km increased by 28% from 55.7million in 2010 to 71.1 million in 2014.</p> <p>2.4 Utilization of Pemba port improved from 18% of 650000 tones ann. capacity in 2010 to 50% of capacity per annum after 2015.</p>	<p><b>Assumptions</b></p> <p>2.1 (a) GOM's maintenance of the road sector; (b) Sufficient funds allocated for routine and periodic maintenance; c) Axle load control measures are in place</p> <p><b>Mitigation Measures</b></p> <p>2.1 The provisions made under the ROADS-3 Strategic Maintenance Plan for the priority paved network has taken into account the recurrent maintenance needs of the project road.</p>

<b>3. Activities</b>	<b><u>Short Term Outputs</u></b>	<b><u>Beneficiaries</u></b>	<b><u>Indicators</u></b>	<b><u>Target Indicators</u></b>	<b><u>Assumptions</u></b>																																								
<p><b>A. Civil Works</b></p> <p>3.1 Pre-qualification of contractors</p> <p>3.2 Issue and receipt of tenders</p> <p>3.3 Evaluation, negotiation and award of contracts.</p> <p>3.4 Upgrade/rehabilitation of roads totaling 269 km.</p> <p><b>Consultant Services</b></p> <p>3.5 Update of signed contract</p> <p>3.6 Commencement of services</p> <p><b>Resettlement of Project Affected Persons (PAPs)</b></p> <p style="text-align: center;"><b><u>Inputs</u></b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><u>Inputs- million UA</u></th> <th></th> </tr> </thead> <tbody> <tr> <td>Civil Works</td> <td style="text-align: right;">116.86</td> </tr> <tr> <td>Supervision and monitoring</td> <td style="text-align: right;">4.78</td> </tr> <tr> <td>Road Safety,</td> <td style="text-align: right;">0.17</td> </tr> <tr> <td>Resettlement</td> <td style="text-align: right;">0.27</td> </tr> <tr> <td>Audit services</td> <td style="text-align: right;">0.10</td> </tr> <tr> <td>Contingencies</td> <td style="text-align: right;">7.82</td> </tr> <tr> <td><b>Total Cost</b></td> <td style="text-align: right;"><b>130.00</b></td> </tr> </tbody> </table> <p style="text-align: center;"><b>SOURCES OF FINANCING (MILLION UA)</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Source</th> <th>Original</th> <th>Additional</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>ADF</td> <td style="text-align: right;">30.10</td> <td style="text-align: right;">32.65</td> <td style="text-align: right;"><b>62.75</b></td> </tr> <tr> <td>JBIC</td> <td style="text-align: right;">19.71</td> <td style="text-align: right;">0</td> <td style="text-align: right;"><b>19.71</b></td> </tr> <tr> <td>SIDA</td> <td style="text-align: right;">16.84</td> <td style="text-align: right;">0</td> <td style="text-align: right;"><b>16.84</b></td> </tr> <tr> <td>GOM</td> <td style="text-align: right;">5.54</td> <td style="text-align: right;">25.16</td> <td style="text-align: right;"><b>30.70</b></td> </tr> <tr> <td><b>TOTAL</b></td> <td style="text-align: right;"><b>72.19</b></td> <td style="text-align: right;"><b>57.81</b></td> <td style="text-align: right;"><b>130.00</b></td> </tr> </tbody> </table>	<u>Inputs- million UA</u>		Civil Works	116.86	Supervision and monitoring	4.78	Road Safety,	0.17	Resettlement	0.27	Audit services	0.10	Contingencies	7.82	<b>Total Cost</b>	<b>130.00</b>	Source	Original	Additional	Total	ADF	30.10	32.65	<b>62.75</b>	JBIC	19.71	0	<b>19.71</b>	SIDA	16.84	0	<b>16.84</b>	GOM	5.54	25.16	<b>30.70</b>	<b>TOTAL</b>	<b>72.19</b>	<b>57.81</b>	<b>130.00</b>	<p>3.1 Bitumen standard road constructed between Montepuez and Marrupa (203 km) and rehabilitated road between Litunde and Lichinga (66 km) and seven bridges constructed between Litunde and Lichinga, while minimizing negative impact on the environment.</p> <p>Project Affected Persons (PAPs) identified, adequately compensated, and safely resettled.</p> <p>Road Safety awareness campaigns implemented in communities along the road corridor.</p>	<p>3.1 Remote communities (including PAP's)</p> <p>3.2 Provincial/district governments of Niassa and Cabo Delgado.</p> <p>3.3 Road users and shippers.</p>	<p>3.1 Number of km of road constructed/rehabilitated and bridges constructed.</p> <p>3.2 50 % of population in the zone of influence with road safety awareness And HIV sensitization</p> <p><u>Source/Methods:</u> Environmental and Social Management Plan (ESMP), Resettlement Action Plan updated status, Quarterly Reports. Bank Supervision reports, report of consultant in charge of monitoring impacts Audit reports. Mid-term review, PCR, and site inspections.</p>	<p>3.1 Total of 203 km upgraded between Montepuez and Marrupa. 66 km rehabilitated between Litunde and Lichinga and 7 bridges constructed between Marrupa and Litunde.</p> <p>3.2 75% of school children and 50% of inhabitants in the project zone of influence received road safety awareness and HIV sensitization.</p>	<p>3.1 GOM timely payment of counterpart finance and VAT refund.</p> <p>3.2 Effective supervision by the consultant, the Bank and ANE.</p> <p>3.3 PAP's adequately and satisfactorily compensated and resettled, and environmental aspects adequately addressed.</p> <p><b>Mitigation Measures</b></p> <p>3.2 More regular supervision missions and improved communication. Project Coordinator will be assigned. On the national level, ANE's capacity has been assessed and was found to be capable of undertaking supervision and activities of similar projects.</p> <p>3.3 Inclusion of loan conditions requiring Government adherence to ESMP and update of RAP.</p>
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## **1. INTRODUCTION**

- 1.1 The Pemba – Montepuez – Lichinga Road Corridor (735km) traverses the two relatively underdeveloped and isolated northern provinces of Niassa and Cabo Delgado which make up the hinterland of Pemba Port. The road corridor is important since it improves connectivity of the two provinces to the national road system; opens up the richest but under-exploited agricultural region of Mozambique for grains and cash crops (tobacco and cotton); and improves social service coverage to the population in its remote rural communities.
- 1.2 The Bank Group and Swedish International Development Agency (SIDA) intervened in the development of the corridor and financed respectively the studies and development to bitumen standard of sections of this corridor; Pemba-Montepuez (210 km) by ADF and Marrupa-Litunde (247 km) by SIDA. The remaining missing road links and bridge structures on the corridor were included in the on-going Phase 2 of the ten year ROADS-3 Program (2007 – 2011). The ROADS-3 programme formulated with donor support was based on the sector policy and strategy that underpinned the Government's goal of poverty reduction through the provision of access to markets and social services/commercial centers by the population, supporting economic growth and the integration of the country.
- 1.3 The GOM requested the Bank in November 2004 to provide financing to complete the missing links of the corridor. These included the upgrading to paved standard of the existing Montepuez-Ruaca-Marrupa track (135 km), the rehabilitation of the sub-standard Lichinga-Litunde paved section (66 km) and construction of the seven (7) low level bridges between Litunde and Marrupa. It is to be mentioned that the Bank had prior to that financed the studies for the rehabilitation of the Pemba – Montepuez road section of the corridor.
- 1.4 The Bank Group, SIDA and the, then, Japan Bank for International Cooperation (JBIC) undertook a joint appraisal mission in June 2006 in response to GOM's request. The three financiers then agreed with GOM on the financing plan and packaging of the project. In October 2006, the Bank approved an ADF loan for UA 30.10 million to cover part of the costs of the project. The ADF approved amount was to cover the costs of Lot A (Montepuez-Ruaca) and Lot C (Marrupa-Lichinga), jointly with JBIC (later JICA), and on parallel financing with SIDA, who would cover the costs of Lot B (Ruaca-Marrupa).
- 1.5 The project faced considerable delays during the early stages mainly due to delays in satisfying conditions for effectiveness, particularly the implementation of the Resettlement Action Plan (RAP). Bidders for the civil works of Lot A and Lot C submitted their offers in June 2009, i.e. three (3) years after project Appraisal. During this period international oil, and hence construction materials, prices witnessed a sharp increase. This led to a large difference (of about 80%) between the project total cost as estimated during Appraisal and the submitted offers. The financing gap amounted to about UA 57.80 million for the whole project. As a result, the GOM requested the Bank in March 2010 to consider providing a supplementary loan to bridge the resulting financing gap. In response to the GOM's request, the Bank mounted a re-appraisal mission during the period 27 July-13 August 2010 with a view to securing a supplementary loan to cover the project cost-overrun. This memorandum is based on the findings of the mission.

## **2. THE INITIAL PROJECT**

### **2.1 Objectives and Description of Components**

- 2.1.1 Objectives: The upgrading of the Pemba-Lichinga Corridor has been conceived within the frame work of the Sector Wide Approach used in the design of the ROADS-3 Programme and fits within Government's road sub-sector policy and strategic framework of providing adequate and efficient transport infrastructure and services capable of servicing the economy and in particular to connect all nations' provinces, provincial capitals and the main international corridors; and to stimulate economic development by providing access to national and international markets.
- 2.1.2 The Montepuez-Lichinga Road which is a vital link in the corridor has in this context been accorded high priority in the ROADS-3 programme as a necessary investment in the northern provinces of Cabo Delgado and Niassa. The road will provide the communities in the zone of influence access to socio-economic services and markets in the major towns of Montepuez, Balama, Marrupa and Lichinga. Also, the lack of adequate transport links is hampering the huge tourism potential of the Cabo Delgado and Niassa provinces. The project when completed will compliment the Pemba-Montepuez road (an earlier Bank's intervention in the corridor) and the Litunde – Marrupa link completed with financing from SIDA.
- 2.1.3 The Pemba-Lichinga Corridor under the national road classification system represents part of the primary road network. The section between Montepuez and Marrupa is a track and can only be used by four wheel vehicles, which makes the entire area inaccessible by light vehicles. The Lichinga-Litunde section is an existing surfaced road of sub-standard geometric cross-section serving beyond its design life with the pavement showing signs of distress and in need of rehabilitation.
- 2.1.4 The section between Litunde and Marrupa covering 247 km has been upgraded to bitumen standard of 7 m overall width without shoulders with funding from SIDA. To reduce the investment costs, low level drainage structures were provided over the major watercourses. During the rain season these structures are overtopped by flood waters and are a danger to traffic and pedestrians. There is need to provide high level bridges for the road to be open all year round.
- 2.1.5 The original project objectives were to upgrade to bitumen standard, the Montepuez-Ruaca road (135 km); rehabilitate the Litunde-Lichinga road (66 km); construction of seven (7) bridges between Marrupa and Litunde and the upgrading of the Marrupa-Ruaca road (68 km) and improve road safety. The project is designed to improve connectivity of the national road corridors of Mozambique, increase access to markets and social services, create off-farm employment, and increased availability of agricultural inputs at lower cost and increased farm gate prices of produce with a purpose of improving the income levels of the rural communities, thereby contributing to the reduction of poverty.
- 2.1.6 Description of Components: project comprises civil works for: (i) the upgrading of Montepuez-Ruaca (135 km) and Marrupa-Ruaca (68 km) road sections from gravel to bitumen surfaced standard as Lot A and Lot B respectively; (ii) the rehabilitation of the Litunde-Lichinga road (66 km) as Part I of Lot C; (iii) the construction of seven bridges between Marrupa and Litunde as Part II of Lot C; (iv) consulting services for design review,

pre-contract services and supervision of the civil works; (v) road safety; (vi) project audit services and (vii) payment of compensation and resettlement of affected persons.

