EUROPEAN COMMISSION

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Mid-term Evaluation of the World Bank administered road contracts: Red Light-Gbarnga, Gbarnga-Ganta-Guinea Border and Cotton Tree-Buchanan Harbour as part of the EC contribution to the Liberia Reconstruction Trust Fund (LRTF)

EDF contract no.: 2016/378863/1 of the Framework Contract

Final Report Volume I – Main Report

Client: Beneficiary Country: Liberia

April 2017

A project implemented by:

ECORYS

COWI




Authors:
Ben Gerritsen
Ron Allan

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The 10th European Development Fund National Indicative Programme
Specific Contract N°: 2016/378863/1

Client: Beneficiary Country: Liberia

Framework Contract Beneficiary 2013 EuropeAid/132633/C/SER/multi
Lot N° 2: Transport and Infrastructure

Ben Gerritsen
Ron Allan

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Executive Summary

In accordance with the Project Cycle Management, the Government of Liberia and the European Union decided to undertake a Mid-term Evaluation of the EC Support to the Liberia Reconstruction Trust Fund (LRTF). The Financing Decision was taken on the 20th of October 2009 and the Financing Agreement (FA) became effective after the signing of the Administration Agreement (AA) with the World Bank by the DEU in Liberia on the 23rd of September 2010.

The Liberia Reconstruction Trust Fund was established in 2007 and is managed by the International Development Association (IDA) on behalf of the Government of Liberia (GoL).

The overall objective is to contribute to inclusive economic growth and poverty reduction in line with the Liberian Poverty Reduction Strategy (PRS), through fostering LRTF coordinated planning of infrastructure reconstruction (specific objective).

Although not specifically earmarked, the EC contribution to the LRTF programme was seen crucial for the rehabilitation of two of Liberia's most important primary roads, i.e. Monrovia-Gbarnga-Ganta-Guinea border and Cotton Tree-Buchanan Harbour.

In the Financing Agreement it is stated that the programme aims to achieve the following result:

- *The rehabilitation and maintenance of at least one section of the two primary roads.*

The Mid-term Evaluation involved a fact finding mission and an analysis of the implementation of the programme in accordance with the five DAC-OECD Evaluation Criteria which are: Relevance, Efficiency, Effectiveness, Impact and Sustainability and two EU-specific criteria: Coherence and EU value added.

RELEVANCE of the programme (and its design) to known needs

- The project has been consistent with, and supportive of, the policy and programme framework of the Government of Liberia (GoL), the GoL's Road Sector policy, the EC's Country Strategy Paper and the National Indicative Programme;
- Support to the LRTF is in line with current and on-going initiatives;
- The quality of the problem analysis and of the project's intervention logic and logical framework matrix are up to standard. The appropriateness of the objectively verifiable indicators should be expanded with traffic counts and impact indicators for household income and access to educational trips;
- The stated objectives correctly address the identified problems and the clarity and internal consistency of the stated objectives is correct;
- The recommended monitoring and evaluation arrangements are appropriate;
- The design service levels were discussed and agreed at a seminar in 2009 involving Government of Liberia's officials, Infrastructure Implementation Unit (IIU), and stakeholders. During the implementation phases the stakeholders participated through the Oversight Committee;

- The choice of the Output and Performance-based Road Construction (OPRC) format for tendering the works was driven by the urgency to tackle the problems, the limited capacity in the Ministry of Public Works (MPW) and in the contracting industry and an expected lower cost;
- The analysis of assumptions and risks has been a major driving factor in the choice for OPRC. This has worked out quite well.

EFFICIENCY of the programme's implementation

Operational work-planning, implementation and budget management:

The TNM Contract:

- The conceptual design and tender documents to be delivered by TNM were prepared with differing degrees of quality for the various deliverables but in general were acceptable;
- The pavement design was given for procurement comparison only and was changed on all three road sections after the contracts were awarded;
- An item that has not been developed well in the conceptual design stage was the preparation and execution of the Resettlement Action Plan (RAP). It should have been left completely outside the project cycle. Due to financial constraints and the Ebola crises this activity resulted in claims up to USD 15 million.

The OPRC Contract Lot 1: Red Light-Gbarnga:

- The implementation of the rehabilitation works was scheduled over a period of 36 months but due to the problems with the RAP, Ebola Virus Disease (EVD) and slow progress of the CE in the first year there was a delay of 20 months;
- The quality of the works executed in the Rehabilitation Works phase is considered as reasonable/good;
- A major landslide occurred in September 2015 but a decision on how to proceed still has to be taken. The estimated cost is USD 1 million to solve this problem;
- Compliance with the Environmental Management Plan was considered poor;
- The start of the Routine Maintenance Phase is cumbersome. Non-conformance with the required Levels of Services (LoS) was excessive;
- Total amount of claims related to the Rehabilitation Phase only stands at USD 10,953,805 approximately;
- No provision was made for contingencies within the contract, but according to the World Bank they are included in the LIBRAMP Program.

The OPRC Contract Lot 2: Gbarnga-Ganta:

- Implementation of the rehabilitation works was scheduled over a period of 24 months but due to the problems with the RAP and EVD there was a delay of 10 months;
- The quality of the works executed in the Rehabilitation Works phase is considered to be good and the Routine Maintenance phase is developing well;
- Traffic Safety is a major concern on the roads. Initiatives are well underway to tackle this issue in a more structured way;
- The total amount of claims, related to the Rehabilitation Phase only, stands at USD 4,822,380 approximately but these claims can be covered from the contingencies within the contract.

The Cotton Tree-Buchanan Harbour road:

- The first two sections of this road from Cotton Tree to Bokay Town and Bokay Town to Compound 1 were executed before the EU started contributing to the LRTF. The last section

from Compound 1 to Buchanan Port started on the 6th of May 2011 and the rehabilitation works were completed on the 4th of June 2013;
- The quality of the Rehabilitation Works is generally speaking good and the road is holding well, 3.5 years after completion;
- The project was not affected by RAP or EVD problems and completed on time and within the available budget;
- Contrary to Lots 1 and 2, no maintenance phase was included in the contract. Instead, the EU and DFID have agreed to fund the routine + emergency maintenance works for a 5-year period.

The Monitoring Consultants:
- Lot 1 Red Light-Gbarnga is monitored by OPUS from New Zealand, IMC Worldwide monitors Lot 2 Gbarnga-Ganta-Guinea Border and the consultants from EGIS monitored the Cotton Tree-Buchanan Harbour;
- All consultants have performed well and reporting is up to the required standards.

Relations and co-ordination with local authorities and beneficiaries:

The relations and coordination with the local authorities and beneficiaries went well and no serious problems arose, apart from some opposition in the RAP process and damage supposed to be related directly to rock blasting at the quarry site in Weala.

Quality of information management and reporting:
- Information to the donor community is structured along the lines as set out in the Administration Agreement between the World Bank (WB) and the donors. All donors can obtain further detailed financial information through the World Bank Client Portal however, but this is hardly used by any of the donors;
- Information on project level from the CE and MC is well organized and strictly followed. Monthly progress reports (financial and physical) are produced, as well as special reports, if and when required. The quality of the reports is good and provides all the information required.

Respect of deadlines:
- The deadlines for the reporting activities to the donors are well respected. The deadlines for the implementation of the works contracts vary: Lot 1 experienced a severe delay of 20 months and Lot 2 a delay of 10 months. The Cotton Tree-Buchanan road was completed on time;
- The Administration Agreement between the WB and the EU has to be extended in order to avoid cancellation of funds undisbursed within the current duration of the present Administration Agreement. The End Disbursement Date stands now at the 31st of December 2020 but might have to be extended till mid 2014.

Justification of project costs in comparison with similar projects or known alternative approaches:

GoL did things right, but did GoL do the right things? If the objective is to provide access to all, the GoL should look into the possibility of funding the road from Buchanan to Pleebo, connecting the coastal counties Grand Basse, River Cess, Sinoe, Grand Kru and Maryland, thereby using alternative approaches like minimal intervention solutions.

Cost effectiveness of the used OPRC model for the construction and the maintenance phases:
- The Prices for Lot 2 (and for Lot 1) are reasonable and in relation to the required and delivered output for the rehabilitation stage and upcoming maintenance phases;
- This does not, however, imply that the chosen OPRC concept is the most cost effective solution. It is also possible to have a hybrid FIDIC or EU contract whereby the Rehabilitation

works are paid on Unit costs and the Maintenance phase(s) are on a lump sum basis (see for example in Zambia). Also it is possible to split the contract into separate contracts for the rehabilitation (by larger contractors) and for maintenance (by smaller contractors).

Comparison Cost effectiveness Routine Maintenance Red Light-Ganta and Cotton Tree-Buchanan roads:

- The total cost for Lot 2 Gbarnga-Ganta routine maintenance + Emergency Works + supervision = USD 4,514 + USD 5,922 = USD 10,436 per km/year;
- The total cost for Cotton Tree-Buchanan routine maintenance + Emergency Works + supervision = USD 1,887 + USD 160 = USD 2.047 per km/year, or just 20% of the cost of Lot 2.

Possibilities of upgrading/rehabilitating roads using minimum interventions (single/double surface treatments):

The methodology as proposed by AIC Progetti is very good for Low Volume Sealed Roads, but applying this methodology on all sections of the Buchanan-Greenville-Barclayville-Pleebo road is not possible. It is estimated that the average cost for the whole road with this methodology would be USD 275,000 to USD 325,000 per km.

GoL's contributions:

Up to now, the Government of Liberia has contributed zero to the project. In 2014 there was deferment of payment because of the Ebola outbreak, which had a severe impact on the National Budget. As at the 31st of December 2016, the amount due has risen already to more than USD 23 million. This threatens the sustainability of the LIBRAMP program. The Minister of Works has assured the participants of the presentation meeting that the Ministry of Finance will make available the necessary funds in time.

Technical Assistance:

The quality of the services delivered is rated as good, but special attention should be given to the coordination of the Technical Support Group (TSG) activities with the GIZ/Gopa team in order to avoid overlap in the field of Institutional Reforms.

Quality of monitoring:

The project has an active LogFrame and Project Development Objectives (PDOs) are being collected. In addition there are numerous reports required from the MCs and CEs, ranging from activities being carried out, accidents, IRIs, environmental performance etc. However, there is no existing framework for Monitoring and Evaluation (M&E) that would collect all the information and systematically synthesize and distribute it in an effective manner.

Any un-planned outputs from activities so far:

There are two un-planned outputs that need urgent action:

Return to the Right of Way (ROW):

The encroachment of the RoW is more and more a problem. For Lot 1 Red Light-Gbarnga alone, there are now 515 structures encroaching into the RoW, and they are steadily increasing in number.

Road safety:

The severity of road accidents is worsening along the corridor. A task force has been established comprising MPW, CE and MC and the Liberia National Police (LNP) to better enforce traffic safety issues.

A Traffic Safety Analysis has been conducted for Lots 1 and 2. This included an analysis of accidents prior, during and after rehabilitation of the road. The results of this study became available in February 2017 and the recommendations will be implemented.

Financial Performance:

The LIBRAMP project faces the following financial challenges:

- The budgeted project contingency will be soon exhausted and this threatens the Program's sustainability;
- If planned contracts are to be realized:
  - Project budget will be exceeded by at least USD 5 million;
  - RAP (SD Cooper and ELWA Intersection) might cost another USD 3 million.
- The biggest threat of all is the missing GoL Counterpart funding. Out of the planned USD 72.8 million, USD 22.3 million is already past due. The following options for the Government of Liberia are under consideration:
- GoL may lack fiscal space to fulfil the following obligations in a timely and orderly manner: Loss due erosion in SDRs value (USD 10 million?):
  - Funds for remaining RAP (USD 3 million?);
  - Settle outstanding contractual claims (USD 3 million with interest);
  - Significant counterpart funding pending (USD 72.8million);
  - Significant risk to the project to run out of funds before the end of the project (2021?).
- Three options may be available to the government:
  - Keep project components intact and secure additional financing to cover all claims and RAP (about US$8+ million);
  - Drop one of the project components; namely rehabilitation of SD Cooper road to Coca Cola Factory;
  - In addition to option (a) or (b), to part cover the original counterpart funds, secure additional financing from IDA or LRTF or both.

The amount for Administrative fees and expenses withheld should explain by the World Bank.

EFFECTIVENESS of the programme at generating benefits:

Extent to which the Project Objectives have been achieved:

- The overall objective, namely to foster national integration and economic recovery by improving transportation, has been fulfilled. The result sought from the project was for one main axis road to be rehabilitated. This was fulfilled twice over;
- The project roads have improved the quality of life for those living near the road through better access to services. Regional integration is enhanced because the improved road extends to the Guinea border and benefits Cote d'Ivoire traffic entering Nimba and proceeding to Monrovia.

Economic re-evaluation of Lot 2:

- The TNM study estimated a 30%pa economic internal rate of return (EIRR) for Lot 2. The economic re-evaluations use the HDM4 vehicle operating cost (VOC) model to estimate savings arising from the programme;
- The re-evaluation supports TNM's findings. The new EIRR of 35%pa is very close to the TNM value of 30%pa, even though there are differences in assumptions. If allowance is made for a 20% drop in traffic during the six-month wet season the EIRR falls to 29%pa.

IMPACT of the programme in a wider context

- The planned benefits listed in the section on Relevance were realised and that they benefitted the expected beneficiaries. There is, however, an unplanned disbenefit: a marked increase in serious road accidents;
- Following completion of the rehabilitation phase on Lots 1 and 2, there have been many more accidents on the corridor— 55 fatalities during January-November 2016;
- A report has been prepared by the deputy team leader of Lot 1 who is a road safety specialist. This report will recommends what should be done;
- A proposed "dry port" in the vicinity of Ganta may provide unplanned benefits that could not have been anticipated at the time of project preparation. The dry port would not be viable without the road improvement from Red Light to Ganta.

SUSTAINABILITY of the programme's benefits

Ownership of objectives and achievements:

To the extent that the concept of 'ownership' can apply in circumstances when stakeholders have only indirect influence, the fact that greatly reduced travel time is highly valued by road users and the catchment population is evidence of 'ownership' of the project.

Policy support:

- The project was formulated by GoL and LRTF donors agreed to its implementation and assisted with funding, thereby demonstrating the concurrence of donor and national policies;
- GoL support is evidenced by road sector reforms being implemented. The National Road Fund Act 2016 was passed in December. Road user charges will be collected as from the financial year commencing July 2017. The Road Fund will support maintenance of the project roads when the contracts currently maintaining them expire in a few years.

Capacity to preserve the Roads:

Institutional capacity to take over the project roads is weak. To an extent this is a consequence of lack of funds for road maintenance. This lack of funding has recently been addressed by establishing the Road Fund and road user charges will be collected from July 2017. The government will need to build on this positive start by progressively incrementing the road user charges so that the core road network is preserved.

Budget:

- None of GoL's contribution of USD 72.8 million has been forthcoming. Extenuating circumstances, namely the Ebola crisis and a fall in commodity prices, are blamed. There was good reason why GoL did not have funds to contribute to the LRTF but conditions have

improved over the last year and GoL may now be in a position to commence making its contributions;
- To date, payments to contractors have not been affected by GoL's lack of contributions. Donors' contributions will eventually be exhausted however, and without GoL contributing the contractors cannot be paid. The World Bank is seeking additional funding with a view to reducing the GoL's liability to USD 40-50 million.

Axle load control:
- Sustainability of project benefits depends on preservation of the subject roads. Road preservation depends on road maintenance and on control of truck overloading;
- As yet there is no enforcement of the axle load regulations by the Ministry of Transport, and nothing is planned;
- Axle load enforcement should be phased in. In the first phase only warning notices should be issued. Once the trucking industry understands what it means to be overweight the surveillance turns to enforcement, by imposition of fines;
- Since traffic levels are below the TNM forecasts, compensation for unforeseen pavement wear might not have been an issue since it would be logical to conclude that pavement loadings are less, not more, than expected: logical, but wrong;
- Even though the numbers of trucks are much less than was assumed for pavement design, ESALs/truck assumed by TNM were far too low. The actual number of ESALs will far exceed the design ESALs, making it necessary to survey ESALs passing over the Lot 1 and Lot 2 roads;
- This still leaves unresolved just what cost is to be compensated. The pavement is designed for 20 years and handed over at 10 years, with a fresh overlay. The pavement will likely be in good condition and the ESAL/truck discrepancy will not impact the contractor. This risk is borne by the government, as owner of the roads.

COHERENCE of the programme with other (EU) objectives

Through the support to the LRTF:
- The results and impacts have mutually reinforced one another;
- The results and impacts have not been duplicated or conflicted with one another;
- The results have contributed to EC policies;
- The results are in line with evolving strategies of the EC and its partners.

EU VALUE-ADDED and synergy with initiatives of EU member states

- The support to the LRTF is complementary to the interventions of EU member states in the country and is well coordinated via the Oversight Committee;
- There is no overlap in the activities in the infrastructure sector;
- The visibility of the European Union in this project was poor. On demand of the DEU the visibility on the Buchanan road was slightly improved. The MPW has made sure contractors put up road signs with donor logos etc.;
- The EU has engaged a consultant who evaluated the visibility actions taken in the LRTF and made recommendations for the remainder of the programme.