## 2.2 Initial Cost and Financing Conditions

2.2.1 The original overall project cost was estimated at UA72.19 million net of taxes and duties, but including contingencies. A summary of the original project costs by component for the overall project is in Table 1 below.

**Table 1: Summary of Original Cost Estimates of Overall Project by Component**

Component	USD (million)	UA (million)
	Total	Total
<u>Civil Works</u>		
Lot A: Montepuez-Ruaca (135 km)	44.22	29.59
Lot B: Ruaca-Marrupa (68 km)	19.75	13.22
Lot C-Part I: LitundeLichinga (66 km)	16.17	10.82
Lot C-Part II: Seven (7) Bridges	4.87	3.26
<b>Sub-Total</b>	<b>85.01</b>	<b>56.89</b>
<u>Supervision</u> (inc. Pre contract & design review services)		
Lot A: Montepuez-Ruaca (135 km)	3.51	2.35
Lot B: Ruaca-Marrupa (68 km)	1.60	1.07
Lot C-Part I: Litunde-Lichinga (66 km)	1.30	0.87
Lot C-Part II: Seven (7) Bridges	0.39	0.26
<b>Sub-Total</b>	<b>6.80</b>	<b>4.55</b>
Project Audit Services (Lots A and C)	0.15	0.10
Resettlement	0.40	0.27
Road Safety	0.25	0.17
<b>Total Base Cost</b>	<b>92.61</b>	<b>61.98</b>
<i>Physical Contingencies</i>	9.26	6.20
<i>Price Contingencies</i>	5.98	4.01
<b>TOTAL PROJECT COST</b>	<b>107.86</b>	<b>72.19</b>

### Initial Financing Conditions

2.2.2 According to the original financing plan, the ADF and JBIC were to jointly co-finance with GOM the road-works and consulting services for Lots A and C, and SIDA would co-finance with GOM the road works and consulting services for Lot B. SIDA would also entirely finance road safety and GOM would finance the resettlement and compensation costs. The costs of the environmental and HIV/AIDS mitigation measures were included in the civil works costs and were part of the BoQs. GOM would be responsible for all the taxes and duties.

2.2.3 The original financing share were; ADF: 42% (UA30.10 million) of the total project cost; JBIC (JICA): 27% (UA19.71 million); SIDA: 23% (UA16.84 million) and GOM: 8% (UA5.54 million) of the total project cost. The original financing plan by source for the overall project is shown in Table 2 below.

**Table 2: Original Financing Plan of Overall Project by Source (UA million)**

SOURCE	Total	Percentage (%)
ADF	30.10	42
JBIC (JICA)	19.71	27
SIDA	16.84	23
GOM	5.54	8
<b>Total</b>	<b>72.19</b>	<b>100</b>

## 2.3 Initial Loan Conditions

2.3.1 The original loan was subject to the conditions below.

(A) Conditions Precedent to Entry into Force:

The entry into force of the loan Agreement was subject to the fulfillment by the Borrower of the conditions set in the General Conditions Applicable to Loans and Guarantee Agreements of the Fund. These conditions were completely satisfied in July 2007.

(B) Conditions Precedent to First Disbursement:

- (i) Provision of evidence of a streamlined procedure acceptable to the Fund of refunding Value Added Tax (VAT) on the project.
- (ii) Provision of evidence satisfactory to the Fund that the displaced persons have been compensated for their losses at 'full replacement' cost prior to commencement of civil works in accordance with the ESMP.
- (iii) Provision of evidence to the satisfaction of the Fund that the required resources to be provided by JBIC (JICA) for joint financing of the Montepuez to Ruaca, and rehabilitation of the Litunde–Lichinga and construction of seven bridge structures from Marrupa to Litunde and SIDA for the Upgrading of the Ruaca-Marrupa Section including the Messalo bridge on parallel basis, have been secured.

2.3.2 These conditions were all satisfied in July 2008, when the Bank declared the loan effective.

## 2.4 Project Implementation Status

2.4.1 Consulting Services: contracts for the consulting services (design review, pre-contracts, and supervision) were signed in October 2008 for Lot A for an amount equivalent to US\$3.30 million (net of tax), and for Lot C for an amount of US\$2.18 million (net of tax). The contract for consulting services for Lot B (financed by SIDA) was signed prior to that.

2.4.2 Civil Works: ANE submitted to the Bank on 27th July 2009 the Bid Evaluation Report for the civil works for Lot A and Lot C. The submitted offers were considerably higher than the allocated funds and accordingly the Bank withheld the 'no objection' until the financing gap was bridged. This was communicated to the GOM on 20th October 2009. Following this, an agreement was reached to relocate the funds allocated (by ADF and JICA) for Lot C, to Lot A. The Bank granted conditional No-objection to the arrangement in March 2010. The conditions included, among others, the following;

- i) Provision by the GOM of an undertaking to bridge the remaining financing gap for Lot A, as well to cover any additional costs that may be incurred during implementation.
  - ii) Commitment by the GOM to consider Lot C of the project as a priority project within the Transport sector, and to search for possible sources to fund its completion.
- 2.4.3 The GOM satisfied the above objectives and accordingly the Bank granted a No-objection to the award of contract to the lowest evaluated bidder for Lot A in May 2010.
- 2.4.4 The contract for civil works was signed in June 2010 for a total value of Meticais (Mzm) 2,474,898,102.36 million (equivalent to about UA 56.36 million). Mobilization and site preparation works commenced in June 2010.
- 2.4.5 Mobilization have commenced by the contractor in Lot A. However, Advanced payment, which would represent the first payment from the loan for the civil works, have not been disbursed at the time of preparation of this report. Accordingly, no Audit reports were submitted to date. Amounts disbursed to date cover only part of the consulting services and amount to UA 328,376.11.

#### Difficulties encountered

- 2.4.6 **Effectiveness:** The project faced major delays, particularly in satisfying conditions precedent to first disbursements. This is particularly the case with the condition regarding compensation and resettlement of Project Affected Persons (PAPs).
- 2.4.7 The road corridor runs through two Districts, which meant that the consultations, compensations and resettlement had to be done in coordination with two different District Government authorities. Furthermore, the settlement locations of the PAP's were scattered along the relatively long road corridor. These two factors led to additional administrative and logistical challenges to the Executing Agency in compensating and resettling the PAPs. As a result, the completion of the compensation and resettlement could not be completed before July 2008, i.e. 21 months after approval.
- 2.4.8 **Procurement:** In addition to the above the procurement of the consulting services faced minor delays. These included revisions of evaluation reports, negotiations with lowest bidders to reduce offers to within the budget allocated to this component. This further impacted the civil works procurement, where the services of the consulting firms included preparation of bidding document of the civil works contract.
- 2.4.9 **Financial :** As a result of the above, the implementation of the project as a whole was significantly delayed. The ADF loan approval took place in December 2006, but the offers for the civil works were submitted only in June 2009. During this period the global prices of construction materials and oil-based materials witnessed dramatic increases, particularly in the years 2007 and 2008.
- 2.4.10 This resulted in the submitted offers for civil works being considerably higher (by about 80%) than the funds allocated for this component of the project.
- 2.4.11 The resulting financing gap further delayed implementation of the project by an approximately 8 months, where, as a first step, the Fund had to assess the possibility of relocating the available funds to cover Lot A only (as described above), before then engaging in preparation and appraisal of this subject supplementary loan.

## Lessons Learnt

- 2.4.12 The main lessons learnt from the delay that took place in project implementation, and subsequently the need for the Supplementary Loan, is that conditions precedent to first disbursement have to be carefully designed, taking into considerations Government implementation capacity, as well as other factors.
- 2.4.13 Furthermore, careful assessments need to be undertaken of the Government's implementation capacity regarding RAP, and any measures that can strengthen this capacity have to be considered at the earlier stages of project preparations.

### **3. THE PROJECT AT RE-APPRAISAL AND THE SUPPLEMENTARY LOAN**

#### **3.1 Objectives and Description**

- 3.1.1 There are no changes to the project objectives and its scope from the original Appraisal Report.
- 3.1.2 The summary of the project components is listed below.

<b>A</b>	<b>Road Construction and Rehabilitation</b>
A1	Construction of lot A: Montepuez-Ruaca (135 km) – <i>ADF co-financed</i>
A.2	Construction of lot B: Ruaca - Marrupa (68 km)
A.3	Rehabilitation of Lot C: Litunde - Lichinga (66 km) – <i>ADF financed</i>
A.3.2	Construction 7 bridges: along Marrupa-Litunde – <i>ADF financed</i>
A.4	Sensitization road safety
A.5	Compensation
<b>B</b>	<b>Management of the project</b>
B.1	Project Auditing – <i>ADF financed</i>
B.2	Supervision of Works – <i>ADF co-financed</i>

#### **3.2 Revised Project Cost Estimates**

- 3.2.1 The revised total project cost is estimated at UA130.00 million (including contingencies). Compared to the project's original cost estimate of UA72.19 million. This produces a financing gap of UA 57.81 million (including utilization of original contingencies).
- 3.2.2 The cost estimates for the civil works of Lot A are those of the actual contract signed, including contingencies. The cost estimate for Lot C is that of the lowest bid, with which the contract is envisaged to be signed. For Lot B, the estimate for the civil works was prepared by the Engineer, who has based their estimates on the contracts signed and to be signed for Lot A and Lot C. These figures (including those of Lot C) were reviewed by the appraising team and compared to other prevailing costs in Mozambique at the time, and were found to be acceptable. The costs of consulting services contracts are those of the actual signed contracts.
- 3.2.3 The contingencies allocated by ADF represent the difference between the maximum proposed supplementary loan and the estimated costs. These contingencies are considered to be adequate.

3.2.4 Table 3 below shows a comparison between the original project costs and the revised cost. Annex 2 shows the application of the “Road Unit Cost Study” recommendations.

**Table 3: Comparative Analysis of Project Cost Estimates**

	Original				Revised			
	F.C. (US\$)	L.C. (US\$)	Total (US\$)	Total in UA	F.C. (US\$)	L.C. (US\$)	Total (US\$)	Total in UA
Civil Works								
Lot A: Montepuez- Ruaca (135 km)	35.40	8.82	44.22	29.59	66.73	16.68	83.41	56.36
Lot B: Ruaca-Marrupa (68 km)	15.79	3.96	19.75	13.22	38.48	9.62	48.10	32.5
Lot C-Part I: LitundeLichinga (66 km)	12.90	3.27	16.17	10.82	23.68	5.92	29.60	20.00
Lot C-Part II: Seven (7) Bridges	3.90	0.97	4.87	3.26	9.47	2.37	11.84	8.00
<b>Sub-Total</b>	<b>67.99</b>	<b>17.02</b>	<b>85.01</b>	<b>56.89</b>	<b>138.36</b>	<b>34.59</b>	<b>172.95</b>	<b>116.86</b>
Supervision*								
Lot A: Montepuez-Ruaca (135 km)	2.81	0.70	3.51	2.35	2.44	0.61	3.05	2.06
Lot B: Ruaca-Marrupa (68 km)	1.29	0.31	1.60	1.07	1.61	0.40	2.01	1.36
Lot C-Part I: Litunde-Lichinga (66 km)	1.03	0.27	1.30	0.87	1.61	0.40	2.01	1.36
Lot C-Part II: Seven (7) Bridges	0.31	0.08	0.39	0.26	0.00	0.00	0.00	
<b>Sub-Total</b>	<b>5.44</b>	<b>1.36</b>	<b>6.80</b>	<b>4.55</b>	<b>5.66</b>	<b>1.41</b>	<b>7.07</b>	<b>4.78</b>
Project Audit Services (Lots A and C)	0.15	-	0.15	0.10	0.15	-	0.15	0.10
Resettlement	-	0.40	0.40	0.27	-	0.40	0.40	0.27
Road Safety	0.25	-	0.25	0.17	0.25	-	0.25	0.17
<b>Total Base Cost</b>	<b>73.83</b>	<b>18.78</b>	<b>92.61</b>	<b>61.98</b>	<b>144.42</b>	<b>36.41</b>	<b>180.83</b>	<b>122.18</b>
Physical Contingencies	7.38	1.88	9.26	6.20	14.44	3.64	18.08	5.43
Price Contingencies	3.78	2.20	5.98	4.01				2.39
<b>TOTAL PROJECT COST</b>	<b>84.99</b>	<b>22.86</b>	<b>107.85</b>	<b>72.19</b>	<b>158.86</b>	<b>40.05</b>	<b>198.91</b>	<b>130.00</b>
Share								

### 3.3 Revised Financing Plan

3.3.1 The financing gap will be bridged by the proposed ADF Supplementary Loan of UA32.65 million, and an additional allocation by the GOM of UA25.41 million (this includes an earlier additional commitment by GOM of UA7.3 million). The revised total GOM share will be UA30.95 million, equivalent to 24% of the total project cost. *Annex-3* Shows a comparative table of the original financing plan and the revised financing plan.

3.3.2 Strategically, it is important for the entire corridor’s missing links to be implemented to realize fully the objectives of the project road corridor. Therefore, the Supplementary Loan is subject to the commitment of GOM to bridge the remaining financing gap for the project. The GOM has committed to the provision of the additional allocation to ensure the successful completion of the project.

3.3.3 As per the revised financing plan, the ADF Supplementary Loan will cover;

- i) 100% of the total costs of civil works of Lot C (including part I: Rehabilitation of Litunde-Lichinga, and part II: construction of seven bridges along Marrupa-Litunde),
- ii) The increased share of ADF in the supervision consulting services of Lot C (after relocating JICA’s allocations to Lot A)
- iii) Contingencies estimated at about UA 4.3 million

- 3.3.4 The additional allocation by GOM will cover the financing gap for Lot A (as agreed in March 2010) and the financing gap for Lot B.
- 3.3.5 The amount of JICA's allocations will remain unchanged, however, these will now cover only part of the civil works for Lot A, and part of the consulting services for the same lot. Part of the JICA's allocation for the consulting services for Lot C (as per the original financing plan) was already disbursed, and this covered the pre-contract services. The remaining amounts (by JICA) for this contract will be relocated to Lot A. Accordingly ADF will cover the remaining of the supervision contract for Lot C.
- 3.3.6 SIDA's allocated amount (grant) will also remain unchanged, and will contribute (as per the original financing plan) towards covering the cost of Lot B, as well as the Road Safety component.
- 3.3.7 JICA's and SIDA's shares in the overall cost of the project will reduce to 15% and 13% respectively.

### **3.4 Revised Implementation Schedule**

- 3.4.1 The revised implementation schedule for the project is shown in *Annex 4*.

#### Supervision and Monitoring

- 3.4.2 Supervision and monitoring of the components covered by the Supplementary Loan will be conducted as indicated in the original Appraisal Report as shown below.
- 3.4.3 Environmental and social measures will be monitored and enforced, together with health and safety measures (accident prevention, etc.) applied by the contractor for his workforce. Reporting in these areas will be undertaken in conjunction with construction progress. These will be monitored by ANE and reviewed by MICOA provincial office. ANE stipulated Social Clauses will cover gender, labour laws and HIV/AIDS component modalities. These are very detailed and include involvement of NGOs for implementation and that of CNCS Provincial Office for monitoring HIV/AIDS activities.
- 3.4.4 The ADF shall undertake ad hoc environmental inspections with ANE personnel and, as appropriate, liaise with MICOA, both at national and regional levels during project implementation to ensure effective monitoring of compliance with environmental standards. However primary responsibility for environmental monitoring and supervision of environmental management (and resettlement – see below) will fall on ANE and the consultant engaged for project supervision services.
- 3.4.5 Supervision of civil works will be undertaken by two, already contracted, well reputable firms (one for each of Lot A and Lot C). There is also a Project Coordinator assigned by ANE for the project. He is be the Bank's contact person regarding the project and shall liaise with the consultant, prepare and forward the quarterly progress reports to the Bank. The Coordinator will attend all site meetings, process the contractor's payment certificates and the consultant's invoices and prepare the Borrower's Project Completion Report at the end of execution.

- 3.4.6 AfDB, JICA and SIDA will adopt a collaborative approach on supervision of the project, including civil works, where joint technical progress meetings will be held on regular bases by the field offices. AfDB's Field Office will undertake a minimum of one comprehensive project supervision assignment each year, where SIDA and JICA will invited to participate. In addition, bi-annual supervision missions and a Mid-Term Review will be conducted by AfDB Headquarters, during which implementation of the whole project (Lot A + Lot B + Lot C) will be supervised.
- 3.4.7 There are no changes to the financial management arrangement put in place by the original project.

### **3.5 Environmental and Social Impact Assessment**

- 3.5.1 The original environmental and social impact assessment (ESIA) for the project area was undertaken in 2003 by Bceom Consultants. Given the time lapse to 2006, a revised report was issued dated May 2006. According to the Resident Engineer's review there have been no significant changes in land use and environmental profile of the project area. Therefore, there is no need to undertake additional environmental assessment except those in the context of Contractor's requirement in ensuring that the impacts assessed in the 2006 report are fully mitigated. In addition, and as per the national procedures, the areas where materials will be sourced and borrow pit areas identified will require summary environmental impact assessment determined by the Ministry of Mineral Resources' Environmental Unit. Nevertheless, the Contractor has submitted revised Environmental and Social Management Plan (ESMP), included in the BoQs.
- 3.5.2 Not-with-standing the above, there have been changes in the resettlement pattern which has been triggered by the revised road alignment and extension of the Right of Way (ROW) to 15 meters. People affected by these changes have been fully compensated by 2009. *Annex-5* shows details on the updated situation.

#### Implementation of the RAP and Update

- 3.5.3 Full compensation and relocation of houses and properties within the ROW was a condition of the original loan, where according to the information and documents supplied by Government all compensation and resettlement had been completed and evidence submitted were accepted by the Bank on 29<sup>th</sup> July 2008. The total number of households that has been compensated was 696 (being 158 between Montepuez and Ruaca, and 538 between Ruaca and Lichinga). Final payments were carried out in June 2009. In view of the additional households that needed to be compensated (see 3.5.2 above), ANE and Government has commenced and completed the process of compensating the additional households. So far meetings have been held with the new PAPs, those living in the Montepuez town, alternative pieces of land have been identified and authorization (DUAT) issued to occupy the land. The status report on RAP implementation for both Lot A and C is attached as *Annex-5*. The supplementary loan will include new loan conditions which will require ANE to submit evidence that works will not begin before the supplementary list PAPs have been fully compensated and resettled. Hence, the contractor will commence works in areas that have no settlements until the resettlement has been completed. The Appraisal Mission was provided with the supplementary list of PAPs and its costs as was financed by ANE.