CONCLUSIONS

Based on documents studied, people interviewed and site visits, the Evaluators have drawn the following conclusions:

a. The relevance of the projects funded under the LRTF and subject to this evaluation was high;
b. The efficiency of the LRTF as a funding mechanism is rated good;
c. The execution of the RAP was very poor due to underfunding and resulted in high claims that will have to borne in the end by the Government itself;
d. The efficiency of the implementation of the three OPRC contracts was good; value for money was received;
e. The OPRC methodology in itself is good, but hampered severely by:
    - a lack of understanding by most stakeholders of the Asset Management concept; and
    - contract documents that have to be modified considerably.
f. The OPRC projects were cheaper than comparable traditional FIDIC works contracts recently tendered in Liberia and the region;
g. The cost for Routine Maintenance + Emergency Works of Lot 1 and 2 are considerably higher than Buchanan road due to higher estimates for emergency works and the supervision costs.

RECOMMENDATIONS

The following recommendations are offered for consideration:

a. Preparation of conceptual designs has to be improved. It should be less input-driven and more in line with real Design, Build, Operate, Maintain and Transfer principles. The conceptual design should not be for procurement comparison only;
b. Funds for the RAP have to be secured before a contract is signed and should be left out of the project cycle. The costs of the RAP include transfer of land from Liberia (private owners) to Liberia (the Government). It is not appropriate for donors to “pay” for this transfer, but they can pay for the effort to accomplish this;
c. The quality of the tender documents should be improved. During the Lessons Learned session valuable suggestions were given and these should be introduced in new OPRC contracts (S.D. Cooper Road);
d. Employment creation through local contractors in maintenance phases has to be promoted, thereby making sure that the sub-contractors comply with the regulations of the Liberian Labour Law, including the payment of minimum wages. The main CE is still responsible for his sub-contractors compliance with the laws of the country;
e. The funding for the remaining part of the LIBRAMP project has to be secured, especially the possible defaulting of the GoL on their contribution of USD 72.8 million;
f. Look at the possibilities for the minimal intervention solution for sealing. This can be done in stages:
    - Firstly, fix the notorious black spots in the country, that block traffic every rainy season, by paving them;
    - Secondly, make a selection of the minimal intervention solution and prioritize the roads that qualify for this intervention;
    - Thirdly, seek funding from the 40% of funds for capital works from the Road Fund.
g. Traffic safety should be the top priority and recommendations made by the Road Safety advisor of Lot 1 should be implemented;
h. The future of the LRTF is given in Volume II-Annex 2. Given the fact that almost all resources of the LRTF are already disbursed/committed, it is unlikely that in the near future new road

projects can be co-funded. Maybe the LRTF should develop an exit strategy, rather than embarking on costly new road projects;

i. The recommendations of the Report on Visibility should be implemented. Special attention should be given to readability of signs.

Abbreviations and acronyms

AA	Administration Agreement
AASHTO	American Association of State Highway and Transportation Officials
AC	Asphalt Concrete
AfDB	African Development Bank
ACP	African, Caribbean and Pacific countries
BOQ	Bill Of Quantities
CBA	Cost-Benefit Analysis
CE	Contracting Entity
CBO	Community Based Organisation
DANIDA	Danish International Development Agency
DCP	Dynamic Cone Penetrometer
DEU	Delegation of the European Union
DFID	Department for International Development (UK)
EDF	European Development Fund
EMUS	Emergency Monrovia Urban Sanitation
EU	European Union
EUR	Euro
EVD	Ebola Virus Disease
FA	Financing Agreement
FIDIC	Fédération International des Ingénieurs Conseils
FWD	Falling Weight Deflectometer
GVM	Gross Vehicle Mass
GoL	Government of Liberia
h	hour
HDM4	Highway Design and Maintenance Model version 4
IIU	Infrastructure Implementation Unit
IRI	International Roughness Index
KfW	Kreditanstalt für Wiederaufbau
km	Kilometre
LIBRAMP	Liberia Road Asset Management Project
LICUS	Low Income Countries Under Stress (WB)
LRD, L$	Liberian Dollar
LRTF	Liberia Reconstruction Trust Fund
LVSR	Low Volume Sealed Road
M&E	Monitoring and Evaluation
MC	Monitoring Consultants
MFDP	Ministry of Finance and Development Planning
MPW	Ministry of Public Works Liberia
MTR	Mid Term Review
NAO	National Authorizing Officer
NIP	National Indicative Programme
OC	Oversight Committee
OO	Overall Objective
OPRC	Output and Performance-based Road Contract
PDO	Project Development Objective

PP	Project Purpose
RAP	Resettlement Action Plan
RE	Resident Engineer
RoW	Right of Way
t	tonne
ToR	Terms of Reference
TSG	Technical Support Group
TST	Technical Support Team
URIRP	Urban and Rural Infrastructure Rehabilitation Programme
USD, US$ or $	United States dollar
VOC	Vehicle Operating Cost
VPCS	Visual Pavement Condition Survey
WB	World Bank

1 Programme context

On the 20th of October 2009 the Commission of the European Communities approved the Support to the Liberia Reconstruction Trust Fund (LRTF) for a total amount of €60,200,000 to be financed from the 10th European Development Fund. The actual start date for the EU was the 23rd of September 2010, when the Administration Agreement (AA) between the EU and the World Bank was signed. Under this AA the World Bank is charged with the administration of the EU grant to the LRTF.

The Overall Objective (OO) is: Fostering the LRTF's coordinated planning of infrastructure reconstruction and agriculture revitalisation in support of Liberia's Poverty Reduction Strategy. The Project Purpose (PP) is:

a. Improving the quality of life of people by providing greater access to markets, employment opportunities and social services and helping Liberia achieve its Millennium Development Goals (MDG) 1, 2, 4 and 5 targets; and
b. Supporting the use of Output and Performance Based Contracts (OPRC) for the long-term maintenance of the primary road network.

Up to now the LRTF is co-funding the following main projects/programmes:

- Emergency Monrovia Urban Sanitation Project (EMUS);
- Urban and Rural Infrastructure Rehabilitation Programme (URIRP);
- Liberia Road Asset Management Project (LIBRAMP);
- LRTF Administration and Projects Preparation and Supervision.

Given the fact that the LRTF is a multiple-donor trust fund, the EU contribution could not be earmarked clearly to specific projects/contracts. However, it was agreed that the major focus of the EU funding would be the following three road projects and one sanitation project:

- Under the Urban and Rural Infrastructure Rehabilitation Programme (URIRP) the road from Cotton Tree to Buchanan Harbour;
- Under the Liberia Road Asset Management Project (LIBRAMP) the roads from Red Light to Gbarnga and Gbarnga to Ganta/Guinea Border;
- Under the Emergency Monrovia Urban Sanitation (EMUS) Project the garbage collection and disposal in Monrovia.

On the request of the DEU and as stated in the ToR, in this report only the three road projects will be evaluated.

The construction phase of the three road sections has finished in October 2016, leaving only the 8-year maintenance period of the roads Red Light-Gbarnga and Gbarnga-Ganta-Guinea Border. For that reason the DEU has hired the consultancy consortium COWI/Ecorys to conduct the “Mid-Term Evaluation of the World Bank administered contracts: Red Light-Gbarnga, Gbarnga-Ganta and the Cotton Tree-Buchanan roads as part of the Liberia Reconstruction Trust Fund (LRTF)”. The contract was signed on the 14th of November 2016.

The Evaluation Team comprised of:

- Mr Ben A.M. Gerritsen, Team Leader / M&E Specialist;
- Dr Ron Allan, Transport Economist.

The list of persons contacted is given in Annex 3, the documents studied in Annex 4 and the Terms of Reference for this evaluation in Annex 5 of Volume II – Annexes.

2 Programme description

2.1 Overall Objective

The objective of the LRTF is to provide a vehicle for donors to pool resources to support the Government of Liberia in improving its basic infrastructure, aiming at: (a) improving the enabling environment to increase economic growth; (b) allowing increased access to basic services; and (c) building government capacity to plan and manage development projects.

2.2 Specific Objective

No specific objective was defined in the documents.

2.3 Expected Results and Main Activities

The description of the Expected Results and Main Activities was very vague. The document says only:

The programme aims to achieve the following result:

Rehabilitation and maintenance of at least one section of the two primary roads.

This was all what was required for obtaining a grant of € 60,000,000!

With the money the LRTF co-financed the following projects/programs:

1. Emergency Monrovia Urban Sanitation Project (EMUS);
2. Urban and Rural Infrastructure Rehabilitation Programme (URIRP);
3. Liberia Road Asset Management Project (LIBRAMP);
4. LRTF Administration and Projects Preparation and Supervision.

The two primary roads as referred to above are:

- Under 2 URIRP the road Cotton Tree-Buchanan Harbour;
- Under 3 LIBRAMP the road sections Red Light-Gbarnga and Gbarnga-Ganta.

2.4 Planned Program Activities and Budget

Below in Table 1, a breakdown is given of the planned activities and budget as per 30 September 2016:

- The Donor Contributions;
- The Project Commitments;
- The Project Disbursements;
- The total LRTF Administration and Project Preparation and Supervision Costs.

In Volume II – Annex 2 LRTF Strategy version 8 a description is given of a possible direction in which the LRTF could be heading. It consists of the funding of the road sections:

- Ganta-Saclepea, length 38 km, estimated cost USD 40 million;

- Saclepea-Tappita, length 63 km, estimated cost USD 60 million;
- Tappita-Zwedru, length 120 km, estimated cost USD 120 million.

These road sections are part of the South-eastern corridor between Ganta and Harper. The other part from Zwedru to Harper is "claimed" by the African Development Bank and the sections Fish Town-Karloken and Karloken-Harper are already under construction.

Furthermore the construction of a new landfill site in Cheesemanburg as part of the EMUS urban sanitation project is foreseen. The estimated cost for this new landfill site is USD 20 million.

Table 1 Planned project activities and budget

Source: LRTF Financial Report as of Sept. 30, 2016

Contributions	
Received Cash Contributions	196,226,384.27
Investment Income	3,941,029.82
Total Receipts (Note 1)	***200,167,414.09***
Approx.Future Cash Contributions as per Administration Agreements to was signed ***(Note 2)***	***11,000,000.00***
Total LRTF (Approximately)	***211,167,414.09***
Project Commitments	
EMUS	-18,400,000.00
EMUS AF	-7,000,000.00
URIRP (fully disbursed)	-9,200,000.00
URIRP II AF	-27,000,000.00
URIRP III AF	-9,400.00
LIBRAMP	-108,900,000.00
Total project commitments	***-179,900,000.00***
Project Disbursements	
EMUS	-17,959,054.63
EMUS AF	-7,000,000.00
URIRP (fully disbursed)	-9,200,000.00
URIRP II AF	-25,016,280.32
URIRP III AF	-7,463,686.81
LIBRAMP	-73,821,657.69
Total project disbursements to date	***-140,460,679.45***
LRTF Administration and Projects Preparation and Supervision Costs	
LRTF Administration	-843,348.00
Total Non-Project Disbursement – Admin Fee ***(Note3)***	-2,775,611.00
EMUS Appraisal and Supervision	-1,096,684.00
URIRP I and II Supervision	-368,992.00
LIBRAMP Supervision	-1,116.00
Total Admin Costs	***-5,085,751.00***
Available amount for future commitments (Note 4)	***14,302,990.98***

(Note 1): This amount includes all donor contributions to date plus investment income (US$3,742,173.60).

(Note 2): This amount represents the Euro 10 million per addendum administration agreement with KfW which was signed on January 18, 2016. .

(Note 3): This includes the Administration Cost Recovery Fee, as per the Administration Agreements, Annex 2 and paragraph 3.

(Note 4): The exact amount of available for new project commitments is confirmed by the WB's Trust Fund Accounting team approximately six weeks before Board/RVP project presentation.

3 Appreciation of the task

The Consultant evaluated the Terms of Reference carefully and found them detailed and comprehensive. The discussions held with relevant staff of the Delegation of the European Union (DEU) in Monrovia and the documents reviewed have further clarified elements of the considered assignments.

The Consultant's appreciation and certain detailed comments and remarks on the ToR are discussed hereafter:

1. At times there was confusion amongst the stakeholders (and also the evaluators themselves) on the level of detail to which the evaluators were supposed to go. The perception of many stakeholders was that this is a Mid-term Evaluation of the EU support to the LRTF and should not directly be an evaluation of some of the projects co-funded from LRTF sources. The World Bank itself carried out a Mid-term Evaluation of the two projects under the LIBRAMP program and a Technical Audit of the rehabilitation works on the Red Light-Gbarnga-Ganta road works is in the pipeline. Nevertheless, the level of cooperation of all stakeholders, especially staff of the IIU/MPW, PFMU, WB and Monitoring Consultants was optimal. Interviews were given in a very open atmosphere and all documentation requested was compiled and submitted in due time;
2. During the kick-off meeting with the DEU a new item was brought in that had no direct relation to the evaluation of EU support to the LRTF. The EU Delegation in Monrovia asked the evaluators to comment on a paper prepared by the consultants of AIC Progetti concerning the possibilities of rehabilitating and/or upgrading roads using minimum interventions like single or double surface treatments, in particular for the road Buchanan-Greenville-Barclayville-Pleebo. They prepared this paper within the framework of the EU-funded feasibility study for the Coastal Corridor. Also the results of another EU-funded on-going study "Optimizing gravel road maintenance in Liberia's extreme climate conditions – an applied research", executed by IMC Worldwide had to be taken into consideration. The evaluators have coordinated the outcome of these two studies and given their comments under Par. 7.8 of this report.

4 Work content

The Terms of Reference stipulate that the programme should be evaluated according to the seven criteria of Relevance, Efficiency, Effectiveness, Impact, Sustainability, Coherence and EU Value Added. The terms of reference helpfully list, in generic terms, items to be covered under each criterion. These items have been interpreted for the particular case of the design, construction and monitoring of the following roads:

- Red Light-Gbarnga (Design, build, operate, maintain and transfer);
- Gbarna-Ganta0Guinea Border (Design, build, operate, maintain and transfer);
- Cotton Tree-Buchanan Harbour (Design, build and transfer).

The criteria are expressed more fully as follows:

- RELEVANCE of the project (and its design) to known needs;
- EFFICIENCY of the project's implementation;
- EFFECTIVENESS of the project at generating benefits;
- IMPACT of the project in a wider context;
- SUSTAINABILITY of the project's benefits;
- COHERENCE of the project with other (EU) objectives;
- EU VALUE-ADDED and synergy with initiatives of EU member states.

The Consultant's team has evaluated the programme under the headings set out above.

5 Project components

Below a description is given of the project components that have been evaluated:

5.1 Conceptual designs and preparation of tender documents for "Red Light-Gbarnga-Ganta-Guinea Border" and "Cotton Tree-Buchanan" roads by TNM

On the 5th of October 2008 the contract "Consultancy Services for Conceptual Designs and Preparation of Tender Documents for Red Light – Gate 15 – Gbarnga – Ganta – Guinea Border and Cotton Tree to Buchanan" was signed between the MPW-IIU in Monrovia and the Consultant TNM Technology and Management Ltd. (in collaboration with TNM Engineering & Research Ltd. and TASC Tel Aviv Strategic Consulting Ltd). The original contract amount was US$ 1,706,107.00 and the WB Project ID was P104716.

The contract finished with submission of the required output on the 27th of April 2010.

5.1.1 Expected results

The expected result was a Final Report containing:

- The traffic level and forecast of the roads;
- Conceptual designs;
- Level of Service (LoS);
- Selection of engineering solution and road project civil works lots;
- Risk analysis and costing for the selected engineering alternative;
- Asset management structure involving the client, contractors and monitoring consultant;
- Cost estimates for the selected engineering alternative;
- Payment model (recovery model).

5.2 Works contract Red Light-Gbarnga (180.36 km)

The contract for this road section was signed with the contractor China Chongqing International Construction Corporation (CICO). The Contract Commencement Date was the 25th of January 2012 and the Revised Date of Completion (Maintenance) is the 26th of September 2023.

The contract entailed:

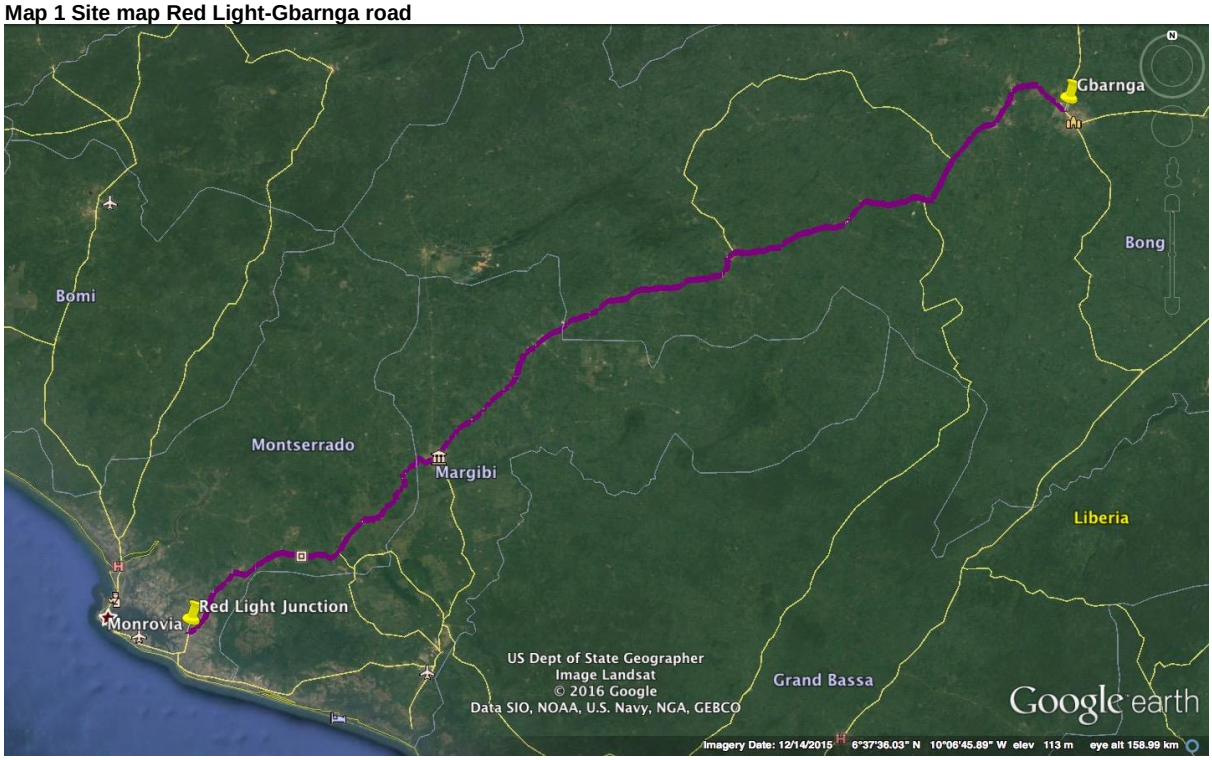
- Full rehabilitation of the road section Red Light-Gbarnga;
- Routine maintenance for a 7-year period;
- Periodic maintenance of the road by placing a new asphalt concrete overlay.

The original contract amounts were:

• Preparation of detailed designs and rehabilitation	US$ 92,016,629.00	55.4%
• Routine Maintenance	US$ 44,848,086.00	27.0%
• Periodic Maintenance	US$ 29,234,436.00	17.6%
• Sub-total	US$ 166,099,151.00	100.0%
• Provisional Sum (Emergency Works)	US$ 0.00	
• Provisional Sum (Price Contingencies)	US$ 0.00	
• Total	US$ 166,099,151.00	

Construction started in earnest at the start of the dry season towards the end of 2012. By the end of April 2014 the Monitoring Consultants OPUS left the site due to the Ebola outbreak and Force Majeure was declared in August 2014. The works reached a status of full re-mobilization in January 2015 and the rehabilitation works were completed on the 25th of September 2016. The maintenance period started on the 26th of September 2016 and will end on the 26th of September 2023.

Map 1 Site map Red Light-Gbarnga road



5.2.1 *Expected results*

The following main products, works and services were foreseen:

- The preparation of detailed designs;
- The rehabilitation of the road comprising of the following main components:
  - Asphalt pavement (binder and wearing course): 180.36 km;
  - Double Surface Treatment of shoulders: (180.36 km on either side of the carriageway);
  - Base course: 180.36 km;
  - Drainage (lined/earth): 180.36 km;
  - RC culverts:
    - Replace 2 bridges at Km 71+200 and Km 83+200;
    - Repair of handrails in Bridges;
    - Reflective painting for road marking lines (centre and sides).
- Routine maintenance of the road for a period of 7 years;
- Periodic Maintenance of the road by placing a new asphalt concrete overlay.

5.3 Works contract Gbarnga-Ganta-Guinea border (68.61 km)

The contract for this road section was signed with the contractor China Henan International Cooperation Group Co. Ltd (CHICO). The Contract Commencement Date was the 8th of May 2013 and the Revised Date of Completion (Maintenance) is the 7th of March 2024.

The contract entailed:

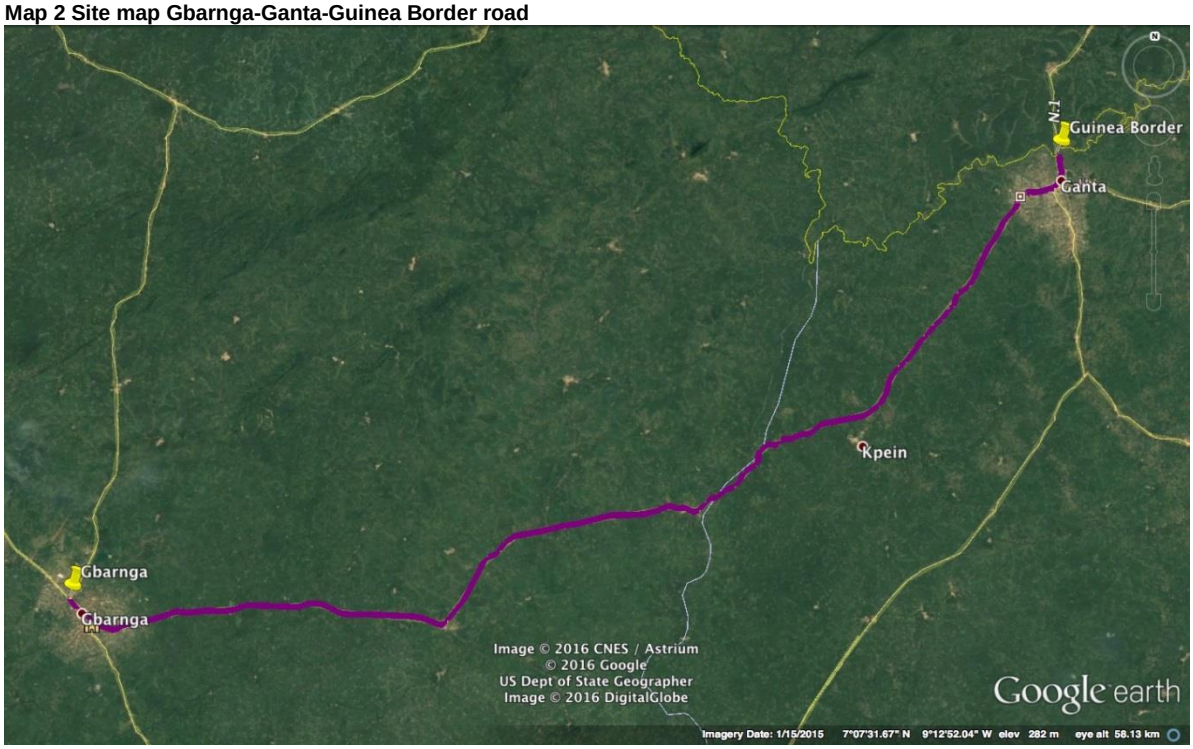
- Full rehabilitation of the road section Gbarnga-Ganta-Guinea Border;
- Routine maintenance for an 8-year period;
- Periodic maintenance of the road by placing new asphalt concrete overlay.

The original contract amounts were:

• Preparation of detailed designs and rehabilitation	US$ 31,452,711.99	52.1%
• Routine Maintenance	US$ 17,084,678.49	28.3%
• Periodic Maintenance	US$ 11,832,498.18	19.6%
• Sub-total	US$ 60,369,888,66	100.0%
• Provisional Sum (Emergency Works)	US$ 1,509,247.22	
• Provisional Sum (Price Contingencies)	US$ 9,055,483.30	
• Total	US$ 70,935,619.18	

Construction started in earnest at the start of the dry season towards the end of 2013. By the end of April 2014 the Monitoring Consultants IMC left the site due to the Ebola outbreak and Force Majeure was declared in August 2014. The works reached a status of full re-mobilization in January 2015 and the rehabilitation works were completed on the 7th of March 2016. The maintenance period started on the 8th of March 2016 and will end on the 7th of March 2024.

Map 2 Site map Gbarnga-Ganta-Guinea Border road



5.3.1 *Expected results*

The following main products, works and services were foreseen:

- The preparation of detailed designs;
- The construction of the road comprising of the following main components:
  - Asphalt pavement (binder and wearing course): 68.61 km;
  - Double Surface Treatment of shoulders: (68.61 km on either side of the carriageway);
  - Base course: 68.61 km;
  - Drainage (lined/earth): 68.61 km;
  - RC culverts:

- Replace bridge at Km 214+100;
- Repair of handrails in Bridge;
- Reflective painting for road marking lines (centre and sides).

- Routine maintenance of the road for a period of 8 years;
- Periodic Maintenance of the road by placing new asphalt concrete overlay.

5.4 Works contract Compound 1-Buchanan Harbour (56.54 km)

Under the Urban and Rural Infrastructure Rehabilitation Project (URIRP) the road from Cotton Tree to Buchanan was rehabilitated.

The contract entailed the full rehabilitation of this section of the road and the original contract amount was US$ 33,759,227.94. Contrary to the two sections from Red Light to Ganta, this road was Design and Build only and no maintenance period was included.

Construction started in earnest at the start of the dry season towards the end of 2011. The works reached a status of full mobilization in January 2012 and the rehabilitation works were completed in June 2013. The defects liability period expired in June 2014.

Map 3 Site map Cotton Tree-Buchanan Harbour road

5.4.1 Expected results

The following main products, works and services were foreseen:

- The preparation of detailed designs;
- The construction of the road comprising of the following main components:
  - Asphalt pavement (binder and wearing course): 56.54 km;
  - Double Surface Treatment of shoulders: (68.61 km on either side of the carriageway);
  - Base course: 56.54 km;
  - Drainage (lined/earth): 56.54 km;

- RC culverts:
- Construction of a new 130 m long bridge;
- Repair of handrails on Bridges;
- Reflective painting for road marking lines (centre and sides).

5.5 Monitoring Consultants OPUS, IMC and EGIS

The contracts for the project monitoring were, after tendering, awarded to respectively:

Table 2 List of Monitoring Consultants

Road section	Consultant	Start date	Revised tentative end date	Amount in USD
Red Light – Gbarnga	OPUS	11/04/2013	25/09/2023	8,278,417.00
Gbarnga-Ganta	IMC	17/02/2014	17/02/2024	5,165,625.00
Compound 1 - Buchanan	EGIS	01/08/2011	15/06/2014	1,173,208.47

5.5.1 Expected results

The following main services are foreseen:

- The review and approval of the detailed designs prepared by Contracting Entity;
- The monitoring of the construction of the roads;
- For the roads Red Light-Gbarnga and Gbarnga-Ganta Guinea Border the monitoring of the routine maintenance and the periodic maintenance activities.

6 Relevance of the programme (and its design) to known needs

6.1 Consistency with, and support for, GoL's Road Sector policy and EC's Country Strategy and National Indicative Programme

The project was initiated under the 10th EDF 2008-13. The National Indicative Program (NIP) for Liberia totalled EUR 150 million of which EUR 125 million was for infrastructure administered through co-financing/pool funding. The Government and donors duly established a multi-donor infrastructure trust fund, the LRTF, as the main co-financing facility for implementation of national infrastructure programmes, road maintenance funds and rural services funds.

The NIP Logframe, Intervention Framework and Performance Indicators, defined the overall objective as follows:

- Foster national integration and economic recovery by improving transportation and the sustainable provision of utility services.

It listed the expected results for transport as:

- National transport strategy;
- Legal and regulatory framework established;
- One main axis road rehabilitated/constructed;
- Several secondary and feeder roads rehabilitated;
- Road maintenance system established and MPW staff trained.

This project supported the third of these.

In 2008 a Poverty Reduction Strategy (PRS) identified four “pillars” as the foundation for generating inclusive, sustainable growth and addressing poverty.

Pillar I: Security
Pillar II: Economic Revitalisation
Pillar III: Governance and Rule of Law
Pillar IV: Infrastructure and Basic Services

During public consultations the most frequently cited concern, under Pillar IV, was the shortage and poor state of roads. During the war nearly all roads and bridges were seriously damaged or destroyed. About 700 km of once-paved roads were grossly deteriorated. Few of the laterite roads linking the 15 counties were trafficable during the 6-month rainy season.

One of the Government’s foremost objectives was to rehabilitate infrastructure, roads in particular, to deliver basic services promoting broad-based growth, poverty reduction and security. The PRS ambitiously planned to build or reconstruct 1900 km of primary roads— 1700 km paved using surface dressing— by June 2011. In 2012 the National Transport Master Plan (NTMP) presented a rehabilitation plan to create an all-weather strategic primary network linking Monrovia to the county capitals and to the nation’s main border crossings.

The subject project is founded on the EC Country Strategy and is consistent with and supportive of the Government’s policies.

6.2 Project coherence with current and on-going initiatives

The Project coherence is addressed in Chapter 11.

6.3 Quality of the problem analysis, intervention logic and logical framework, and appropriateness of objectively verifiable indicators

The problem analysis is presented in the 2008-2013 National Indicative Programme (NIP).

The NIP noted that GoL had identified the central need for efficient road connections between Monrovia and the rest of the country. This would:

- Support security and long term peace;
- Accelerate social and economic rehabilitation of affected populations;
- Provide employment opportunities and field-to-market access for rural communities;
- Foster economic growth.

These are very appropriate high-level goals.

Insofar as the NIP addressed roads, the table overleaf set out the logical framework for EU interventions. The intervention logic stated the **overall objective** as:

- Foster national integration and economic recovery by improving transportation.

In more detail, the **programme's purpose** was to:

1. Improve the quality of life of people by expanding access to vital social and economic services;
2. Stimulate private-sector development by improving transportation infrastructure to facilitate free movement of people and goods;
3. Foster regional integration by interconnecting Liberia with the rest of the region and also the world economy.

Whilst not explicitly mentioning security and peace these three listed purposes contribute to security and peace by promoting prosperity in the long term.

The project roads do promote the three listed purposes. The project roads have enhanced access and mobility by providing fast all-weather road transport for the free movement of people and goods. The road connecting Monrovia to Guinea enhanced regional integration and interconnection with the world economy was enhanced by the road to Buchanan port, which exports bulk cargoes sought by the world economy.

Of the desired **results** the one relevant to this project is:

- One main axis road rehabilitated/constructed.

This is fulfilled twice over. The road from Monrovia to the Guinea border at Ganta was restored and the road from Monrovia to the port at Buchanan became paved all the way with the completion of the section from Cotton Tree to the port.

The relevant **objectively verifiable indicator** is simply:

- *kilometres of roads improved.*

Table 3 Intervention Framework and Performance Indicators as Related to Transport

	Intervention Logic	Objectively Verifiable Indicators	Sources of Verification	Assumptions
Overall Objectives	Foster national integration and economic recovery by improving transportation.	• GDP growth; • GINI index on income distribution; • Urban versus rural poverty indicators.	• National accounts; • IMF; • WB; • Humanitarian assessments.	• Peace and stability; • Improved governance.
Programme Purpose	• Improving the quality of life of people by expanding access to vital social and economic services; • Stimulating private-sector development by improving transportation infrastructure to facilitate free movement of people and goods; • Fostering regional integration by interconnecting Liberia with the rest of the region and also the world economy.	• Access to transport (km of paved and unpaved roads); • Transportation cost of business (% of overall production costs); • Regional trade (share of regional trade in overall export and import, volume of goods crossing the borders, etc.).	• PRS indicators; • WB, UNDP, UN etc. sector reports; • MPW reports; • Data from Bureau of Customs & Excise.	• National budget earmarks sufficient funds for covering recurrent costs (e.g. road maintenance); • Efficient and transparent fiscal system established.
Results	• National transport strategy; • Legal and regulatory framework established; • One main axis road rehabilitated/constructed; • Several secondary and feeder roads rehabilitated; • Road maintenance system established and MPW staff trained.	• Policy documents adopted and published; • Primary and secondary legal texts prepared and adopted; • Kilometres of roads.	• National Assembly discussions; • Legal registry; • MPW reports; • Other donor reports.	Government committed to sector reform.

Source: Extracted from Country Strategy Paper and Indicative Programme for the period 2008-2013, European Commission, 2007.

6.4 Extent to which objectives address identified problems and clarity and internal consistency of stated objectives

At the highest level, the objective was post-conflict recovery— unify the nation and rebuild economic wellbeing, which had plummeted from relative prosperity prior to 1980.

As elaborated by the intervention framework, the transport sector's contribution to economic recovery was by facilitating free movement of people and goods, stimulating private-sector development and connecting Liberia to the West African region and world markets.

Thus the stated objectives correctly addressed identified problems.

6.5 Appropriateness of the recommended monitoring and evaluation

The recommended objectively verifiable indicators were the following:

- Access to transport (km of paved and unpaved roads);
- Transportation cost of business (% of overall production costs);
- Regional trade (export and import volumes of goods).

The first indicator could be much improved by adopting the World Bank's Rural Access Indicator (RAI), which equates rural access to proximity (2 km) to a motorable road. The RAI can be improved, however, since it ignores whether, or what, transport services ply the road. The RAI could incorporate a measure of whether transport services meet the needs of rural populations. Key measures are fares/freight tariffs, service frequencies and journey times. That said, the point being made is more relevant to the result "several secondary and feeder roads rehabilitated" than it is to "rehabilitation/construction of one main axis road".

The second indicator is aimed at commercial costs, and the ease of setting up businesses. It should be applied to the project's sphere of influence. Official statistics will be too coarse, geographically, to do this. Thus, to quantify this indicator, costly interview surveys are required of a range of business activities to find out how transport costs have changed.