### ESMP/RAP Implementation, Supervision and Monitoring

- 3.5.4 As was stated in the original PAR, implementation of the ESMP is the responsibility of the contractor, while implementing the RAP is the responsibility of Government, through the local authorities in collaboration with the Regional Delegate of ANE. Payment for compensation and resettlement costs is done by Road Fund through ANE. The supervision of the ESMP implementation is done by the Resident Engineer who would engage an environmentalist as part of the staffing contingent. The environmental technician of MICOA together with the ANE environmentalist and where applicable the environmentalist from key agents, such as Ministry of Mineral Resources, will monitor implementation of the ESMP. Annual audits will be undertaken on whose basis the General Inspector of MICOA will conduct follow-up inspections to ensure that all recommendations emanating from the audits are implemented.

### Road Safety

- 3.5.5 The SIDA financed components include implementation of road safety awareness campaigns for the communities along the road corridor. In addition, the road design for the three lots has incorporated various physical road safety measures.
- 3.5.6 In addition, and based on future discussions between AfDB and ANE, the Engineer maybe required to undertake interim Safety Audits for certain sections of the road, to provide Accident Reduction Measures at potential black spots.
- 3.5.7 Furthermore, when preparing the Project Completion Report, the consultant will be required to assess post completion needs for additional Accident Reduction Measures, after allowing a specific period during which car speed patterns and Non Motorized Users (NMUs) travel patterns are expected to develop. AfDB and ANE will discuss and agree on the most suitable mechanism for the funding of such activities.

### HIV/ AIDS/ STI, Malaria and other Diseases

- 3.5.8 Allocation for mitigation measures against spread of HIV/ AIDS/ STI (sexual transmitted infections) have been incorporated in the original Appraisal Report, and these were captured in the civil works bidding document. The Bank will further discuss with GOM, during implementation, the need for and the mechanism for the supply of malaria nets or other diseases preventive kits to local communities and contractor workers.

### Climate Change

- 3.5.9 The project design incorporated measures to prevent against the negative impact of climate change on the pavement structure, particularly flooding. These include drainage facilities (culverts, bridges, etc). It is to be noted that Lot C-part II includes the provision of new bridges that would change the Marrupa – Litunde stretch of the corridor into a road passable throughout the year. The road, despite being recently constructed, is currently not passable during the rainy season, where increasing flooding rates have been creating obstacles along the road.

### **3.6 Executing Agency**

- 3.6.1 The National Roads Administration (ANE) is still the Executing Agency of the project and the Road Fund is the implementing Agency.
- 3.6.2 The ANE has developed sufficient experience and capacity for the execution of the proposed components in this project. ANE's performance with ADF-financed projects has been improving, particularly with procurement processes. ANE's experience with international donors has been growing and diversifying considerably and this has contributed to a notable improvement in the ANE's staff understanding of international donors' processes, rules and procedures.

### **3.7 Procurement Arrangements**

- 3.7.1 Procurement of the consulting services for Lot A and Lot C were conducted as per the original Appraisal Report and in line with the AfDB Rules and Procedures for Procurement. This was through pre-qualification of firms and evaluation of the Request for Proposals (RFP) based on "Technical Quality with no Price Considerations".
- 3.7.2 Similarly, the procurement of the civil works contract for Lot A, and Lot C were conducted as per the original Appraisal Report and in line with the AfDB Rules and Procedures for Procurement. This was International Competitive Bidding (ICB) with prequalification and with no domestic or regional preference.
- 3.7.3 Contracts were signed for each of the consulting services for Lot A, consulting services for Lot C, consulting services for Lot B, and civil works for Lot A. Audit services are to be entirely financed by the ADF. The selection of an auditing firm will be through a short-list of firms in accordance with the Bank's *'Rules of Procedure for the Use of Consultants'*. Allocation to cover the cost of this component is made under the original loan.
- 3.7.4 Bids for the civil works of Lot C were submitted and evaluated. The Bank had reviewed the evaluation and withheld the decision on No-objection due to the financing gap. Following approval of the Supplementary Loan, ANE is to ascertain the extension of the validity of offer of the lowest bidder for Lot C. In a case of an unsuccessful response from the lowest bidder, ANE will start a fresh procurement process for the civil works of Lot C in accordance with the original Appraisal Report, i.e. International Competitive Bidding (ICB) among pre-qualified contractors with no domestic or regional preference.
- 3.7.5 Procurement of civil works for Lot B will follow SIDA's procurement rules.

### **3.8 Risks and Sustainability**

- 3.8.1 The realization of the total project objectives depends on the assumptions:
- (i) Government's commitment to the transport sector programs: The Bank, through Country and Sector dialogue would collaborate with GOMZ, to ensure that the transport sector programs and its higher objectives are achieved.
  - (ii) Adequate Maintenance: The new road will receive adequate maintenance to sustain the required level of service during its design life. The Road Sector Strategy sets the

financial requirements for routine maintenance, which are wholly financed by the Road Fund. The study also sets the requirements for periodic maintenance, 50% of which is covered by the Road Fund. Donors have pledged to cover the financing gap through budget support. Furthermore, ANE and the Road Fund is undergoing process of revising the maintenance rules with an aim for more decentralization and improved efficiency. This comes under several initiatives taking place to improve maintenance operations in the sector.

- (iii) Government Counterpart Funds: This is considered critical and should its availability on a regular basis become unattainable the project will experience delays in its implementation. The GOM through the Road Fund will budget for the project counterpart funds and make timely release of the funds. The loan for the Supplementary Loan will include a condition to this effect.
- (iv) Effective supervision of Implementation: There is a potential risk of delays in implementation due to capacity constraints in ANE for contract administration. On the Bank's (and co-financiers') part measures that have been taken to improve the performance of Bank funded projects in Mozambique include more regular supervision missions and improved communication (see *Supervision and Monitoring*). For the project, a Project Coordinator will be assigned. On the national level, ANE's capacity has been assessed and was found to be capable of undertaking supervision and activities of similar projects.

#### **4. BANK'S POLICY AND STRATEGIC CONTEXT**

- 4.1 The supplementary loan proposal is in line with the *Bank Group Policy and Procedures for Supplementary Financing*, ref no. ADF/BD/WP97/90 of 11 August 1997. The supplementary loan proposal meets the general and specific conditions for supplementary financing as highlighted below.
- 4.2 The project implementation rate, despite the prolonged delays, is projected to be satisfactory, following the signing of civil works contract for Lot A and the completion of the evaluation of offers for civil works of Lot C. This reduces the delay risks to those associated with the actual construction.
- 4.3 The proposed loan is in line with the allocations for Mozambique under ADF-XI. The Government of Mozambique is determined to complete the subject project, and ranks it a high priority. The Government has, to this extent, contributed a sizable amount to ensure the completion of the project, which raised its share in the financing of the project 8% to 24%.
- 4.4 The implementation environment of Mozambique is favorable.
- 4.5 The project cost overrun is essentially due to the reasons cited earlier (increase in price of crude oil, bitumen, etc.), which are beyond the control of the Government of Mozambique. The Government could not avail financing by other donors. The financing gap is much higher than to be absorbed by technical changes and modifications in the design of the project.

- 4.6 The proposed Supplementary Loan of UA 32.65 million will be funded from ADF XI resources allocated to the country. Furthermore, the project is still technically sound, environmentally sustainable, socially desirable and economically viable. Its completion will enable the Bank and Government to achieve the developmental objective set forth at appraisal.
- 4.7 As the developmental objectives of the corridor can only be met by the complete linkage from the Port of Pemba to the city of Lichinga, the project cannot be reduced in size or scope. The proposed Supplementary Loan is consistent with the Bank Group's intervention strategy in the transport sector as contained in the Mozambique Country Strategy Paper (CSP) 2006-2010. The CSP specifically highlights the Montepuez-Lichinga as a priority intervention for the Bank in the transport sector.

## **5. TECHNICAL AND ECONOMIC JUSTIFICATION**

### **5.1 Technical Justification**

- 5.1.1 As a result of the financing gap that emerged for the civil works, the Montepuez – Lichinga Road project cannot be implemented as originally approved. The proposed Supplementary Loan would contribute towards bridging the financing gap and hence ensuring that the project reaches its developmental objectives as stated above.
- 5.1.2 The cost overrun in the course of the implementation of the project is justified on grounds of unforeseen global and regional general price hike of road construction materials which have impacted severely on the road construction works. Petroleum-based products such as fuel, lubricants and bitumen as well as other materials such as cement and steel which are significant integral component in the cost of road construction. More so, fuel is consumed by heavy-duty equipment used in clearing and grubbing of site, in excavation and haulage of soil from borrow pits and rock from quarry sites, compaction of earthworks, placing and compaction of sub-base and base layers, for heating asphalt mixing plants, and for transporting asphalt. Bitumen is also used in priming the road base course and producing asphalt concrete for road wearing course. The analysis of the trends in the Construction Cost Indices for Mozambique provides adequate justification for the high revised cost estimate of project.

### **5.2 Economic Analysis**

- 5.2.1 The methodology for the economic analysis is based on cost benefit analysis by comparing the “with” and “without “ project scenarios over a period of 20 years, using the Highway Development and Management Model (HDM-4). A discount rate of 12%, a residual value of 20% and upgrading and rehabilitation period of 3 years are adopted. The economic costs consist of (i) the capital investment costs and (ii) the routine and periodic maintenance expenses. The benefits consist of savings in (i) vehicle operating costs; and (ii) motorized traffic travel time for passengers and cargo. The traffic and economic analysis results are presented in *Annex-6*. The summary of the economic analysis at appraisal and re-appraisal is presented in Table 3.

**Table 3: Summary of the Economic Analysis**

	<b>Appraisal</b>	<b>Re-appraisal</b>
FIRR, NPV (base case)	(Not Applicable)	(Not Applicable)
Economic Internal Rate of Return(EIRR)	19.6%	14.2%
Net Present Value (NPV) in US\$	51.09million	31.24million
Sensitivity of EIRR of concurrently 20% increase in cost and 20% decrease in traffic	13.39%	12.3%

## **6. CONCLUSIONS AND RECOMMENDATIONS**

### **6.1 Conclusions**

- 6.1.1 The Montepuez-Lichinga road project is a strategic priority for the Government of Mozambique, and is supported by the Bank's Mozambique CSP 2006-2010.
- 6.1.2 The project cost overrun is due to unforeseen global price hike of petroleum products and other construction material, which have impacted severely on the cost of the road construction works following the delay in completing compensation and resettlement, which have now been completed except for the few that have arisen due to the minor changes in alignment and ROW.
- 6.1.3 Despite the increase in costs the Montepuez-Lichinga road project remains economically viable, technically sound, environmentally sustainable and socially desirable. The supplementary loan will ensure the successful implementation of the project in order to achieve its development objectives.

### **6.2 Recommendations**

- 6.2.1 Based on the above, it is recommended that an ADF Supplementary Loan not exceeding UA32.65 million be extended to the Government of Mozambique to contribute towards bridging the financing gap for the implementation of the project. The Loan will be subject to the following conditions;

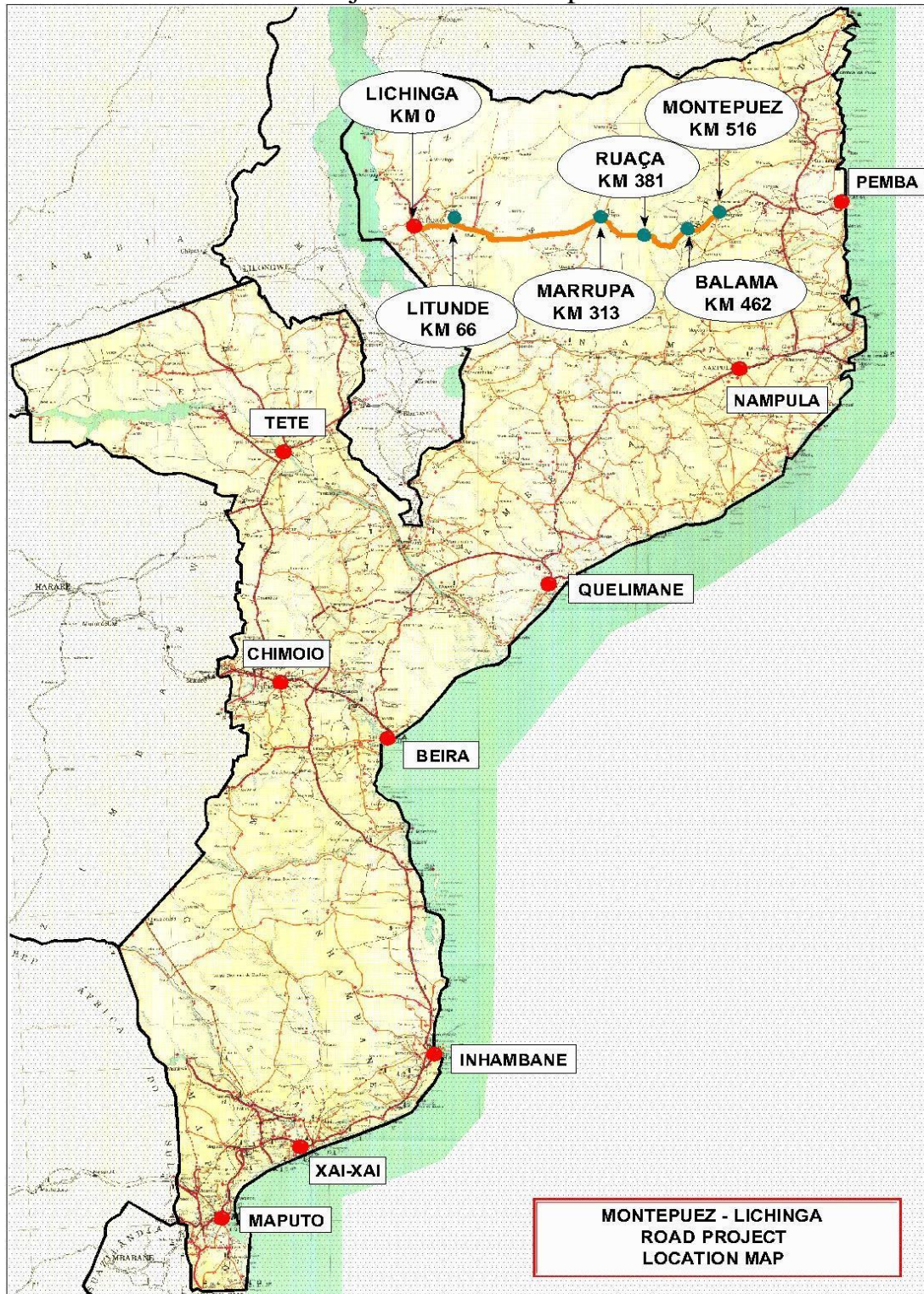
*Conditions Precedent to Entry into Force*

- i) The supplementary loan shall enter into force subject to the fulfillment by the Borrower of the provisions of Section 12.01 of the General Conditions applicable to Loan Agreements and Guarantee Agreements of the African Development Fund;

*Conditions Precedent to First Disbursement of the Loan*

- ii) The Borrower shall evidence satisfactory to the Fund of the following:
- (a) Written evidence of having secured co-financing or counterpart funding for Lot B
- (b) (i) an updated Resettlement Action Plan for Lot C together with the works and compensation schedules outlining the sections in Lot C (between Litunde and Lichinga) wherein the civil works will be divided; and (ii) evidence of having fully compensated and/or resettled all Project Affected Persons, if any.

**ANNEX-1:**  
**MONTEPUEZ-LICHINGA ROAD PROJECT**  
Project Location Map



The map has been prepared by the Appraisal team of the original project exclusively for the convenience of the readers of the report to which it is attached. The dimensions used and the boundaries shown on the map do not imply on the part of the AfDB Group and its affiliates, any judgment on the legal status of any territory or any endorsement or acceptance of such boundaries.

**ANNEX-2:**  
**Application of the Road Unit Cost Study Recommendations<sup>1 2</sup>**

OBJECTIVES/RECOMMENDATIONS	ACTIONS
<b>Objective 1: Ensuring accuracy of project cost estimates</b>	
Ascertain that project design or design review is carried out by renowned consulting firms recruited under appropriate selection process as per Bank guidelines and with TORs requesting specifically a supply chain analysis of contractors' market as well as of key inputs availability and projected prices in determining the engineer's cost estimates (Countries and Bank)	Regarding the civil works for Lot A, consulting services for Lot A, B and C, the costs indicated are actual values of the signed contracts. As for Lot C the cost indicated is the actual lowest bid value with contingencies added. For Lot B (SIDA – financed) the engineer estimate was prepared by a reputable firm, which was selected through a bid process in line with AfDB's procurement guidelines and procedures. In preparing their estimate the Engineer, they compared rates to the contract rates for Lot A and other ANE contracts.
Require sufficient level of geotechnical investigation at design stage (Bank and countries)	Geotechnical investigations have been conducted at earlier stages of project preparations and design reviews were undertaken (including geotechnical aspects) by the supervision consultants for both Lot A and lot C.
Conduct systematic updates of cost estimates in case of project delays, thorough cost review at appraisal and full design reviews if more than 2 years have elapsed since initial design (Bank and countries)	Exercise was undertaken as part of the original Appraisal and as part of the Re-appraisal. Cost estimates were checked against local and regional prices. The base for the estimate were actual recent contracts and not designs.
Encourage, if warranted, the standardization of project design requirements at national level or at regional level in the case of multinational corridors (Bank and other donors)	Road design has been selected with a view to standardizing the design for the entire 360km road, which will be implemented in parallel with funding from the EU and the EIB. The design complies with required design standards adopted for projects in the region. The design also reflects the long term objectives for regional development as a multi-national corridor.
<b>Objective 2: Further enhancing competition in tenders</b>	
Systematically review on a country basis the merits of promoting participation of local contractors, and define associated measures in the project design by the appraisal team - e.g. tender packaging, national preference, prequalification criteria, etc. (Bank and countries)	Considering the current status of the local construction industry, participation by local contractors was not included it as a preference. However, some participation by the local contractors in the bidding process was noted. This was made possible through the packaging of the project into three different civil works contracts.
Ensure appropriate tender advertising and execution, as well as thorough review of implementing agencies' procurement procedures and capacity (Bank)	Advertisement for procurement has been done through GPN, SPN in UNDB, Local News Papers and Embassies. The procurement capacity of ANE and its adherence to the Bank's rules and procedures have been improving considerably over the past years.
Monitor procurement for competitiveness, and intervene when tenders veer towards limited competition (Bank and countries).	The procurement process showed reasonable level of competitiveness, where 7 contractors (including one from Mozambique) were prequalified for Lot C and 5 (including one from Mozambique) for Lot A. Higher trend is anticipated in Lot B (SIDA financed).
<b>Objective 3: Strengthening knowledge management on road cost and construction industry</b>	
Support development of updated national databases on contractors active in the road and construction markets, using information from project implementation and PCRs (countries, Bank and donors)	Trend analysis was undertaken during Appraisal mission and showed increasing participation of contractors in the sector, including mostly foreign ones, beyond the usual pattern of a specific number of usual contractors. The creation of Database to have such analysis easily available and retrievable will be encouraged through sector dialogues.
Monitor changes of international and local prices of key inputs, as early warning signal of contract price increases (countries)	To be incorporated as main item for supervision missions. Field Office will regularly review with the Executing Agency anticipated changes in costs.
Systematically apply FIDIC conditions for price adjustment formula in contracts (countries and Bank)	Bank Standard Bidding Documents for large civil works is based on FIDIC.
Organize internal and external workshops on findings/recommendations of the study and the proposed action plan (Bank)	Initial discussions are to be arranged as part of supervision missions of the project.

<sup>1</sup> Addendum 2, African Development Bank Study on Roads Maintenance and Construction Costs in Africa, October, 2007.

<sup>2</sup> World Bank Africa Infrastructure Country Diagnostic Study on Unit Costs of Infrastructure Projects in Sub-Saharan Africa, The final draft was published in Feb, 2008. The objective of the Unit Cost study is to generate and analyse a database of the unit costs of infrastructure projects in Sub-Saharan Africa during the last decade.