An easier and more direct approach is to compare transport tariffs before and after the project. In Liberia, however, truck transport is run by "unions" which are cartels of truckers. Price competition is weak because shippers must contact a union, which assigns the truck to do the job. In fact, as there is a surfeit of trucks the unions have not lowered their tariff rates. Their justification is that a truck owner is no better off when a two-day trip becomes a same-day return trip; the truck is simply idle for one day longer before the next job.

The third indicator can be quantified using official statistics, but the influence of a road project cannot be distinguished from the influence of other factors such as the world economy. It is more realistic approach would once again be to carry out purpose-specific surveys.

The obvious indicator is traffic volume. It is not listed. Traffic should be counted systematically, on an annual cycle, nationwide. This is not yet being done in Liberia, which, as the Ministry of Transport recognises, is a grave omission. It need not be. The only equipment needed to get started is clipboards and pencils. Guidance can be found on the Internet on how to collect and analyse the data in a systematic and scientific manner.

6.6 Stakeholder participation in design and implementation, local ownership and institutional capacity issues

The TNM design report for the project roads states that design service levels were discussed and agreed at a seminar in 2009 involving GoL officials, Infrastructure Implementation Unit (IIU), and stakeholders. Whilst the identities of the stakeholders are not detailed, such consultation is commonplace and the customary range of stakeholders was most likely consulted. This may or may not have included explicit representation of women who, in Liberia, comprise the majority of farmers.

Opportunity for further stakeholder involvement arose after submission of the application for an environmental impact assessment permit. The applicant is required to publish a notice of intent with information sufficient to allow a stakeholder or interested party to notify interest within 30 days. No record was found of what, if any, subsequent stakeholder involvement took place as a result.

Preparation of the Resettlement Action Plan (RAP) involves many stakeholders who are immediately affected by the project. Very close interaction is inevitable since monetary compensation is at stake. The design report anticipated that impact monitoring of the RAP would include annual quantitative and qualitative surveys— regular public meetings and other consultation with project-affected people and review of grievance mechanism outputs.[1] No documentary verification of such consultation was viewed but it is virtually inevitable that it occurred, given the importance the World Bank attaches to the RAP. TNM p 272 says IIU will monitor Public consultation and grievance procedures in place and functioning. (See maintenance phase reports for grievance processes).

6.7 The realism in the choice and quantity of inputs

For Output and performance-based road contracting (OPRC), see Chapter 7.

6.8 Realism in the assumptions and risks

The last column of Table 3 lists the assumptions underlying the project's intervention logic. The following relating to the road component:

- Peace and stability;
- Government committed to sector reform;
- National budget earmarks sufficient funds for covering recurrent costs (e.g. road maintenance).

These assumptions are sensible and have been, or are being, fulfilled. The situation in 2017 leaves no doubt that peace and stability have been secured.

There is government commitment to sector reform relevant to the roads.

This is evidenced by measures taken to preserve the road network, which hitherto has suffered from a serious lack of maintenance and destructive overloading of trucks. Maintenance has been addressed by establishing a Road Fund, which will be operational from the start of the next financial year (July). Overloading has been addressed by passage of the Axle Load Law 2015 and Axle Load Regulations 2016 pursuant to the Act.

[1] Table 86 Monitoring Framework.

Metamorphosis of the IIU into a Road Agency is still in the pipeline but faces reluctance to proliferate government agencies. International advisers to MWD are currently involved in deliberations looking at alternatives that secure most of the advantages of a Road Agency in a way that is appropriate for Liberia at this time.

The Road Fund will cause a quantum leap in road maintenance. In anticipation of the road fund legislation, an escrow account was established in January 2016 to receive revenues from a levy on petroleum fuels, which raised nearly USD 2 million monthly.

So that it could plan road works for 2017/18 the MWD was notified on 6 December 2016 that $32.0 million would be available for road works. Of this amount 60% must be applied to road maintenance, with 40% used for capital works or repaying loans for capital works. Thus an annual amount of USD19 million will be available for maintenance, a remarkable advance for road network preservation.

Implementation of axle load enforcement is held up for lack of equipment— or funds with which to purchase it. Since monies spent on enforcement will reduce maintenance costs, it makes sense for the Road Fund to provide funds for purchase.

Any risk arising that the assumptions would not be satisfied are, therefore, nearly completely dispelled. There are some road project-specific risks, however.

The TNM report opens with the following statement:

> The Government of Liberia, working through the Ministry of Public Works, wishes to implement OPRC for the on-going management, rehabilitation and maintenance of its road network. As a first step in this process, the MPW intends to implement OPRC management, rehabilitation and maintenance of two major transport corridors, one between Cotton Tree and Port of Buchanan and the second between Red Light and Ganta/Guinea Border.[2]

A risk is any factor, event or influence that threatens successful completion or performance of a project in terms of time, cost or quality. Risks should be allocated to the party best suited to manage them. OPRC redistributes project risks shared by contractor and employer.

The TNM report presents an analysis of risks associated with the road contracts, which are classified as follows.

Construction risks:
- Design defects
- Cost overrun
- Delay in project completion
- Failure to meet performance criteria

Maintenance risks:
- Maintenance cost overrun;
- Failure to obtain operation certification;
- Failure to meet required quality standards.

[2] To hasten completion of the Cotton Tree-Buchanan road a conventional design-and-build contract was used. Only the contracts for lots 1 and 2 of Red Light-Ganta were OPRC.

Financial risks:

- Interest rate;
- Currency fluctuations;
- Inflation rates and other indices.

Other risks:

- Tendering risks;
- Political risks;
- Regulatory/contractual risks;
- Force majeure and special circumstances;
- Modifications and extensions;
- Early termination.

The TNM report concluded that, as a general principle, the contractor should bear design, construction and maintenance risks. Other risks should be borne by the employer, supported by the World Bank and donors.

The analysis did not elucidate the differences between OPRC and conventional contracts. For example, the contractor might find it financially beneficial to walk away (literally or figuratively) from an OPRC during the maintenance phase, which extends several years beyond the initial capital works to restore the road. To guard against that eventuality the payments schedule can be (and was) skewed towards the latter years of the 10-year contract period. This then posed a risk for the contractor, since deficit-financing was needed for initial restoration of the road. A knock-on effect of deficit-financing is that bids are elevated to cover the hidden costs of financing and exceed the engineering estimates. Also, bids may be confined to large firms or firms with substantial financial backing, limiting competition.

In the event, tenders did exceed engineering estimates for Lo2 2 of the OPRC contracts, which had to be re-bid with some cost items removed.

7 Efficiency of programme implementation

7.1 Operational work-planning, implementation, and budget management

7.1.1 The conceptual design and tender documents prepared by TNM

The contract for this entailed the following:

- Traffic levels and forecasts of the roads;
- Conceptual designs;
- Level of service;
- Selection of engineering solution and road project civil works lots;
- Risk analysis and costing for the selected engineering alternative;
- Asset management structure involving client, contractors and monitoring consultant;
- Cost estimates for the selected engineering alternative;
- Payment model (recovery model).

All these activities were carried, but with different degrees of quality:

- The traffic level and forecast of the roads was satisfactory;
- The conceptual designs were just enough to create a common ground for the bidding process. This contravenes the spirit of a real Design and Build approach, especially when it comes to pavement solutions. On all three roads the constructed pavement differs from that proposed by TNM. The proposed design speed of 100 km/h for the whole road was already lowered to 80 km/h in Addendum 1 to the Contract Documents;
- The Levels of Service proved to be cumbersome and the MC's of Lot 1 and 2 propose modifications;
- Selection of the engineering solutions and road project civil works lots was satisfactory, but the Cotton Tree-Buchanan was changed from full OPRC (Design, Build, Operate, Maintain and Transfer) to Design, Build and Transfer only;
- The risk analysis and costing was carried out satisfactory;
- The Asset Management Structure was developed well but implementation is difficult given the limited understanding of the concept;
- Cost estimates for the selected engineering option were in line with the bid prices. TNM prices don't have to be raised because during 2009-2011, price inflation was very limited (see Table 18 in par. 7.5):

Table 4 Comparison cost estimates TNM and actual Bid Prices/Costs in USD

Road	Estimate TNM	Bid Price/actual cost
Red Light-Gbarnga	156,432,250	166,099,151
Gbarnga-Ganta	54,643,100	60,369,889
Cotton Tree-Buchanan Harbour	59,550,499	55,834,496
Environmental and Social Mitigation Costs	8,000,000	
Total	**278,625,849**	**282,303,536**

* Prices do not include PS for Emergency Works and Price Contingencies.

- The Payment Model (recovery model) is considered harsh by the Contractors but was a choice completely in accordance with the World Bank policy for long-term OPRC contracts. It provides a safeguard for early termination by the contractor after the rehabilitation phase, but it definitively has a price.

An item that has not been developed well in the conceptual design stage was the preparation and execution of the Resettlement Action Plan (RAP).

The RAP is implemented jointly by Ministry of Finance and Development Planning (MFDP) and MPW with the latter verifying the RAP and levels of compensation. There was a delay in payment to RAP firstly because the request missed the FY 12/13 funding cycle and then because not enough was provided for the 13/14 funding cycle. There was also some delay in the CEs preparation of the RAP.

The funds (around $6 million) were ultimately allocated from the Urban and Rural Infrastructure Rehabilitation Project (URIRP). Release of these funds started in March 2015, more than three years after the date of commencement of Lot 1. The CE's were in some instances allowed to work on land that was under expropriation but not yet paid for and could thereby reduce somewhat the delays caused by the late hand-over of the site.

The fact that the borrower was not able to hand over the site in time is considered a main failing by the borrower. Not only did the financial constraints lead to this situation; the Ebola crises also affected the hand over process as can be seen in the table below for Lot 1. The fields marked in yellow are during the declared Force Majeure period.

Table 5 Comparison actual and planned hand over of the site for Lot 1

No.	ROAD SECTION	Actual hand over	Planned handover	Delay Days	Length
1	135 145	15-Feb-13	15-Feb-13	0	10
2	71 78	15-Feb-13	15-Feb-13	0	6.9
3	2 13	26-Feb-13	26-Feb-13	0	11
4	114.6 135	10-Dec-13	10-Dec-13	0	20.4
5	61.1 71.1	13-Mar-14	13-Mar-14	0	10
6	41 61.1	26-Feb-14	25-Mar-14	-27	20.1
7	13 23	03-Mar-15	31-Aug-14	184	10
8	104.6 114.6	09-Jun-15	31-Aug-14	282	10
9	145 155	15-Aug-14	31-Aug-14	-16	10
10	90 104.6	09-Jun-15	30-Sep-14	252	14.6
11	78 90	09-Jun-15	31-Mar-15	70	12
12	23 41	30-Jun-15	30-Sep-14	273	18
13	155 165	22-Jun-15	30-Sep-14	265	10
14	165 178.7	22-Jun-15	31-Mar-15	83	13.7
					176.7

The implications of the RAP's late implementation are very significant:

- late delivery of the project milestones;
- the raised claims against the client due to late handover of the site.

For that reason the Government had not only to pay for the RAP but they also had to pay compensation to the CEs. Funding for RAPs should be kept outside the project cycle and funds have to be secured before a contract is signed.

7.1.2 *OPRC Contract Lot 1: Red Light – Gbarnga (180.36 km)*

The Consultants TNM carried out the planning of the works back in 2010. Procurement of works went relatively smoothly. The contract was awarded to China Chongqing International Construction Corporation (CICO) and the contract amount was USD 166,099,150.67.

Implementation of rehabilitation works was scheduled over a period of 36 months, followed by a routine maintenance period of 84 months, in total 120 months. During the last 24 months of the contract the laying of an asphalt-concrete overlay is foreseen. The commencement date of the contract was the 25th of January 2012.

Due to the late handing over of sections of the site - caused by financial problems in the RAP implementation - there was slow progress in the first year. This was followed by the declared Force Majeure due to the Ebola Virus Disease (EVD). Implementation of the Rehabilitation Works ended only on the 26th of September 2016, a delay of 20 months. An extension of time is required to fully execute the routine and periodic maintenance interventions.

The quality of the works executed in the Rehabilitation Works phase is considered to be reasonable/good, although there are several outstanding mainly minor items to be completed from the Rehabilitation Work phase. As from the 26th of September 2016 the CE has six months to complete these items.

The first formal IRI testing was carried out at the end of December 2016 and all sections were in compliance with the specifications. There is however a poor 5 km section of the road that may require treatment during the contract period in order to maintain the IRI values. The poor section is presented in terms of IRI fluctuating around 3.0, but within the 4.0 threshold.

A major landside occurred in September 2015 (see picture below). Currently two options are under investigation how to solve this issue: 1) install a retaining wall or 2) realign the carriageway. Both options are currently estimated between USD 900,000 and USD 1,000,000. A final decision has not been taken yet. Given the fact that the slope is still unstable, the Evaluators tend to be in favour of the realigning of the carriageway. Irrespective of which option is chosen, a ditch at the top of the landside should be constructed (hand-dug as soon as possible) to divert the water from the slope.

Compliance with the Environmental Management Plan was considered poor on this contract. As for the Environmental and Social Management issues, 7 Audits of the CE activities were held during the Rehabilitation Works phase. The last one in August 2016 was disappointing and showed a continuing downward trend for most activities. The CE will be required to ensure that all remaining hazardous materials are disposed of.

The first three months of the Routine Maintenance phase were disappointing. The number of Non-conformances with the required Levels of Services (LoS) was excessive and the CE needs urgently to put better systems in place to avoid this. There are serious concerns that if a significant level of payment deductions is applied, then this may result in further Non conformances.

Picture 1 Landslide at km 31+200

The budget for the Rehabilitation Works phase was managed well by the Monitoring Consultant, the MPW-IIU and the MoF-PFMU but will be affected by:

		Provisional amounts
a.	Claim related to late handing-over site	USD 9,822,921.00
b.	Claim related to explosives	USD 490,000.00
c.	Claim related to fuel taxes	USD 1,490,884.00
d.	Price adjustment corrections	USD - 850,000.00
	Sub-total	USD 10,953,805.00

Since the Lot 1 contract included no Provisional Sums for Emergency Works (estimated now at USD 2,500,000) and Price Contingencies, these costs have to be covered from elsewhere within the LIBRAMP budget. Provision of USD 7,500,000 for Lot 1 contingencies has to be included.

Approval and processing of the claims is very slow, leading to unnecessarily high claims for interest.

7.1.3 OPRC Contract Lot 2: Gbarnga–Ganta–Guinea Border (68.61 km)

The Consultants TNM also carried out the planning of the works for this road back in 2010 but the procurement of the works did not go as smoothly as for Lot 1. The bid prices received for this contract were too high and could not be accommodated within the budget envelope. Re-tendering was necessary and this time it was successful.

The contract was awarded to the contractor China Henan International Cooperation Group Co. Ltd (CHICO) and the contract amount, including a Provisional Sums of 2.5% for Emergency Works and 15% for Price Adjustment, was USD 70,880,849.33.

Implementation of rehabilitation works and construction of a new bridge at km 214+100 (see picture below) was scheduled over a period of 24 months, followed by a routine maintenance period of 96 months, in total 120 months. During the last 24 months of the contract, the laying of an asphalt concrete overlay is foreseen. The commencement date of the contract was the 8th of May 2013.

Picture 2 New Bridge at km 214+100

Due to the late handing over of sections of the site, caused by financial problems in the RAP implementation, and to the declared Force Majeure due to EVD, project implementation of the rehabilitation stage ended on the 7th of March 2016, a delay of 10 months. The 96-months long Routine Maintenance period started on the 8th of March 2016 and will end on the 7th of March 2024. For that reason an extension of time is required on this contract also, to fully execute the routine and periodic maintenance interventions.

The quality of the works executed in the Rehabilitation Works phase is considered good.

The last formal IRI testing was carried out in December 2016 and all sections were in compliance with the specifications. The average value for any one km road section must be less than the threshold value of 4.0 IRI. All sections of the road were below 2.16 IRI. The average Pavement roughness for the entire road must be below the threshold of 3.0 IRI and the average was 1.55 IRI.

Falling Weight Deflectometer (FWD) tests were carried out in the second quarter of the Routine Maintenance period and all values recorded were within the contractual limits.

Also in the second quarter the prescribed annual Traffic Counts were collected.

The Routine Maintenance phase is developing well. Routine works attended to by the CE consisted mainly of: grass cutting, side culvert cleaning, pavement repairs and stone pitching at culverts, attending accidents, oil spill clean-up, debris removal from pavement and litter control in Gbarnga, Ganta and other small towns along the road.

Traffic Safety is a major concern on the road. Initiatives are well underway to tackle this issue in a more structured way. Formal Road Safety meetings are being held bi-monthly with the participation of the IIU, MPW, Liberia National Police (LNP), GIZ, the CE and the MC.

The budget for the rehabilitation phase was managed well by the Monitoring Consultant, the MPW-IIU and the MoF-PFMU but will be affected by:

		Provisional amounts
a.	A claim related to late handing-over site	USD 5,274,581.97
b.	A claim related to fuel taxes	USD 297,798.00
c.	Price adjustment corrections	USD - 750,000.00
	Sub-total	USD 4,822,379.97

Since there were Provisional Sums for Emergency Works and Contingencies for Price escalations included in the Lot 2 contract, these costs can be covered within the contract amount.