<b>Objective 4: Minimizing project implementation delays</b>	
Assess in depth the capacity of implementing agencies and include adequate capacity strengthening in project components as needed (Bank and countries)	For the project, a Project Coordinator will be assigned. On the national level, ANE's capacity has been assessed and was found to be capable of undertaking supervision and implementation of similar projects.
Ensure effective project supervision and compliance with realistic procurement timetables (Bank)	It was agreed, in line with Bank practices, that 2 supervision missions will be conducted annually with the participation of other co-financiers, and regular supervision visits and meetings will be conducted by the Field office.
Continue, as far as possible, minimizing non-essential conditions precedent to loan effectiveness or disbursement, e.g. by excluding conditions linked to sector policy reform that should be advanced through development policy or sector reform loans (Bank)	CP were minimized to one in the case of the subject Supplementary loan.
Consider systematically using advanced procurement actions (Bank and countries)	Procurement procedures were completed at the time of Re-appraisal. This excludes Lot B, for which the procurement process is underway already.
Maintain continuity in project supervision and implementation staff (Bank and countries)	While project faced change of Task Managers, continuity was maintained and will be maintained in the future too. Similarly, a supervision rate of the project was maintained at a minimum of two missions per year. The trend would only increase with more frequent visits by the Field Office.
Assess the possible use of alternative procurement methods, such as the design-build-maintenance approach, and the way forward towards improvement/harmonization of associated procurement guidelines (Bank and other donors)	The procurement method selected is the most suitable for the type of works to be undertaken.
Continue supporting road sector institutional reform and capacity building (Bank and countries)	Reforms for the Road Fund and ANE has already taken place, more minor reforms will continue to take place. AfDB shows support to such reforms aiming at improving operational efficiencies and will intervene whenever and wherever possible to contribute towards these reforms. Further discussions will be held with the concerned entities in Mozambique.
<b>Objective 5: Preparing better for possible price increases</b>	
Agree with Borrowers on a mitigation plan in case of price increases higher than the projects' contingencies, including options such as increased counterpart funds and other measures. (Countries and Bank)	Price increases will be closely monitored. As this is a Supplementary Loan, the Government will cover all additional unforeseen increases in costs. To this extent the Government is pursuing talks with other donors, namely the Islamic Development Bank, to obtain financing for the project as an additional contingency measure.
Justify price and physical contingencies in project cost estimates to reflect adequately the projects' and countries' specifics, the perceived soundness of design cost estimates, and the expected future variations in prices of key inputs (Bank)	As this is a Supplementary Loan, the contingencies available represent simply the difference between the maximum amounts to be allocated (in the case of ADF-financed components) and the cost estimate/ contract value. These amounts were considered reasonable for the time.

**ANNEX-3 :**

**Montepuez - Lichinga Road Project: Revised Financing Plan**

	Original					Revised				
	Cost Estimate	Financing Plan (UA)				Cost Estimate	Financing Plan			
	Total in UA	ADF	JICA	SIDA	GOM	Total in UA	ADF	JICA	SIDA	GOM
Civil Works										
Lot A: Montepuez- Ruaca (135 km)	29.59	16.07	10.74	-	2.78	56.36	27.64	18.12	-	10.60
Lot B: Ruaca-Marrupa (68 km)	13.22	-	-	13.22	-	32.5	-	-	13.22	19.28
Lot C-Part I: LitundeLichinga (66 km)	10.82	5.87	3.93	-	1.02	20.00	20.00	-	-	-
Lot C-Part II: Seven (7) Bridges	3.26	1.77	1.18	-	0.31	8.00	8.00	-	-	-
<b>Sub-Total</b>	<b>56.89</b>	<b>23.71</b>	<b>15.85</b>	<b>13.22</b>	<b>4.11</b>	<b>116.86</b>	<b>55.64</b>	<b>18.12</b>	<b>13.22</b>	<b>29.88</b>
Share		42%	28%	23%	7%		48%	16%	11%	26%
Supervision										
Lot A: Montepuez-Ruaca (135 km)	2.35	1.33	0.85	-	0.17	2.06	1.24	0.82	-	-
Lot B: Ruaca-Marrupa (68 km)	1.07	-	-	1.07	-	1.36	-	-	1.36	-
Lot C-Part I: Litunde-Lichinga (66 km)	0.87	0.49	0.31	-	0.06	1.36	1.24	0.12	-	-
Lot C-Part II: Seven (7) Bridges	0.26	0.15	0.09	-	0.02				-	-
<b>Sub-Total</b>	<b>4.55</b>	<b>1.98</b>	<b>1.25</b>	<b>1.07</b>	<b>0.25</b>	<b>4.78</b>	<b>2.48</b>	<b>0.94</b>	<b>1.36</b>	<b>0.00</b>
Share										
Project Audit Services (Lots A and C)	0.10	0.10	-	-	-	0.10	0.10	-	-	-
Resettlement	0.27	-	-	-	0.27	0.27	-	-	-	0.27
Road Safety	0.17	-	-	0.17	-	0.17	-	-	0.17	-
<b>Total Base Cost</b>	<b>61.98</b>	<b>25.79</b>	<b>17.10</b>	<b>14.46</b>	<b>4.63</b>	<b>122.18</b>	<b>58.22</b>	<b>19.06</b>	<b>14.75</b>	<b>30.15</b>
Physical Contingencies	6.20	2.6	1.6	1.45	0.55	5.43	2.78	0.65	1.45	0.55
Price Contingencies	4.01	1.71	1.01	0.93	0.36	2.39	1.75		0.64	
<b>TOTAL PROJECT COST</b>	<b>72.19</b>	<b>30.10</b>	<b>19.71</b>	<b>16.84</b>	<b>5.54</b>	<b>130.00</b>	<b>62.75</b>	<b>19.71</b>	<b>16.84</b>	<b>30.70</b>
Share		42%	27%	23%	8%		48%	15%	13%	24%



## **ANNEX-5:**

### **STATUS OF THE IMPLEMENTATION OF RESETTLEMENT ACTION PLAN OF THE MONTEPUEZ - RUAÇA AND RUAÇA - LICHINGA**

#### **1. Description of the project, project area and area of influence**

The project area lies in the northern provinces of Mozambique Cabo Delgado and Niassa. The road corridor stretches from Montepuez to Lichinga, with approximately 516 Km.

The project is packaged as three lots, Lot A: is upgrading of the Montepuez-Ruaça (135 km) of the N14 in the Cabo Delgado Province. The road is a gravel road in poor condition and will be upgrading to a new 8.6m wide sealed road. Lot B: is upgrading of the Ruaça-Marrupa (68 km) and Lot C-Part I: rehabilitation of Litunde-Lichinga (66 km), Lot C-Part II: construction of seven Bridges along the Marrupa- Litunde. The works for Lots A and C will be financed by ADF jointly with JICA and GOM. SIDA will jointly cover Lot B with GOM. The costs of resettlement are totally covered by GOM.

The zone of influence occupies five districts within these provinces with Montepuez and Balama in Cabo Delgado and Marrupa, Majune and Lichinga in Niassa Province. The total population is approximately 300,000 (INE, 2007) inhabitants covering an area of 57,312 km<sup>2</sup>. Over 85% of the population is engaged in agriculture mostly subsistence. Food crops include maize, beans, cassava, rice, millet, sorghum and cowpeas. Growing of tobacco and cotton are on the increase. Cabo Delgado and Niassa are the one of the poorest provinces in country with 57,4% and 70,64% respectively (IAF, 96/97).

#### **2. Potential Impacts**

The survey was done within 10meters of each side of the road from the central line to minimize resettlement of population.

Based on the road alignment survey the Lot A: Montepuez to Ruaça is traverses the districts of Montepuez and Balama where approximately 158 traditionally built houses with approximately 790 people were affected and compensated. Due to the revision of the design, where it was considering 15 meters for each side from central line, it was found that 127 houses and 956 plants will be affected within Montepuez to Balama village.

In Lot B: Ruaça-Marrupa 158 traditional built houses and 214 plants were affected and compensated in period of June, 2008 and 2009.

In Lot C: Litunde to Lichinga 382 traditionally built houses and 83 plants were affected and compensated with approximately 1910 people were affected. The process of payment was done within years 2008 and 2009.

### **3. Organizational Responsibility**

The Local Administration in coordination with ANE, were responsible for making compensation payments to the PAPs; ensuring that the correct persons are paid through the confirmation of the Local Leaders. They were generated and maintained records of PAPs and the payment details, copies of which were retained at the local Administration and ANE.

The Local Administration, through their local leaders will receive complaints from PAPs and assist the PAPs accordingly. The complaints will be brought to the attention of ANE for record and for further assistance where necessary. ANE is ensuring that PAPs are well informed, through the Local Administration, at each stage of the process.

### **4. Community participation**

Consultations have taken place with the District Administrators of the affected districts and heads of administrative posts, local leaders and Municipality head. Further discussions took place with representatives of affected communities and potentially affected persons. For the affected communities and PAPs, the meetings were to explain how the authorities would undertake compensation to mitigate impacts. Lists of names and structures were created to understand likely numbers affected. Furthermore, the consultations presented methods of compensation payment in kind or in financial terms and given chance to choose the form of compensation and resettlement. The consultations also touched on procedures for presenting complaints and grievances that may arise would be redressed, clearly stipulating the processes and people involved (see below).

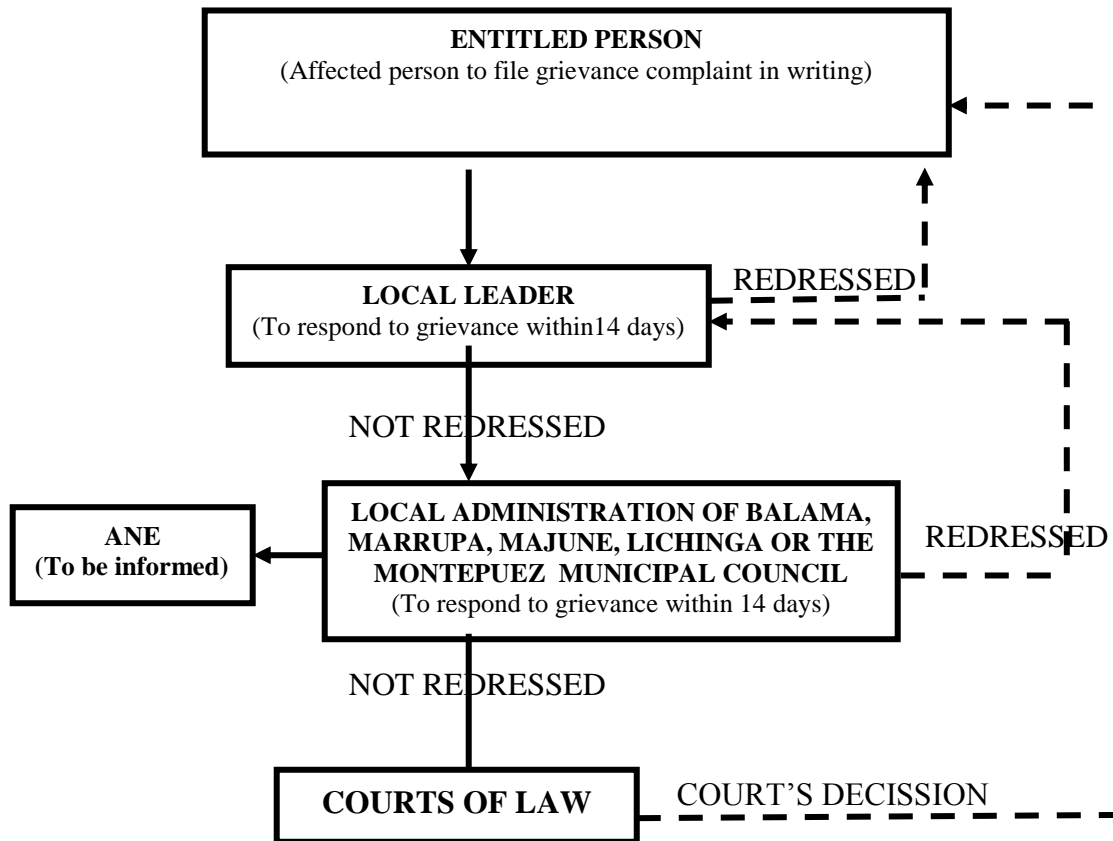
In Lot A meeting was held on 14<sup>th</sup> June 2010 to sensitize new affected people informing them about the importance of the project and how the compensation will be.