7.1.4 Cotton Tree-Bokay Town-Compound 1-Buchanan Harbour (81.54 km)

The road from Cotton Tree to Buchanan was rehabilitated under the Urban and Rural Infrastructure Rehabilitation Project (URIRP) The URIRP project comprised originally the following components:

*Component I - Infrastructure Investments - (IDA USD **40.45** million; LRTF USD **9.20** million)*

This component will fund design, rehabilitation and supervision activities of infrastructure assets. Included in these activities are:

i) Resurfacing and rehabilitation of city streets in Monrovia and traffic solution for one major congested city interchange (at convergence of new Vai Town Bridge funded under ADP and existing Tucker Bridge);
ii) Rehabilitation of primary road sections in rural area (Cotton Tree-Bokay Town, and Pleebo-Barclayville);
iii) Maintenance o f primary and secondary roads through collaboration with UNDP and UNMIL peacekeepers; and
iv) Construction of a major bridge and a new fuel unloading facility.

*Component II - Program Management and Institutional Support – (IDA **USD 3.55** million)*

Project implementation will be by the IIU, which for the short and medium term is intended to substantially improve government's technical and analytical capacity and contract management. For the long term, it is envisioned that the IIU be converted to a road authority. The IIU will have internationally recruited management and be established on the basis of current special implementation arrangements.

The program was revised several times; items were added and deleted and 2 Additional Financing packages were agreed. The total budget for the URIRP Programme including the 2 additional financings was USD 129.2 million, comprising of IDA loans for an amount of USD 83.6 million and a grant through the LRTF of USD 45.6 million. The table below gives a breakdown:

Table 6 The total allocation (in US$ million) for the URIRP project

	IDA	LRTF	Total	Description
Original allocation	44.0	9.2	53.2	
Additional Funding 1	20.0	27.0	47.0	
Sub-total	**64.0**	**36.2**	**100.2**	
Additional Funding 2	19.6	9.4	29.0	Used for RAP payments on Red Light-Gbarnga, Contract Price Adjustments Bokay Town-Buchanan and Conceptual Design Ganta-Zwedru.
Total	**83.6**	**45.6**	**129.2**	

The first 2 sections of this road from Cotton Tree to Bokay Town and Bokay Town-Compound 1 were executed before the EU started contributing to the LRTF. Therefore the evaluators have only taken into consideration the section from Compound 1 to Buchanan Port (56.54 km).

The Consultants TNM carried out the planning of the works back in 2010. The contract was originally designed to be a full OPRC contract with a routine and periodic maintenance phase. It would last 10 years in total. In order to speed up the procurement however, it was decided to omit the routine and periodic maintenance interventions and handle the project as a Design, Build and Transfer (DBT) project.

The first section of the road from Cotton Tree to Bokay Town (length 15 km) started in December 2009 and was completed on the 26th of September 2010 for an amount of USD 9,800,000 (rounded).

The second section of the road from Bokay Town to Compound 1 (length 10 km) was completed on the 27th of April 2011 for an amount of USD 6,640,000 (rounded).

The last section from Compound 1 to Buchanan Port (length 56.54 km) was started on the 6th of May 2011. The rehabilitation works were completed on the 4th of June 2013 and the defects liability period expired on the 4th of June 2014. The contract amount was USD 33,759,227.94 and included the construction of a 130m long bridge crossing the Mechlin River. (See picture below.)

Picture 3 Construction of Abutment A2 of the bridge over the Mechlin River

The procurement of the works went relatively smoothly. The contract was awarded to the contractor China Henan International Cooperation Group Co. Ltd (CHICO).

The final total cost for the civil works on the 3 sections is USD 55,834,495.68. The project was not affected by the EVD and was completed on time and within the available budget.

The quality of the Rehabilitation Works is generally speaking good and the road is holding up well 3.5 years after completion.

Contrary to the Lots 1 and 2 of the Red Light-Ganta-Guinea Border road, no maintenance phase was included. Due to the non-availability of funds for maintenance, the road was starting to be eaten up by vegetation. In order not to loose the costly intervention, the DEU, together with DFID, agreed with the Ministry of Public Works to fund a routine maintenance program for the road section ELWA Junction-Firestone Gate (45.5 km) and the section Cotton Tree-Buchanan (80.8 km). The program commenced on the 22nd of February 2016 and will last for 5 years. The total cost for the 2 sections is estimated at USD 1,168,153.20. More details are given in Par. 7. Monitoring Consultants OPUS, IMC and EGIS.

7.1.5 Monitoring Consultants OPUS, IMC and EGIS

Lot 1 Red Light-Gbarnga is monitored by OPUS from New Zealand. They were not in place yet when the contract for the construction was signed with CICO. A short-term contract was signed with IMC Worldwide to bridge the gap.

OPUS's work is progressing satisfactorily and reporting is up to the required standard. Now for the Routine Maintenance phase the staffing input has been reduced.

Lot 2 Gbarnga-Ganta-Guinea Border is monitored by IMC Worldwide. Also this Monitoring Consultant is performing well and reporting is up-to-date. Given the fact that the Routine Maintenance phase on this Lot 2 started some 6 months earlier than on Lot 1, they have to be more inventive in this phase and can provide valuable experience to Lot 1 as well.

Cotton Tree-Buchanan Harbour was monitored by the consultants from EGIS. The project was completed within the available time frame and budget. For that reason one can conclude that they did a good job.

All three Monitoring Consultants had to adapt to their role as monitoring consultants rather than supervisors under a traditional Input-based FIDIC contract.

The concept of Monitoring Consultants was not optimally applied in Clause 16.1 of the Particular Conditions. Under a full Design and Build approach, whereby the CE has its own Quality Assurance system and an approved Quality Management Plan, the Project Manager (MC) cannot advise the Client to just stop the work until corrections are made to its satisfaction or reject the work and require that the defective work is removed within 5 working days of its instruction to do so. The Project Manager and the Client have to follow the procedures of the Quality Assurance system and Quality Management Plan.

7.2 Relations and co-ordination with local authorities and beneficiaries

The relations and coordination with the local authorities and beneficiaries went well and no serious problems arose, apart from some opposition in the RAP process and damage supposed to be related directly to rock blasting at the quarry site in Weala.

7.3 Quality of information management and reporting, and informing stakeholders about the project activities

The information for this project is divided into:

- Information to the donor community;
- Information on project level from the CE and MC.

Information to the donor community is structured along the lines as set out in the Administration Agreement between the WB and the donors. For the donors represented in the LRTF this means that they are all members of an Oversight Committee and are informed on a quarterly basis. All donors can obtain further detailed financial information through the World Bank Client Portal however, that is hardly used by any of the donors.

Information on project level from the CE and MC is well organized and strictly followed. Monthly progress reports (financial and physical) are produced, as well as special reports, if and when required. The quality of the reports is good and provides all the information required.

7.4 Respect of deadlines

The deadlines for the reporting activities to the donors are well respected.

The deadlines for the implementation of the works contracts vary:

The rehabilitation phase of the Lot 1 road Red Light-Gbarnga experienced a severe delay of 20 months. This was due to the late handing over of sections of the site, caused by financial problems in the RAP implementation, slow progress in the first year and the declared Force Majeure due to EVD.

Similarly the rehabilitation phase of Lot 2 Gbarnga-Ganta-Guinea Border was delayed, but only for a period of 8 months. As for Lot 1 this was related to the RAP implementation and the EVD.

For that reason an Extension of Time is required for both Lots 1 and 2 to execute the Routine and Periodic Maintenance phases. This is currently under consideration.

The consequence of time extension is that the Administration Agreement between the World Bank and the EU has to be extended further in order to avoid cancellation of undisbursed funds within the duration of the present Administration Agreement. The End Disbursement Date now stands at the 31st of December 2020.

The road Cotton Tree-Buchanan Harbour was executed in time and therefore no extension of time was required here.

7.5 Extent to which project benefits justify project costs

DEU has expressed a desire to analyse the LRTF investment choices from Liberian citizens' point of view. Was it the right decision to adopt the highest-cost rehabilitation option?

Liberian citizens may be better served by a major road backbone maintained to a good gravel road standard for its entire length, with black spots repaired so that roads are open year-round. It's now 14 years after the war and Harper rightly feels politically neglected since it is still cut off for days at a time in the rainy season— not to mention the other cities along the coast whose right to access seems completely overlooked.

The question is not whether GoL/LRTF ***have done the things right***, but rather, whether they ***have done the right things***.

It is easy to see that the GoL/LRTF with the assistance of the World Bank **have done the things right** in terms of output delivery. The three roads have been built (albeit with delays, caused by RAP implementation and EVD), they are of a good quality and they were constructed at reasonable cost, considering the required end product.

But have they **done the right things**? This is more difficult to answer. Choice of the three roads was in line with the Poverty Reduction Strategy and was never contested by any of the Donors. What is being questioned is the price for the rehabilitation of the three roads in relation to the available budget for the country as a whole and the need to provide access to as many inhabitants as possible.

The opinion persists that due to the OPRC approach, the roads are more expensive than necessary, leaving less money to solve other bottlenecks in the road network. Figures given in Par. 7.6 show that the rehabilitation costs of the three roads were below the average for Africa. The prices for the routine and periodic maintenance were reasonable also and in line with current

practices. The application of a new asphalt-concrete overlay in the years 9 and 10 of the project life cycle is questionable, given the level of traffic.

Were there alternatives? There are always alternatives but they have not been considered seriously by the GoL and neither by the Donors/Financiers. Decisions regarding priorities and implementation methods are for GoL to decide. They are being worked on by the multi-modal transport plan currently under development.

The EIRR is an appropriate metric to prioritise rival projects. But for “projects” to exist there has to be funding for them. At a million dollars a kilometre there are few projects. The Bank’s Roads are unaffordable. Should we therefore face up to letting roads become impassible in the wet season, and reinstating them afterwards? Or should we identify the impassible bottle necks (in the wet) and improve those road sections? Liberia cannot afford to pay back the money needed to make all major roads trafficable at a high standard year round.

As outlined in Par. 7.8 there are ways to construct roads quicker and cheaper in the short run, especially for the roads with a low traffic volume, but this method would not have given satisfactory results in the long run on the three roads that have been evaluated.

It is clear that the Government of Liberia, with the help from the World Bank, African Development Bank and the Donor community, will continue to construct the main corridor Ganta-Zwedru-Fish Town Harper on a technical basis similar to Monrovia-Ganta. The contract form - input-based FIDIC contract or OPRC contract - will depend on the GoL’s choices, mainly on financial grounds.

In order to comply with the wish to provide access to all, GoL should look into the possibility of funding the road from Buchanan to Pleebo, connecting the coastal counties Grand Basse, River Cess, Sinoe, Grand Kru and Maryland. This is a low-volume road and will remain so for quite some time. It qualifies for the approach as outlined under Par. 7.8, but still at a cost between USD 275,000 and 325,000 per km.

Justification for the chosen OPRC approach in monetary terms is given in Chapter 8: Effectiveness.

7.6 Cost effectiveness of OPRC for construction and maintenance

From the identification phase of the project, the EU Delegation in Liberia has questioned the appropriateness and cost effectiveness of the used OPRC model. This was mainly due to the fact that the prices for the Routine and Periodic maintenance under OPRC were considered very high compared with traditional maintenance contracts.

First of all, an explanation of definitions of the cost for rehabilitation, routine and periodic maintenance has to be given. For this, the costs of Lot 2 Gbarnga-Ganta-Guinea Border have been analysed and reduced to USD values only. The reason for taking Lot 2 as the example is based on the fact that a more detailed bid price is available based on actual cost estimates and not on the pre-defined breakdown of the payment schedule.

There are two prices that should not be mixed up: the bid price of the contractor and the payment schedule for the various components, as can be seen in the table below.

The bid prices of the contractor reflect his real cost, including overheads and profits. The payment schedule gives the amounts and when the contractor gets paid.

So when comparing rehabilitation and maintenance cost with traditional input-based FIDIC contracts, the values of the contractor's bid prices should be compared and not the values quoted in the payment schedule.

From the tables below it is clear that the cost of Lot 2 for the various items based on the contractor's bid price and excluding Provisional Sums for Emergency Works (2.5%) and Price Contingencies (15%), are as follows:

Table 7 Bid Price details Lot 2

	Total	Unit cost
Rehabilitation:	USD 46,143,822.55	USD 672,552.43 / km
Routine maintenance for 8 years:	USD 842,240.00	USD 1,534.47 / km per year
Periodic maintenance:	USD 13,383,826.12	USD 195,071.07 / km
Total Cost:	USD 60,369,888.66	USD 879,899.27 / km

For Lot 1 Red Light-Gbarnga the total cost per km, including the routine and periodic maintenance phased is USD 920,931.20 per km,- USD 41,031.93 per km more than Lot 2. The explanation is that the pavement for Lot 1 required a heavier construction (12.34 km Intervention type 1, 17,79 km Intervention type 2 and 150.23 km Intervention type 3) than for Lot 2 and there was one bridge more to be rebuilt. No breakdown based on real cost estimates is available for Lot 1.

Table 8 Bid Price and Payment Schedule rates for the interventions

Lot 2 **68.61 km** **Exchange rate 1 USD = 73.50 LRD**

Bid Price

Start 8 May 2013 End 6 March 2016 Start 7 March 2016 End 7 March 2024 Start 7 March 2022 End 7 March 2024

Rehabilitation		Routine Maintenance		Periodic Maintenance		Emergency Works		Totals	
LRD	USD	LRD	USD	LRD	USD	LRD	USD	LRD	USD
169,578,547.87	43,836,631.42	3,095,232.00	800,128.00	49,185,560.96	12,714,634.81			221,859,340.83	57,351,394.23
Equivalent LRD in USD	2,307,191.13	Equivalent LRD in USD	42,112.00	Equivalent LRD in USD	669,191.31			Equivalent LRD in USD	3,018,494.43
Sub-total	**46,143,822.55**		**842,240.00**		**13,383,826.12**				**60,369,888.66**
	76.44%		1.40%		22.17%				
price per km	672,552.43	price per km per year	1,534.47	price per km	195,071.07			price per km	879,899.27
P.S. Emergency works							1,509,247.22		1,509,247.22
P.S. Price contingencies	6,921,573.38		126,336.00		2,007,573.92				9,055,483.30
Sub-total	**6,921,573.38**		**126,336.00**		**2,007,573.92**		**1,509,247.22**		**10,564,730.52**
Total Bid price	**53,065,395.93**		**968,576.00**		**15,391,400.03**		**1,509,247.22**		**70,934,619.18**
	74.81%		1.37%		21.70%		2.13%		
price per km	773,435.30	price per km per year	1,764.64	price per km	224,331.73	price per km per year	2,749.69	price per km	1,033,881.64

Payment schedule

Start May 2013 End 6 March 2016 Start 7 March 2016 End 7 March 2024 Start 7 March 2022 End 7 March 2024

Rehabilitation		Routine Maintenance		Periodic Maintenance		Emergency Works		Totals	
LRD	USD	LRD	USD	LRD	USD	LRD	USD	LRD	USD
115,588,716.57	29,880,076.39	62,786,193.45	16,230,444.57	43,484,430.80	11,240,873.27			221,859,340.82	57,351,394.23
Equivalent LRD in USD	1,572,635.60	Equivalent LRD in USD	854,233.92	Equivalent LRD in USD	591,624.91			Equivalent LRD in USD	3,018,494.43
Sub-total	**31,452,711.99**		**17,084,678.49**		**11,832,498.18**				**60,369,888.66**
	52.10%		28.30%		19.60%				
price per km	458,427.52	price per km per year	31,126.44	price per km	172,460.26			price per km	879,899.27

68.16% 68.16% 2028.48% 2028.48% 88.41% 88.41%

Table 9 Breakdown Bid Price Lot 2 for Rehabilitation Phase

Item No.	Description (main items)	Unit	Unit Price		Quantity	Subtotal		Total expressed in USD	Percentage of rehabilitation cost	Percentage of contract amount
			LC	FC (USD)		LC	FC (USD)			
1	Asphalt pavement (binder and wearing course)	Km	1,024,773.75	264,907.50	68.61	70,309,726.99	18,175,303.58	19,131,898.51	41.46%	31.69%
2	DoubleSurface Treatment	Km	104,737.50	27,075.00	68.61	7,186,039.88	1,857,615.75	1,955,385.00	4.24%	3.24%
3	Base course	Km	882,000.00	228,000.00	68.61	60,514,020.00	15,643,080.00	16,466,400.00	35.68%	27.28%
4	Drainage (lined/ earth)	Km	82,871.25	21,422.50	68.61	5,685,796.46	1,469,797.73	1,547,155.50	3.35%	2.56%
5	RC culvert	LSum	1,837,500.00	475,000.00	1	1,837,500.00	475,000.00	500,000.00	1.08%	0.83%
6	Replace bridge at km 214+100	One bridge	1,765,837.50	456,475.00	1	1,765,837.50	456,475.00	480,500.00	1.04%	0.80%
7	Repair of handrails in Bridge	LSum	238,875.00	61,750.00	1	238,875.00	61,750.00	65,000.00	0.14%	0.11%
8	Reflective painting for road marking lines (center and sides)	LSum	5,029,237.50	1,300,075.00	1	5,029,237.50	1,300,075.00	1,368,500.00	2.97%	2.27%
9	Other costs[4)]	LSum	17,011,514.55	4,397,534.37	1	17,011,514.55	4,397,534.37	4,628,983.55	10.03%	7.67%
10	**Total Rehabilitation Bid Price**[1)]	**-**	**-**	**-**	**-**	**169,578,547.87**	**43,836,631.42**	46,143,822.56	100.00%	76.44%