In 19<sup>th</sup> and 20<sup>th</sup> August 2010 the affected communities in lots B and C were informed that the project will start soon so the affected people who are still in place have to leave the houses. The communities have agreed to leave up to end of August. 151 houses still on place but with their new houses built, ANE was informed that this happened because they are waiting to be told when the project will start, so they can demolish the house.

In Lot C the communities constructed their houses within the same place they only moved back.

During public consultation questions and concerns were raised such as: When the project will start? How long it will take? Do the communities will be involved during the project implementation?

The following organogram below illustrates the sequential steps for the grievance redress mechanism discussed with communities:



### 5. Integration with host communities

During resettlement implementation Local administrations were asked to provide land for affected people. For all Lots there were no problems with host communities because in Lot A they were moved to a new place where there were no hosts and in Lots B and C they only moved back at the same place and others moved to their farms. The new site in Montepuez Municipality has all the social services such as education, water, health, electricity, and others.

### 10. Valuation of and compensation for losses

Loss of assets such as houses and other physical structures were determined from the replacement cost of building similar or better structures. The replacement cost included the cost of materials, labour and transport to the site of construction of new replacement structures. For many of the affected structures, the new site for construction of replacement structures is within the same area along the project.

In determining the replacement cost for the affected assets, the following factors are considered:

- The type of material used for construction;
- The age of the build;
- depreciation of the assets and the value of salvage materials are not taken into account; and the value of any benefits to be derived from the project is not deducted from the valuation of an affected asset;
- The houses that were partially demolished / affected are assumed as if the entire house was affected. Therefore, compensation for the entire house will be paid. the compensation rate is estimated on the basis of the type of the affected houses. The cost of each house that was replaced or compensated was estimated on the basis of

specification and bill of quantities as applicable by the Government institutions and verified with PAPs.

### **11. Environmental protection**

The site in the Municipal Council of Montepuez is well developed and does not require additional measures for environmental protection. The new plots/ houses of the persons to be resettled lie within an already developed site; therefore environmental and social impacts are insignificant.

### **12. Implementation schedules**

An implementation schedule covering all resettlement activities from preparation through implementation, including target dates for achievement of expected benefits to resettlers and hosts and terminating the various forms of assistance.

### **13. Costs and budget**

Funds of the past compensation and new compensation are provided by Road Fund. The total estimate of the overall cost of compensation and resettlement is 11.897.712,66 Mt. This cost is comprised of:

<b>Lots</b>	<b>N° of houses</b>	<b>N° of plants</b>	<b>Cost (Mt)</b>	<b>Stage</b>
<b>A</b>	156	1259	3.074.000,00	Done
<b>A (new survey)</b>	127	956	5.109.634,25	In process
<b>B</b>	158	214	772.288,59	Done
<b>C</b>	382	83	2.941.789,82	Done

Disbursements were approved by ANE and was made through the Local Administration of the affected areas in Cabo Delgado and Niassa Privinces. Tables indicating breakdown of cost estimates for all resettlement activities, including allowances for inflation and other contingencies; timetable for expenditures; sources of funds; and arrangements for timely flow of funds.

**14. Monitoring and evaluation**The arrangements for monitoring the land acquisition, resettlement and compensation activities would fit the overall monitoring programme of the entire project programme, which falls under the overall responsibility of ANE. ANE instituted an administrative reporting system that:

- (a) maintains records of any grievances that require resolution;
- (b) documents timely completion of project resettlement obligations (i.e. payment of the agreed-upon sums, construction of new structures, etc.) for all permanent and temporary loses, as well as unanticipated, additional construction damage and;
- (c) updates the database with respect to changes that occur on the ground as resettlement and compensation activities are being implemented

## **ANNEX-6: TECHNICAL AND ECONOMIC JUSTIFICATION**

### Technical Justification

1. The cost overrun in the course of the implementation of the project is justified on grounds of unforeseen global and regional general price hike of road construction materials which have impacted severely on the road construction works. The delay in the project implementation has exposed the project to cost increases. Petroleum-based products such as fuel, lubricants and bitumen as well as other materials such as cement and steel have significant integral component on the cost of road construction. More so, fuel is consumed by heavy-duty equipment used in clearing and grubbing of site, in excavation and haulage of soil from borrow pits and rock from quarry sites, compaction of earthworks, placing and compaction of sub-base and base layers, for heating asphalt mixing plants, and for transporting asphalt. Bitumen is also used in priming the road base course and producing asphalt concrete for road wearing course. The analysis of the trends in the Construction Cost Indices for Mozambique provides adequate justification for the high revised cost estimate of project.
2. The escalation in price of diesel fuel in Mozambique, which is imported from South Africa, is assessed based upon the South African producer price index at wholesale level for coastal area, which is 52% higher, between 249.1 (July 2007) and 301.1 (June 2010). Bitumen used for road construction in Mozambique is also imported from South Africa. During the same period, the price of bitumen has increased by 104.2% (from 242.9 to 347.1) and civil engineering plant and equipment has also increased by 37.1% (from 150.3 to 187.4)<sup>3</sup>. The major source of expatriate labor on construction sites in Mozambique comes from South Africa. The average monthly earnings (including bonus and overtime) for construction sector have increased by 70% from Rand 4,853 in May 2006 to Rand 8,252 in February 2010<sup>4</sup>. This could also be attributed to the high construction workload in South Africa (2010 World Cup) and Angola construction sector boom, as supply vs demand dynamics causes price to rise. The Mozambican Government's National Institute of Statistics summary of remuneration of indices for the local labor unit rates of the industrial sector shows an increase by 71.5% from 132.4 (June 2006) to 203.9 (February 2010)<sup>5</sup>. These major factors of road construction inputs have influenced the increased project cost a great deal. Even though the material cost index for cement could not be available, ANE record shows an increase of 43% for cement and 5% for steel between 2006 and 2009.
3. A review of the breakdown of items of works indicated that most of the increases are in earthworks, stabilization of sub-base layer, crushed stones in base layer, and DBST wearing course of the road pavement. Furthermore, recent experience from other donor-funded projects in Mozambique confirms that average unit costs of road projects have significantly increased. For example, the unit tender cost of the Massinga – Nhachengue road rehabilitation project in Mozambique that is being funded by IDA was USD 816,000/km while that of Chimoio- Lucite (120km) and Lucite – Espungabera (99km) financed by Portuguese Government were USD767,000 and USD788,000/km respectively. Cognizant of the problem, the Government has invited consulting firms in March 2010 to submit their proposals for a road construction cost study, financed by the EU.

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<sup>3</sup> *Producer Price Index(PPI), Statistical Release P0142.1, ndices da Actividade Economica, Instituto Nacional de Estatistica , Fevereiro 2009, No. 70, 2010.*

<sup>4</sup> *Quarterly Employment Statistics (QES), Statistical Release P0277, Statistics South Africa, Pretoria, South Africa, March 2010.*

<sup>5</sup> *Indices da Actividade Economica, Instituto Nacional de Estatistica , Fevereiro 2009, No. 70, 2010.*

4. Given the above analysis, the increased cost estimate of the road works from UA72.19m in 2006 to UA 130.98m in 2010 by 81% could be reasonable. Furthermore, the pavement design options for the road have been reviewed. The upgrading and rehabilitation options recommended as per the initial appraisal is necessary from both technical and traffic load configuration on the project road and was concluded not advisable to reduce the scope of the civil works as a result of the increase in cost.
5. The revised cost estimate has sufficient provisions built in to accommodate future unforeseeable additional works and inflation during the implementation period. The actual tender prices (net of taxes) have been used as the base costs, and a provision of 10% physical contingency sum has been added. Given the fact that the project is no longer subject to speculation of higher tender prices since the procurement activity in Lot A has been finalized and those of Lots B and C will be completed within few months time, the risk of further uncontrollable cost escalation beyond the revised estimate is low during the 3 year construction period. The application of the Bank Road Unit Cost Study Recommendations is attached at the end of this annex.