Table 10 Breakdown Bid Price Lot 2 for Routine Maintenance Phase

Item No.	Description (main items)	Unit	Unit Price		Quantity	Subtotal		Total expressed in USD	Percentage of routine maintenance cost	Percentage of contract amount
			LC	FC (USD)		LC	FC (USD)			
1	Durability performance measures	Km	8,820.00	2,280.00	68.61	605,140.20	156,430.80	164,664.00	0.195507219	0.27%
2	Signaling and Road safety	Km	6,762.00	1,748.00	68.61	463,940.82	119,930.28	126,242.40	14.99%	0.21%
3	Drainage	Km	6,468.00	1,672.00	68.61	443,769.48	114,715.92	120,753.60	14.34%	0.20%
4	Vegetation	Km	7,350.00	1,900.00	68.61	504,283.50	130,359.00	137,220.00	16.29%	0.23%
5	Structures	Lsum	683,035.50	176,567.00	1	683,035.50	176,567.00	185,860.00	22.07%	0.31%
6	Slopes-cuts and embankments	Lsum	395,062.50	102,125.00	1	395,062.50	102,125.00	107,500.00	12.76%	0.18%
7	**Total Routine Maintenance Bid Price**					**3,095,232.00**	**800,128.00**	**842,240.00**	**100.00%**	**1.40%**
							Price per km per year in USD:	**1,534.47**		

Table 11 Breakdown Bid Price Lot 2 for Periodic Maintenance Phase

Item No.	Description (main items)	Unit	Unit Price		Quantity	Subtotal		Total expressed in USD	Percentage of periodic maintenance cost	Percentage of contract amount
			LC	FC (USD)		LC	FC (USD)			
1	Asphalt pavement overlay	Km	516,796.88	133,593.75	68.61	35,457,433.94	9,165,867.19	9,648,281.25	72.09%	15.98%
2	Double Surface Treatment	Km	126,787.50	32,775.00	68.61	8,698,890.38	2,248,692.75	2,367,045.00	17.69%	3.92%
3	Reflective road marking lines (center and sides) including shoulder delineation	Km	73,301.81	18,948.77	68.61	5,029,237.18	1,300,075.11	1,368,500.11	10.23%	2.27%
4	**Total Periodic Maintenance Bid Price**					**49,185,560.96**	**12,714,634.81**	13,383,826.36	100.00%	22.17%
							Price per km in USD:	**195,071.07**		

For Lot 1 no breakdown based on real cost estimates is available as given above for Lot 2. Below the theoretical breakdown, based on the fixed percentages for the various interventions, is given. Please note that the figures in red should have been added, but that was not done.

Table 12 Bid Price Lot 1 based on Payment Schedule rates for the interventions

Lot 1 **180.36 km** **Exchange rate 1 USD = 72.00 LRD**

Bid Price (amounts based on defined split of contract sum)

Start 25 Jan. 2012	End 26 Sept. 2016	Start 26 Sept. 2016	End 26 Sept. 2023	Start 26 Sept. 2021	End 26 Sept. 2023				
Rehabilitation		Routine Maintenance		Periodic Maintenance		Emergency Works		Totals	
LRD	USD	LRD	USD	LRD	USD	LRD	USD	LRD	USD
198,406,719.00	89,260,980.00	96,871,866.00	43,502,643.00	63,146,103.00	28,357,407.00			358,424,688.00	161,121,030.00
Equivalent LRD in USD	2,755,648.88	Equivalent LRD in USD	1,345,442.58	Equivalent LRD in USD	877,029.21			Equivalent LRD in USD	4,978,120.67
Sub-total	**92,016,628.88**		**44,848,085.58**		**29,234,436.21**		-		**166,099,150.67**
	55.40%		27.00%		17.60%				
price per km	510,183.13	price per km per year	35,522.67	price per km	162,089.36			price per km	920,931.20
P.S. Emergency works							4,152,478.77		4,152,478.77
P.S. Price contingencies	13,802,494.33		6,727,212.84		4,385,165.43				24,914,872.60
Sub-total	**13,802,494.33**		**6,727,212.84**		**4,385,165.43**		**4,152,478.77**		**29,067,351.37**
Total Bid price	**105,819,123.21**		**51,575,298.42**		**33,619,601.64**		**4,152,478.77**		**195,166,502.03**
	54.22%		26.43%		17.23%		2.13%		
price per km	586,710.60	price per km per year	40,851.07	price per km	186,402.76	price per km per year	2,877.91	price per km	1,082,094.16

The only breakdown based on real costs for Lot 1 is given below:

Table 13 Breakdown of the cost for Lot 1

Item No.	Description	Unit Price		Countervalue LRD in USD	Total expressed in USD	Percentage of contract amount	Percentage LRD	Percentage USD
		LC (LRD)	FC (USD)					
1	Machinery (depreciation cost)		14,910,340.00		14,910,340.00	8.98%	0.00%	100.00%
2	Materials	14,400,000.00	86,437,867.00	200,000.00	86,637,867.00	52.16%	0.23%	99.77%
3	Labor	141,523,200.00	10,334,800.00	1,965,600.00	12,300,400.00	7.41%	15.98%	84.02%
4	Engineering design and associated services		4,256,054.00		4,256,054.00	2.56%	0.00%	100.00%
5	Bank guarantees		1,200,000.00		1,200,000.00	0.72%	0.00%	100.00%
6	Insurances		700,000.00		700,000.00	0.42%	0.00%	100.00%
7	Site overhead	137,891,541.00	5,891,953.00	1,915,160.29	7,807,113.29	4.70%	24.53%	75.47%
8	Home Overhead & profits	64,609,688.00	37,390,016.00	897,356.78	38,287,372.78	23.05%	2.34%	97.66%
		358,424,429.00	**161,121,030.00**	**4,978,117.07**	**166,099,147.07**	100.00%	3.00%	97.00%

As for Emergency Works, the following quantities were given for Lot 2:

Table 14 Emergency works for Lot 2

Item no.	*Description*	*Unit*	*Quantity**	*Rate ($US)*	*Amount ($US)*
2.01	Clear site on either side of the centre line of construction width of all bush, shrubs, grass and trees including top soil.	m^2	15.75	8.50	133.88
2.02	Excavate any material except rock in cuttings and side drains, haul excavated material any distance, deposit, spread in 150mm layers and compact to 100% AASHTO & ASTM. to form embankments and margins as directed.	m^3	7.7	22.50	173.25
2.03	Cut out material in extremely failed areas up to sub grade to a depth of 500 mm or as directed.	m^3	0.6	4.75	2.85
2.04	Replace material removed in Item 2.03 with material from approved borrow pit at any distance, spread in 150mm layers and compact to 100% AASHTO & ASTM compaction and as filling for embankments and margins, shape formation and trim slope to required cross-section.	m^3	0.6	8.25	4.95
2.06	Scarify existing bituminous surface, shape and compact to 100% AASHTO & ASTM compaction to receive additional fill.	m^2	75	5.70	427.50
2.06A	Scarify And Pulverize bituminous surface, shape and compact to 100% AASHTO & ASTM compaction.	m^2	75	7.70	577.50
2.07	Dub in grass to slopes of embankments as specified and directed rate to include top soil 100mm thick.	m^2	15.75	4.25	66.94
2.08	Cut out in rectangular shape pot holes on the carriageway and patch with asphalt concrete wearing course as directed.	m^2	5.7	32.50	185.25
4.01	Shape and compact formation in cutting to 100%.AASHTO & ASTM compaction.	m^2	75	6.50	487.50
4.02	Provide, spread, shape and compact to 100% AASHTO & ASTM naturally occurring laterite as sub-base not exceeding a compacted layer of 200mm thickness on carriageway and shoulders (haulage inclusive).	m^3	6	12.30	73.80
4.04	Provide and lay prime coat using MC0 or MC1 cut-back bitumen at 0.9 litres/m^2 including blinding with sand or quarry fines.	m^2	147	4.90	720.30
4.05	Provide and lay first coat surface dressing using 80/100 bitumen at the rate of 1.3 litres/m^2 and 18mm single-sized crushed rock chipping on outer shoulders.	m^2	30	15.50	465.00
4.06	Provide, spread, shape and compact approved wet-mix crushed rock base 200mm thick in the pavement as directed.	m^3	0	62.00	-
4.07	Provide, lay and compact bituminous base (binder course)	m^3	0	23.60	-
4.08	Provide lay and compact asphalted concrete (binder course) to a compacted thickness of 60mm on carriageway for the failed areas.	m^3	9	29.60	266.40
4.09	Provide, lay and compact asphaltic concrete wearing course to a compacted thickness of 50mm on carriageway	m^3	6.7	24.30	162.81
4.1	Provide, lay and compact asphaltic concrete wearing course to a compacted thickness of 40mm on inner shoulders	m^3	2	20.66	41.32
4.11	Double Layer Chip Seal	m^2	2	9.50	19.00
5.01	Concrete for trapezoidal channels	m^3	1.2	385.80	462.96
5.02	Concrete for V channels	m^3	2	275.00	550.00
5.03	Replacing box culverts	m^3	3	479.30	1,437.90
6.01	Reflective painting for road marking lines (center and sides)	M	4	9.20	36.80
7.01	Removal of landslide debris	m^3	100	25.38	2,538.00
7.02	Slope repair	m^3	10	195.00	1,950.00
7.03	Retaining wall repair	m^3	10	275.00	2,750.00
7.04	Lay-by repair	m^2	20	30.75	615.00
				Total for Bill No.	**14,148.90**

- The quantities are per 1 km of road; and
- The quantities are indicative and for the establishment of unit rates purposes ONLY.

Although this breakdown per km was given, the total Provisional Sum for Emergency Works has been fixed in the Contract for Lot 2 at 2.5 % of the Contractor's Bid Price.

For Lot 1 no unit rates for Emergency Works were given, resulting in the fact that the Emergency Works are paid basically on Daywork rates or rates proposed by the Contracting Entity (CE) and established by the Monitoring Consultant (MC).

One striking difference between Lot 1 and Lot 2 is the fact that in the signed contract for Lot 1 no amounts have been included for Provisional sums for Emergency Works (2.5%) and Price Escalations (15%). If the contingencies for Lot 1 also had been included, the total contract price would have gone up from USD 166,099,150.67 to USD 195,166,502.03 (plus 17.5%). The cost for the Price Escalation and Emergency works has now to be covered from an increase in the overall budget (see Table 26).

The prices for Lot 1 and 2 without the two contingencies for Emergency Works and Price Escalation coincided remarkably well with the cost estimates prepared by TNM and given in their conceptual design report in 2010 (Table 77 and 79 respectively):

Cost estimate TNM		Bid price	Difference
Lot 1	USD 175,197,960.00	USD 166,099,151.00	- 5.19%
Lot 2	USD 61,502,268.00	USD 60,369,888.66	- 1.84%

The Evaluators have looked also to comparable costs for rehabilitation, routine and periodic maintenance of roads in the region. For this, a study carried out by Africon in 2007 within the framework of the Africa Infrastructure Country Diagnostic (AICD) was quite helpful. This study was broadened in 2011 with 26 new AfDB projects. The projects finally included in the database consisted of the following:

Table 15 Number of projects included in the AICD/AfDB database

Data Source	Regraveling / Periodic Maintenance of Unpaved Roads	Periodic Maintenance of Paved Roads	Rehabilitation of Paved Roads	Construction and upgrading of paved roads	Total
2007 AICD Study	37	4	51	23	115
2008 AfDB Study	2	0	7	13	22
New projects from AfDB identified during 2010	3	2	14	16	35
Total	**42**	**6**	**72**	**52**	**172**

Table 16 Extract relevant unit costs according to AICD study and ROCKS Database

Unit costs of road construction and maintenance according to AICD study of 2007 by Africon (nominal 2006 USD prices)			
Type	**Lower quartile**	**Median**	**Upper quartile**
Rehabilitation paved > 50 km	181,266	358,654	524,522
Periodic maintenance (paved)	227,788	280,680	297,604
Unit costs of road construction and maintenance according to World Bank ROCKS Database (nominal 2006 USD prices)			
Rehabilitation paved > 50 km	181,858	378,152	502,264
Periodic maintenance	60,054	88,050	203,334

Unit costs of road construction and maintenance according to AICD study of 2007 by Africon (nominal 2006 USD prices)			
Type	**Lower quartile**	**Median**	**Upper quartile**
(paved)			
Unit costs of road construction and maintenance according to AfDB study of 2011on Road Infrastructure Costs (nominal 2006 USD prices			
Rehabilitation paved > 50 km	94,800	168,800	324,000
Periodic maintenance (paved)	113,800	129,200	261.000

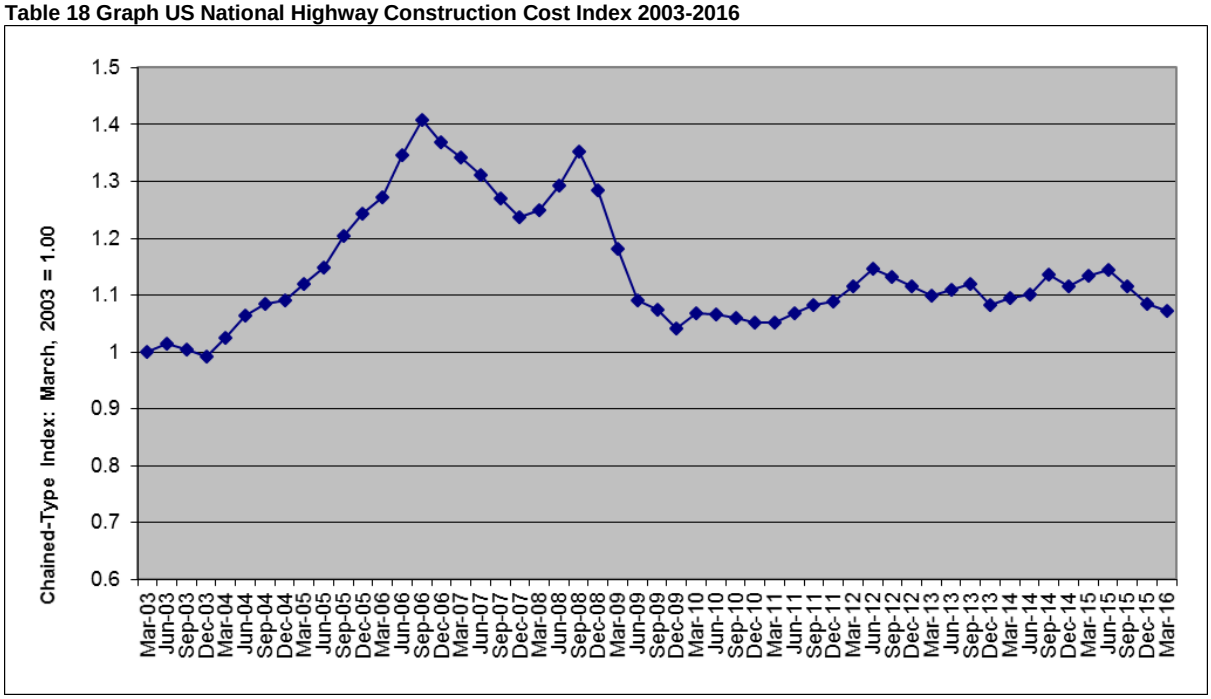
All values are in nominal 2006 USD. Local currency and non-USD currency was converted to USD by using the average conversion rate for that year as per www.oanda.com and then multiplying by the following US CPI rates. If we continue this exercise for the following years, then we have to multiply the figures above by a factor of 0.9958 to arrive at 2012 prices:

Table 17 US National Highway Construction Cost Index 2003-2016

Year	Quarter	Nhcci index
2003	March	1.0000
2004	March	1.0260
2005	March	1.1189
2006	March	1.2727
2007	March	1.3425
2008	March	1.2500
2009	March	1.1818
2010	March	1.0683
2011	March	1.0524
2012	March	1.1147
2013	March	1.1002
2014	March	1.0947
2015	March	1.1334
2016	March	1.0728

1/ Source: Federal Highway Administration, Office of Highway Policy Information, "National Highway Construction Cost Index (NHCCI)".
2/ The 2016 index is preliminary and subject to revision.

Table 18 Graph US National Highway Construction Cost Index 2003-2016



Although it is questionable whether for Africa (and Liberia in particular) the US National Highway Construction Cost Index should be used (like in the AICD study), we can assume that the prices resulting from the AICD and AfDB studies have hardly changed over the 7-year period.

The figures in table 16 for Rehabilitation of Paved roads and Periodic Maintenance of Paved roads are all on the low side compared with the bids received. Since we do not have a detailed breakdown of Lot 1 in terms of Rehabilitation, Routine Maintenance and Periodic Maintenance, only the prices of Lot 2 can be compared (see table below).

Table 19 Comparison Bid price Lot 2 with other studies

Item	Bid Price	AICD 2007 Upper Quartile	ROCKS Upper Quartile	AfDB 2011 Upper Quartile
Rehabilitation paved road/km	USD 672,552	USD 524,522	USD 502,264	USD 324,000
Routine Maintenance /km/ year	USD 1,534	N/A	N/A	N/A
Periodic Maintenance/km	USD 195,071	USD 297,604	USD 203,334	USD 211,000

The Evaluators have compared the Bid Price of the Contractor with the values given under the Upper Quartile for the following reasons:

- In the studies from AICD/AfDB for paved rehabilitation projects, the initial peakiness (unit rates from about USD 1000,000/km) is ascribed to projects in the West Africa sub-region, specifically four in Benin and two in Ghana;
- The type of pavement design chosen for Lot 2 had to be based on extreme rainfall conditions;
- After accounting for environmental drivers of costs such as terrain ruggedness and proximity to markets, residual unit costs are significantly higher in fragile countries. Countries, which are recovering or have just recovered from conflicts, have about 30% higher unit costs.[3]

The cost for the rehabilitation stage is reasonably in line with the AICD 2007 study and the ROCKS Database. The AfDB rates are considerably lower, but that is due to the fact that most rehabilitation

[3] The cost of road infrastructure in developing countries, Paul COLLIER, Martina KIRCHBERGER, Måns SÖDERBOM, 2 May 2013.

projects here were double surface treatment pavements. Also the width of the pavement (2 x 3.75 m + 2 x 1.50 m shoulders) completely covered with an asphalt concrete layer of 0.13 m has affected the bid price considerably.

The Bid Price for the periodic maintenance is in all cases below the 3 results given above, but is in the opinion of the evaluators still high. This opinion is based on the low bitumen price at the moment, but this might have changed when the overlay has to be laid in years 9 and 10 of the project.

The last comparison could be made with the tenders recently awarded in Liberia for the road sections Fish Town–Karloken and Karloken–Harper. These contracts are not OPRC contracts but standard FIDIC Unit Price contracts and do not include a maintenance component after the defects liability period.

Table 20 Comparison prices with Fish Town-Karloken-Harper road

Road	Length	Cost Rehabilitation (including contingencies)	Price per km	Percentage
Fish Town – Karloken	80.00	USD 73,000,000	USD 912,500	81.47%
Karloken – Harper	50.00	USD 56,000,000	USD 1,120,000	100.00%
Gbarnga - Ganta	68.61	USD 53,065,396	USD 773,435	69.06%
Cotton Tree-Buchanan	81.54	USD 55,834,496	USD 684,750	61.14%

* Note: length and amounts for Fish Town-Karloken-Harper have been rounded.

The general conclusion is that the Prices for Lot 2 (and for Lot 1) are reasonable and in relation to the required and delivered output for the rehabilitation stage and upcoming maintenance phases.

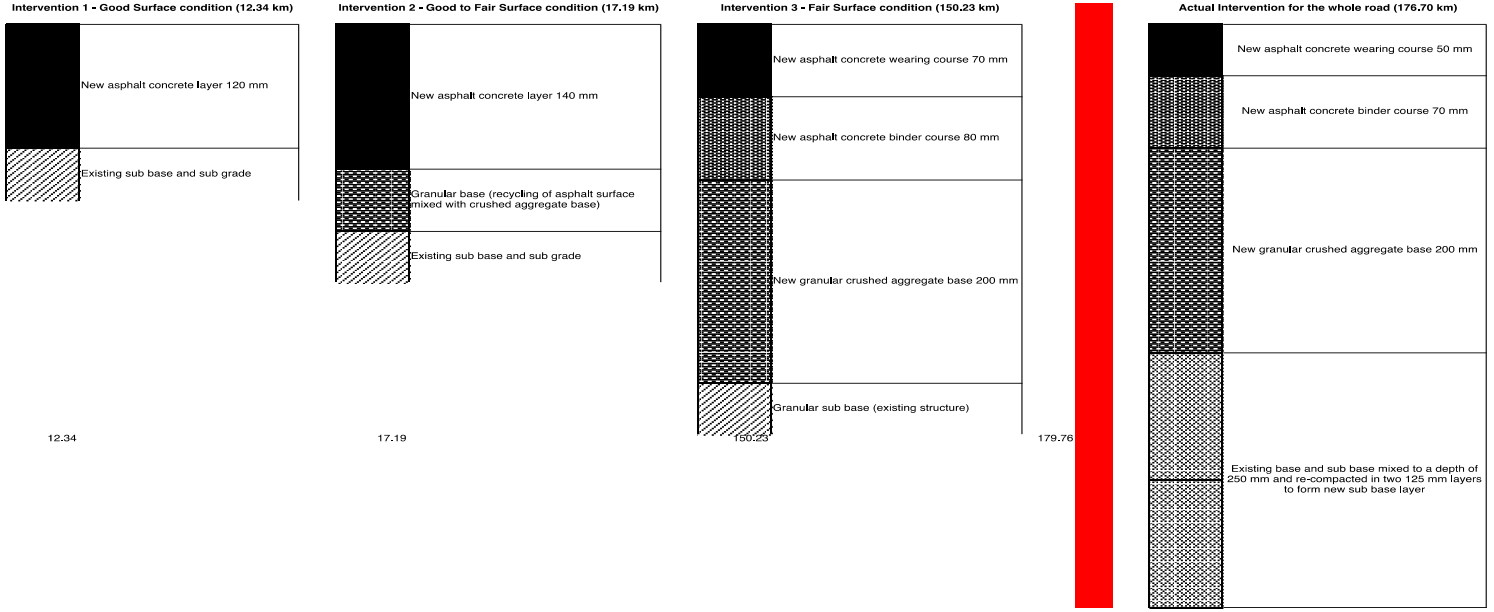
However, this does not by definition mean that the chosen OPRC concept is the most cost effective solution. It is also very well possible to have a hybrid FIDIC or EU contract whereby the Rehabilitation works are paid on Unit costs and the Maintenance phase(s) on lump sum basis (see for example in Zambia). Also is it possible to split the contract into separate contracts for the rehabilitation (by larger contractors) and for maintenance by smaller contractors.

Last but not least there remains the observation that the OPRC concept here applied, does not make full use of the possible benefits of Design, Build and Maintain contract forms. This relates to the provision in the tender documents that the Contracting Entities had to bid for a prescribed pavement construction.

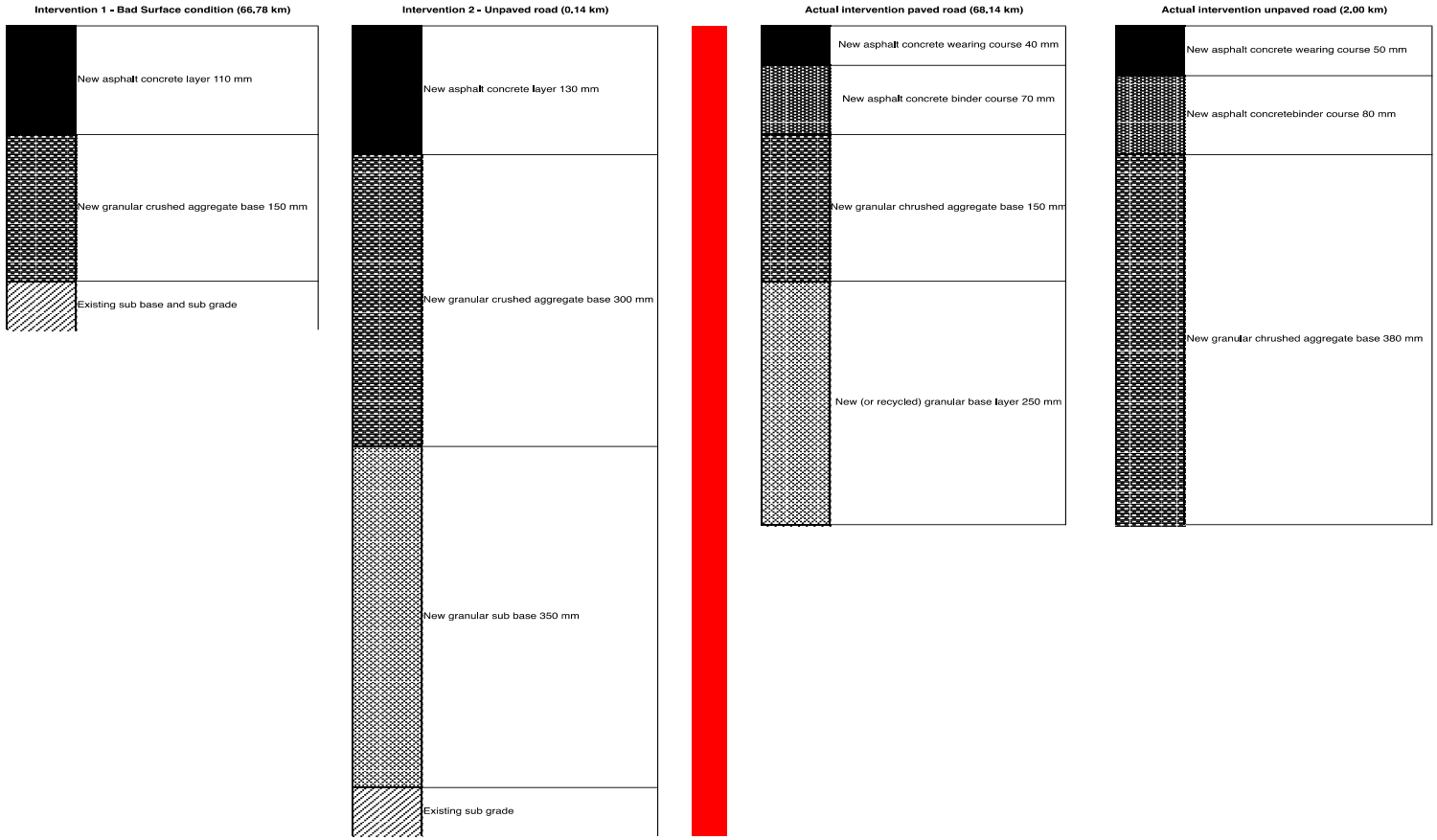
This was done to simplify the price comparison process (all tender on an equal base). However, this is contrary to a real Design and Build philosophy. According to the WB the winning CEs were allowed, and even invited, to propose there own pavement solutions, as long as this would not lead to an increase in the cost. The WB stated that the CEs were free to propose the pavement design they thought was necessary and that price differences were negotiable.

In practice this was not the case. The CEs for Lot 1 and 2 prepared their own pavement designs, these designs were approved by the MCs and the MPW but discussions about additional costs were categorically denied. The differences in the conceptual designs and the realised constructions are given on the next pages.

Lot 1 - Comparison conceptual design and actual design



Lot 2 - Comparison conceptual design and actual design



The MC for Lot 1 Red Light-Gbarnga looked at the cost difference between the two solutions and he came to the following observations:

- *The conceptual design interventions 1 and 2 would not have been sufficient especially given the further deterioration to the pavement between time of original design and award. In addition the double surface treatment shoulder was never a good idea given that drivers here sometimes use that as an extra lane. Construction of the DST would have been time consuming and a maintenance nightmare;*
- *Opus was only appointed 14 months after the contract commenced and the pavement design was virtually done at that point. However, I have done a few rough cal*culations to compare major material quantities as per the conceptual design compared to the actual design approved. See below:

CONCEPTUAL DESIGN									
Base (m^3)	Rate	Amount	Asphalt (m^3)	Rate	Amount	Double Seal (m^2)	Rate	Amount	TOTAL
383,879.00	54.42	20,890,695.18	248,446.00	282.55	70,198,417.30	541,080.00	6.38	3,452,090.40	94,541,202.88

ACTUAL DESIGN									
Base (m^3)	Rate	Amount	Asphalt (m^3)	Rate	Amount	Double Seal (m^2)	Rate	Amount	TOTAL
312,478.00	54.42	17,005,052.76	287,255.00	282.55	81,163,900.25	0.00	6.38	0.00	98,168,953.01

- *The unit rates used are extracted from Appendix 2 to the Bid. Not sure of the accuracy but good enough I think for comparison purposes;*
- *As can be seen the overall amount has increased by U$ 3,627,750. This may not be 100% accurate because the rates in the Appendix to the bid were per km and I used average base and asphalt thicknesses to calculate the unit rate. However, I am sure the Contractor did his calculations in more detail and given the difficulty in constructing and maintaining the DST probably consider*ed it a reasonable alternative.

A similar situation exists for Lot 2 but here no re-calculation is available.

7.7 Comparison Cost effectiveness Routine Maintenance on the Red Light Ganta and Cotton Tree- Buchanan roads

For maintenance of the road between ELWA Junction in Monrovia and Buchanan, the EU signed two Hybrid Output and Performance-based routine maintenance contracts:

1. ELWA Junction-Firestone entrance gate (Km 45.5) is a maintenance contract for a period of 56 months that was signed between the EU and the BMC Group. The contract entailed:

Table 21 Contract amounts routine maintenance ELWA Junction – Firestone entrance gate

Lot 1: Maintenance of the road ELWA Junction – Firestone entrance gate (45.5 km)			
	Quantity	**Unit rate in USD**	**Amount in USD**
Routine Maintenance	2,548 km	116.00	295,568.00
Supervision per diem	112 month	50.00	5,600.00
Repair works			21,275.00
Emergency works			15,650.00
Sub-total			338,093.00
Contingencies 20%			67,618.60
Total			**405,711.60**
Price per km/year			1,914.94

2. For the maintenance of Cotton Tree-Buchanan (80.8km), a similar maintenance contract for a period of 60 months was signed between the EU and the BMC Group. The contract entailed:

Table 22 Contract amounts routine maintenance Cotton Tree-Buchanan road

Lot 2: Maintenance of the road Cotton Tree-Buchanan (80.8 km)			
	Quantity	**Unit rate in USD**	**Amount in USD**
Routine Maintenance	4,848 km	116.00	562,368.00
Supervision per diem	120 months	50.00	6,000.00
Repair works			38,600.00
Emergency works			28,400.00
Sub-total			635,368.00
Contingencies 20%			12,073.60
Total			**762,441.60**
Price per km/year			1,887.23

The cost for the rehabilitation only of the roads Gbarnga-Ganta and Cotton Tree-Buchanan differs considerably, mainly due to different pavement solutions. The Gbarnga-Ganta road is per km 12.95% more expensive than the Cotton Tree-Buchanan road.

The cost for routine maintenance + emergency works on the road Cotton Tree Buchanan is given above as being USD 1,887.23 per km/year.

The cost for routine maintenance only for the road Gbarnga-Ganta is given in the BoQ of the contractor as USD 1,764.64 per km/year. To this we have to add the cost for emergency works. For this a breakdown per km has been included in the BoQ of the contractor. The amount for this is USD 14,148.90 / 8 years = USD 1,768.61 km/year. Therefore the total cost would become USD 1,764.64 + USD 1,768.61 = USD 3,533.25 km/year.

However, in the contract the BoQ of the contractor for the emergency works has not been taken into consideration. The quantities in this BoQ are indicative and for the establishment of unit rates purposes only. Instead, the amount for emergency works included in the contract has been fixed at 2.5% of the contract sum. This works out to an amount of USD 2,749,69 per km/year. With this the contractual cost for routine maintenance + emergency works for the Gbarnga-Ganta road comes to USD 1,764.64 + USD 2,749.69 = USD 4,514.33. Please note that this is based on the real cost breakdown of the contractor and not on the breakdown of the Payment Schedule.

The difference between the Cotton Tree-Buchanan road (USD 1,764.64 km/year) and the Gbarnga-Ganta road (USD 4,514.33 km/year) is very big and is caused solely by the cost estimated for the emergency works. If we look at the individual cost for routine maintenance only then the rate for Cotton Tree-Buchanan road would become (USD 116.00 x 12 months) = 20% contingencies = USD 1,670.40 km/year, compared with USD 1,764.64 km/year for the Gbarnga-Ganta road. The single price for emergency works for the Cotton Tree-Buchanan road is USD 70.30 per km/year only and the corresponding price for the Gbarnga-Ganta road is USD 2,749.68 per km/year!

Periodic Maintenance has not been taken into consideration, since that was excluded from the Cotton Tree-Buchanan road.

All prices are inclusive of the Emergency Works and Price Contingencies as per the respective contract conditions.

Table 23 Comparison rehabilitation and routine maintenance rates

	Rehabilitation USD		Routine + Emergency Maintenance USD	
	Total	Price per km	Total for 5 years	Price per km/year
Gbarnga-Ganta (68.61 km)	53,065,395.93	773,435.50	605,360.00 943,279.51 1,548,639.51	4,514.33
Cotton Tree-Buchanan (81.54 km)	55,834,496.00	684,749.77	762,441.60	1,887.23

Although we have only one detailed cost breakdown of the OPRC contracts on the Red Light-Ganta road to compare with, it looks as if the rate per km/year for the Cotton Tree-Buchanan road is on the low side and the rate per km/year for the Gbarnga-Ganta road is on the high side. The ROCKS Database gives an average of USD 2,232/km (2000 prices) based on real costs of 71 projects in Africa with a variation between the lowest of USD 332 km/year and the highest of USD 5,580 km/year.

The price per km/year of the Cotton Tree-Buchanan road is more in line with rates in other African countries where the Evaluators have worked in the past (for example Tanzania where the rate for routine maintenance of paved trunk roads was in 2000 USD 1,600/km/year). The future will tell us which of the 2 rates is the correct one whereby we should not forget that the maintenance costs in the years 6 to 8 are higher than in the years 1 to 5.