#### Economic Re-evaluation

6. Traffic Analysis: At Appraisal, the 2005 traffic was estimated to range from 130 to 264 average annual daily traffic (AADT), based on the Economic Feasibility Studies undertaken in 2004. The vehicle types used were light vehicle, medium vehicle, bus, small, medium and heavy goods. The vehicular composition of the traffic indicated that trucks constitute about 53.0% of the traffic, pick-up for about 37.0% while cars and buses account for the balance. The traffic level at appraisal was projected to grow at 8.8% per annum for cars, 5.1% per annum for pickups and 8.2% for buses. Freight vehicular traffic was projected to grow per annum at 6.6% for small trucks, 7.6% for medium and articulated trucks. Generated traffic of about 30-40% of normal traffic had been estimated given the elasticity of transport demand due to reduction in vehicle operating costs as a result of road improvement from earth/gravel to bitumen surfaced standard. The generated traffic estimate was regarded as adequate given that Niassa province has about 124.4 million hectares of arable land, with average productivity very low due to poor agricultural techniques and lack of fertilizer usage. The Swedish financed project in Niassa Province (PROANI), had assisted foreign commercial farmers to produce cash crops such as tobacco, cotton, beans, tomatoes and maize and for establishment of agro allied industries. The *Malonda* project, which targets about 50,000 economically active poor subsistence farmers with farm sizes of 1.2- 2.0 hectares to increase agricultural production and incomes would be enhanced by the project road.
7. Diverted traffic of 245 vehicles per day of which over 53.0% are freight vehicles had been estimated in 2005. Provinces of Niassa and Cabo Delgado constitute the hinterland of Pemba port which has a design throughput capacity of 650,000 tons per year but running at just about 100,000 tons per year. More coastal vessels will be able to call at the port as a result of developments in the port hinterland to discharge consumer and capital goods; agricultural inputs that are hither to be sourced from Malawi or from other more distant centres of Mozambique at higher cost and to collect export produce.
8. During re – appraisal, the actual traffic count of 2009 of ANE has been reviewed. The actual weighted average of 2009 traffic (279 AADT) shows an increase of 10.69% increase over the appraisal projection for 2009. The 2009 base year traffic of ANE indicated that light vehicles (pickups) accounts for 57.3%, buses 4.9% and trucks 30.0% and cars 7.8% of the vehicular traffic. Due to the lack of consistent trends, the 2009 traffic was considered as base year

traffic for the re-appraisal analysis. For the re-appraisal traffic forecast, the appraisal traffic growth rate for the different vehicles type, generated and diverted traffic have been considered. Diverted traffic from other parts of the network are due to the Litunde-Lichinga rehabilitation /high level bridge works which enabled all year transistability of the corridor from Pemba to Lichinga.

9. Economic Benefits and Costs: The economic costs of the project include the construction costs, routine and periodic maintenance costs, and construction supervision, audit, as well as contingency costs. The financial cost of these components of cost have been adjusted to economic cost using the Standard Conversion Factor (SCF) of 0.78, which was also used during the appraisal and other studies conducted for ANE. The estimated economic capital investment cost is estimated at USD158.15million compared to USD87.16million at appraisal, resulting an increase of overall cost by 81%.
10. As explained above, the base year traffic has increased by 10.69% and projected to increase in the range of between 5.1 to 8.8% annually for the different vehicle categories with diverted and generated traffic of 30 to 40% from higher base figure. During the re-appraisal, the VOC and travel time savings are US\$14.76million in year 2013, when the road opens to traffic, with an over all annual average saving of US\$18.6million during the 20 years project life.
11. The viability of the project has been reassessed again, considering the prevailing construction cost (bid/ tender quotation). The Highway Development and Management Model (HDM-IV) inputs have been updated. The result of the comparison of quantifiable project benefits and costs during the design life of 20-years of the project, in “with” and “without” project scenario, yields the Economic Internal Rate of Returns (EIRR) of 14.2% for the whole project and Net Present Value (NPV) of USD31.24million. It is therefore concluded that the investment in the entire project road is viable and appropriate. The EIRR and the NPV for the three lots as well as the entire route at appraisal and during the re-appraisal are summarized in the table below.

#### Summary of Economic Analysis

LOTS	APPRAISAL		RE - APPRAISAL	
	Economic Cost (USD million)	EIRR (%)	Economic Cost (USD million)	EIRR (%)
A – Montepuez – Balama	17.50	20.02	29.78	15.9
- Balama - Ruaca	26.24	18.53	44.67	13.5
B – Ruaca – Marrupa	22.03	9.0	42.84	5.7
C – Litunde-Lichinga /bridges works	21.39	27.0	40.87	22.1
<b>Total</b>	<b>87.16</b>	<b>19.6</b>	<b>158.16</b>	<b>14.2</b>

12. The main project benefits taken into account in the analysis include road user benefits consisting of: mainly Vehicle Operating Cost (VOC) savings, time savings accruing to road users from normal and generated traffic on the project road; maintenance cost savings and salvage value of 20% at end of project life. The re-appraisal analysis for the entire road project shows substantial savings in VOC due to updated VOC input data in the HDM-IV, which has higher oil and lubricants as major inputs that affect both the road construction cost, the Vehicle Operating Cost (VOC) and Maintenance cost, which are sensitive to the price of these products. The situation has resulted in increased VOC savings and economic benefits, and thereby off-setting partially the negative impact of the cost increase on the EIRR of the project. Thus, at appraisal the composite VOC savings per vehicle km was estimated at USD

0.443 / veh- km on the gravel road and reduced to USD 0.222 /veh-km when the project road is completed in 2010, resulting in VOC savings of USD 0.221/veh-km. But at re-appraisal, the composite VOCs / veh-km on the existing poor gravel road has increased to US\$ 0.630 in 2010 and expected to be reduced to US\$ 0.259 when the project road is completed and open to traffic in 2013, leading to VOC savings USD0.371/veh-km. This implies that although the overall project construction cost has increased by 81%, the project is still viable at a reduced EIRR of 14.2%, when compared with the appraisal estimate of EIRR of 19.6%. This has been compensated for by the doubling of VOC saving per veh-km.

13. The extension of the supplementary loan will enable the Government to complete the proposed road in the two northern most provinces of Niassa and Cabo Delgado, which will impact positively on the rural community through the generation of employment during project implementation and post-construction maintenance activities, improved accessibility to markets, schools, health centers and rural service centers. The road will also provide the communities in the zone of influence access to socio-economic services and markets in the major towns of Montepuez, Balama, Ruaca, Marrupa, Litunde and Lichinga. The project when completed will compliment the Pemba-Montepuez road (an earlier Bank’s intervention in the corridor) and the Litunde – Marrupa link (247km) completed with financing from SIDA. Furthermore the project road will contribute towards enhancing regional integration in SADC region. The Pemba- Lichinga road would eventually enable additional linkages to the Indian Ocean through Pemba Port to the landlocked countries of Malawi and Zambia.

#### Sensitivity Analysis

14. Test of sensitivity of the re- appraisal results on the base case EIRR of 14.2% to changes in assumptions on levels of construction costs and benefit indicate that the investment is viable. The sensitivity is calculated by increase of 10% in the construction costs, 10% reduction in traffic levels and worst case scenario of concurrently increasing cost and decreasing benefits by 10% each. In the worst case scenario, the EIRR is 12.3%, which is above the 12% opportunity cost of capital in Mozambique. The table below shows the sensitivity analysis for the entire project.

**Sensitivity Analysis (% EIRR)**

Variable	Total Project
Base case	14.2
10% cost increase	13.0
10% benefit reduction	13.4
10% cost increase and 10% benefit reduction	12.3

15. A switching value analysis was undertaken under the revised cost and traffic situation in addition to the sensitivity tests above; for capital investment costs and traffic levels (benefits) as part of the economic viability analysis. In this regard, it has been observed that the capital investment costs would have to increase by over 16.0% before the EIRR falls below 12.0% opportunity cost of capital for Mozambique. Similarly, benefits (traffic) can be reduced by a maximum of 19.1% with costs remaining the same and the project will still be viable. These are critical factors to watch, though the project is more sensitive to increase in cost.

**Switch Values for Construction Costs and Benefit for EIRR of 12.0% and NPV = 0**

Case	Switch values for Construction Cost & Benefit (EIRR of 12.0% and NPV = 0 USD million)
Construction Cost	16.0%
Road User Benefits	-19.1%

## Social and Exogenous Benefits

16. There are other social and exogenous benefits that cannot be quantified in monetary terms and hence have not been taken into account in the original as well as in the updated Economic Evaluation and thus the estimate of the EIRR value. The project is expected to influence an increase in agricultural productivity, for instance, maize production would increase from the current 0.9 tons per hectare to 1.5 tons with rain-fed systems and without fertilizer due to linking of producers to markets and easy access to inputs. However increase in productivity to above 1.5 tons per hectare for maize would require complementary investments in agricultural extension services to enable use of improved techniques, use of fertilizers and this would be further boosted with investment in irrigation schemes which are possible but not taken account of in generated traffic. Thus with complimentary investments in agriculture, generated traffic will increase considerably than what has been taken into account in the updated economic analysis.
17. Similarly, the project once completed will improve delivery of health services to the rural communities with complementary investments in basic primary health systems due to access made possible by the project road. It is expected that maternal mortality would reduce by improving all forms of obstetric care in the zone of influence which is currently very high compared to national average. The project road would also improve delivery of education services. The internal efficiencies of the system would improve resulting in an increase in completion rates especially that of girls in EP1, with complementary activities. The project would also bring in other positive externalities including creation of direct and indirect employment opportunities during execution and after. It would add value to the natural resource endowment of the area including mining, forestry and wildlife tourism. The exogenous benefits not quantified in monetary terms are judged to be overwhelmingly positive with respect to poverty alleviation and in meeting the PARPA II goals and the MDGs.
18. It is to be mentioned that the Government is currently undertaking a major agricultural development initiative in the subject Districts with the assistance of Donors, which aims at improving agricultural productivity in general, and providing technical and financial support to small farmers and SMEs in particular. This initiative will further accelerate the achievement of the above mentioned social and exogenous benefits.

# H D M - 4 Economic Analysis Summary

Study Name: 2010 Total L-M projects

HIGHWAY DEVELOPMENT & MANAGEMENT

Run Date: 29-08-2010

This report shows total economic benefits using the following:

Currency: US Dollar (millions).

Discount rate: 12.00%.

Analysis Mode: Analysis-by-Project

Alternative: Improvement options vs Alternative: Base case

	Increase in Road Agency Costs			Savings in	Savings in	Savings in	Reduction	Net	Net
	Capital	Recurrent	Special	MT VOC	MT Travel	NMT Travel	in Accident	Exogenous	Economic
					Time Costs	& Operating	Costs	Benefits	Benefits
						Costs			(NPV)
Undiscounted	158.16	-0.10	0.00	557.74	150.49	0.00	0.00	0.00	550.17
Discounted	152.22	-0.27	0.00	145.95	37.24	0.00	0.00	0.00	31.24

Economic Internal Rate of Return (EIRR) = 14.2% (No. of solutions = 1)

HDM-4 Version 1.3

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