There is another factor that has to be taken into consideration when comparing the cost effectiveness of the maintenance alternatives: the cost of the supervision.

For the Gbarnga-Ganta road, IMC signed a contract with the following breakdown (including the Addendum):

Monitoring the Rehabilitation stage Lot 2:	GBP 1,403,160 or USD 2,304,215
Monitoring Routine & Periodic Maintenance phases:	GBP 2,226,890 or USD 3,656,914
Total	GBP 3,630,050 or USD 5,961,129

There is no detailed breakdown for the Routine & Periodic Maintenance phases, but according to the RE of Lot it can be estimated at:

Monitoring Routine Maintenance Phase: 7/9 x USD 3,656,914 =	USD 2,844,267
Monitoring Periodic Maintenance Phase: 2/9 x USD 3,656,914 =	USD 812,647
Total	USD 3,656,914

Based on this estimate, the cost for the supervision of Lot 2 of the Routine Maintenance + Emergency Works is:
USD 2,844,267 / 68.61 km / 7 years = USD 5,922 per km/year.

The total cost of supervision for a period of 5 years of the Routine Maintenance and Emergency Works on the Cotton Tree-Buchanan road is estimated at:

Salaries	240 days x USD 150,-/day =	USD 36,000
Out of station allowance	120 days x USD 50,-/day =	USD 6,000
Transport	120 days x USD 100,-/day =	USD 12,000
Sub-total		USD 54,000
Contingencies 20%		USD 10,800
Total		USD 64,800

Based on this estimate, the cost for the supervision of the Cotton Tree-Buchanan road of the Routine Maintenance + Emergency Works is:
USD 64,800 / 80.80 km / 5 years = USD 160 per km/year.

Therefore the total cost for Lot 2 Gbarnga Ganta routine maintenance + Emergency Works + supervision = USD 4,514 + USD 5,922 = USD 10,436 per km/year.

The total cost for Cotton Tree-Buchanan routine maintenance + Emergency Works + supervision = USD 1,887 + USD 160 = USD 2.047 per km/year, or just 20% of the cost of Lot 2.

7.8 Opinion and advice on the possibilities for rehabilitation/ upgrading of roads using minimum interventions (single/double surface treatments)

Although not included in the Terms of Reference, the EU Delegation in Monrovia has asked the evaluators to look at the possibilities of rehabilitating and/or upgrading of roads using minimum interventions like single- or double surface treatments, in particular for the road Buchanan-Greenville-Barclayville-Pleebo.

For this the evaluators were asked to take into consideration:

- The feasibility study including a conceptual design for the road Buchanan-Pleebo which is on-going and executed by the Italian consulting firm AIC Progetti;
- The results of the study “Optimizing gravel road maintenance in Liberia’s extreme climate conditions – an applied research”, executed by IMC Worldwide.

Unfortunately, neither studies has been finalized yet. Also the trial sections included in the applied research study for the various types of sealing of gravel roads have not been constructed yet, more than one year after the start of this study.

According to the provisions of Addendum n° 1 to the contract of AIC Progetti, the consultant is required to study a possible low cost sealing for the entire road or for its subsections. For this, the pavement specialist of AIC Progetti prepared a general paper for the construction of Low Volume Sealed Roads (LVSR). This paper is included in this report as Annex 1.

The basic assumptions for this paper are:

- Average Daily Traffic < 100 vehicles/day
- Average Daily Truck Traffic < 15 trucks/day
- Design speed for the road 60 km/h

- Surfaced carriageway 6.0 m
- Unsurfaced shoulders 0.5 m

The methodology described in the AIC paper is generally speaking correct.

First of all the following preparatory works should be carried out:

- the existing pavement shall be scarified to 20 cm depth, aerated for moisture control if necessary, compacted and finished to a suitable grade and cross-fall;
- should soft spots be identified during compaction, the unstable materials shall be replaced with suitable ones.

After that, Benkelman beam tests are foreseen to determine the bearing capacity. Based on the results of the test one of the following types of intervention is then chosen:

D_{90} > 400 - Three layers overlay:
a new 20 cm thick selected subgrade layer shall be constructed (CBR □ 10 at 95 % MDD);
a new 15 cm thick natural gravel subbase course shall be constructed (CBR □ 25 at 95 % MDD);
a new 15 cm thick natural gravel base course shall be constructed (CBR □ 60 at 98 % MDD).

400 > D_{90} > 300 - Two layers overlay:
a new 15 cm thick natural gravel subbase course shall be constructed (CBR □ 25 at 95 % MDD);
a new 15 cm thick natural gravel base course shall be constructed (CBR □ 60 at 98 % MDD).

300 > D_{90} - Single layer overlay:
a new 15 cm thick natural gravel base course shall be constructed (CBR □ 60 at 98 % MDD).

After that a selection is made of the type of sealing: Otta Seal, Single surface dressing or Double surface dressing.

A cost estimate has been prepared on the assumption that:
25% of the road needs a 3-layer overlay before sealing
50% of the road needs a 2-layer overlay before sealing
25% of the road needs a 1-layer overlay before sealing

Table 24 Cost estimates for various sealing options (in USD)

Work sections	Amount per km ($)		
	Single s.	Double s.	Otta s.
Contracror's design & internal control obligations	5.000	5.000	5.000
Earthworks & pavement layers	49.000	49.000	49.000
Bituminous seals	28.000	37.000	28.000
Total kilometric amount excluding General Items	82.000	91.000	82.000
Contractor's general obligations 15%	12.300	13.650	12.300
Total kilometric price	**94.300**	**104.650**	**94.300**

At a first glance this looks a very attractive option for Liberia. The content of the AIC Progetti paper was discussed with the author himself and the Team Leader of IMC Worldwide who is in charge of the applied research study.

During the discussions it became clear that this methodology unfortunately couldn't be applied to a considerable part of the road, especially the Greenville-Barclayville section. The geotechnical and hydrological conditions on a large part of this road are such, that even for a low volume sealed road much more works have to be carried out, especially related to drainage and soil improvements. Without that, the road would not last for 5 years under the extreme climate conditions in Liberia.

As can be seen in the next picture, the road looks reasonable at the end of the dry season, it is almost impassable during the rainy season due to a complete lack of drainage. There are no side drains or culverts to be found. The cost for brining the road to an acceptable level for the interventions proposed above is not sufficiently reflected in the price estimate given above.

Upgrading a gravel road to bituminous standards is a common activity in Africa and therefore sufficient statistical data are available. The ROCKS Database and AIDC studies reveal that the cost for upgrading from gravel to a sealed bituminous pavement varies unbelievably. The cost of 283 projects have been analysed and the average cost was USD 276,508 per km, ranging from USD 29,987 per km to USD 940,837 per km (2006 prices).

Picture 4 Existing road between Greenville and Barclayville

Apart from the comments given above, the Team Leader of IMC Worldwide suggested on a detailed technical level that:

- the stone has to be nominal 13mm with correct flakiness index and crushing strength;
- no stones should be used less than 13mm for first layer and 6/7mmm for second layer for double chip and spray.

In summary the evaluators want to state that the methodology as proposed by AIC Progetti is very good for Low Volume Sealed Roads, but applying this methodology on all sections of the Buchanan-Greenville-Barclayville-Pleebo road is not possible. It is estimated that the average cost for the whole road with this methodology would be between USD 275,000 and 325,000 per km.

7.9 GoL's contributions

No Government of Liberia contribution to the LRTF is foreseen. However, for the LIBRAMP project, under which the Red Light-Gbarnga-Ganta road is being implemented, a GoL contribution of USD 72.8 million is included in the financing plan.

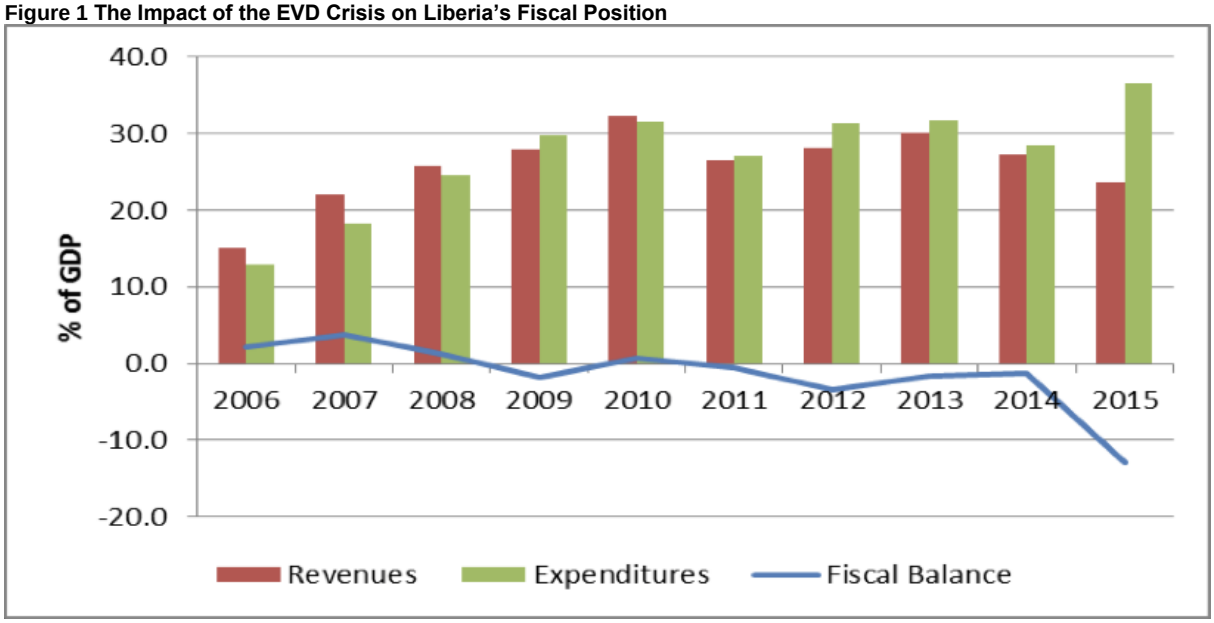
The following breakdown in the contribution to LIBRAMP has been agreed upon:

IDA	117,700,000	=	39.31%
LRTF	108,900,000	=	36.37%
GoL	72,800,000	=	24.32%
Total	299,400,000	=	100.00%

Up to now, the Government of Liberia has contributed zero to the project. In the OC meeting of March 2016 a clarification from the MFDP was sought re the GoL contribution of USD 72.8 million since it is part of the project.

In 2014, there was deferral of payment because of the Ebola outbreak, which had a severe impact on the National Budget.

Figure 1 The Impact of the EVD Crisis on Liberia's Fiscal Position



During the presentation at the end of the Evaluator's mission to Liberia the Minister of Public Works assured those present that the Minister of Finance had confirmed to him that money for LRTF would be provided in the upcoming budget for 2017-2018.

During the OC meeting of March 2016 the KfW requested a formal communication from the Government on payment of commitment; The MFDP was requested to prepare the LRFT portfolio and promised to submit it to the committee, but that was not done. In order for the KfW to prepare a further contribution, KfW will have to receive that information.

As per the 31st of December 2016, the amount due has risen already to more than USD 23 million. This is a big threat to the sustainability of the LIBRAMP program and has to be addressed with some urgency.

7.10 Technical Assistance: did it provide appropriate solutions and develop local capacities?

Technical Assistance is provided in various ways under the LIBRAMP program:

Technical Support Team (TST)

The TST sub-component funds local expertise for the implementation of LIBRAMP. It originally included nine staff but was then increased to seventeen over time, all of whom are on two-year contracts. The staff are local experts in areas such as contracts and project management, procurement and asset management. In addition training TST staff is also included.

A total of US$ 401,000 was originally committed to the TST. It is anticipated that this component will be funded beyond the original US$ 401,000 because it has also been funding the three senior staff at IIU (Manager, Procurement Specialist and Social Safeguards Specialist). It is very important that that funding to secure the services of the 17 skilled staff are maintained throughout the life of the project.

Technical Support Group (TSG)

A contract for the TSG sub-component was signed with Cardno IT Transport in December 2015 for the sum of US$ 2,442,155.

The team includes the Team Leader, Road Asset Management Specialist and Procurement Specialist. Other staff, including a Pavement Specialist have been involved in the project up to date.

As well as continued support for the monitoring of existing projects, including the OPRC Lots 1 and 2, the TSG is in the process of preparing a Draft Highway Act, for which a Concept Paper has been submitted.

The TSG is providing support to collect the Transport Spatial Data survey.

The TSG is delivering training on aspects of Road Planning such as project identification and preparation, procurement and asset management. In addition, the TSG is in the process of developing a Road Management System for Liberia and nationwide survey to collect transport data with mobile phone technology is on-going.

A Multi-Modal Investment Plan (which was originally designated as Sub component 2.4, Transport Plan and Strategic Investment Plan) has been agreed for implementation within Cardno's TSG contract. This study spans 18th October 2016 to June 2017.

TSG is cooperating with the EU-funded GIZ/Gopa team to provide support on new / revised contract documents for large and medium sized tender documents.

TSG is also cooperating with the GIZ/Gopa team on the establishment of a Road Authority in Liberia.

Furthermore, TSG provides on the job training in WB procedures, development of maintenance manuals, a central procurement filing system, a contract management system and the IIU and Ministry of Public Works' web site development.

The quality of the services delivered is rated as good, but special attention should be given to the coordination of the TSG activities with the GIZ/Gopa team in order to avoid overlap in the field of Institutional Reforms.

7.11 Quality of monitoring: its existence, accuracy and flexibility and the use made of it; adequacy of baseline information

The project has an active LogFrame and Project Development Objectives (PDOs) are being collected. In addition there are numerous reports required by the MCs and CEs, ranging from activities being carried out, accidents, IRIs, environmental performance etc. However, there is no existing framework for Monitoring and Evaluation (M&E) that would collect all the information and systematically synthesize and distribute in an effective manner.

The consultants of the TSG therefore suggested that an M&E framework be established (with updated PDO), which clearly defines all the units of measurement, allocates responsible actors and defined deadlines. In addition there should be strategy for dissemination of indicators and recommendations for actions where necessary. A person within the IIU should be designated as the M&E lead officer.

7.12 Any un-planned outputs from activities so far

There are two un-planned outputs that need urgent action:

- Return to the Right of Way (RoW);
- Road safety.

Right of Way

The encroachment of the RoW is creating more and more problems. For Lot 1 Red Light-Gbarnga only there are now 515 structures that have encroached into the RoW and they are steadily increasing in number. If the construction of new structures and the demolition of the existing structures is not controlled by the Government the number of new encroachments will continue to increase. This will affect the efficiency of management of the RoW by the contractor and also affect the safety of the road users, potentially resulting in the following problems:

- New access blocking the drainage systems, causing flooding;
- A potential increasing the number of vehicle movements from/to the highway at inappropriate/unsafe locations;
- Blocking of visibility splays for drivers, increasing the potential for accidents, which is counter to the strategy of improving road safety.

The control of development must be managed by the Government of Liberia, as the Contractor does not have the right to control this activity. To ensure the RoW is adequately protected into the future we strenuously urge the Government to complete any outstanding RoW marker post installation and enforce the removal of the current structures and prevent further encroachment.

Completion of marker installation and protection of the RoW from encroachment is urgently required to avoid future problems and expenditure.

Road Safety

Evidence shows that the severity of road accidents is worsening along the corridor. The primary causes identified are:

- Poor driver skills;
- No adequate system for issuing of drivers' licenses;
- Poor condition of vehicles;
- Overloading of vehicles;
- Inadequate policing.

There has been established a task force between the MPW, CE and MC and the Liberia National Police (LNP) to better enforce traffic safety issues. This task force will deal with the following topics:

- Route safety signing;
- Accident data;
- Enforcement;
- Education;
- Physical safety measures.

A Traffic Safety Analysis has been conducted for Lots 1 and 2. This included an analysis on the accidents prior, during and after rehabilitation of the road. The results of this study have become available in February 2017 and the recommendations will be implemented.

See also Chapter 9 – Impact.

7.13 Financial Performance

The LRTF is a multi-donor trust fund with the following participants:

Table 25 Participants LRTF and their contribution as per 31-12-2016

Donor	Currency	07/01/2016 to 12/31/2016	12/03/2007 (date of inception) to 12/31/2016	12/03/2007 (date of inception) to 12/31/2016	%
EU-COMMISSION OF THE EUROPEAN COMMUNITIES	EUR	0	60,000,000.00	79,921,379.99	40.73%
GERMANY - KREDITANSTALT FÜR WIEDERAUFBAU (KFW)	EUR	10,000,000.00	44,000,000.00	58,375,500.00	29.75%
IRELAND - MINISTER FOR FOREIGN AFFAIRS/ IRISH AID	EUR	0	2,000,000.00	2,842,600.00	1.45%
LICUS TRUST FUND	USD	0	3,000,000.00	3,000,000.00	1.53%
NORWAY - MINISTRY OF FOREIGN AFFAIRS	NOK	0	15,000,000.00	2,532,201.16	1.29%
SWEDISH INTERNATIONAL DEVELOPMENT COOPERATION AGENCY (SIDA)	SEK	0	129,000,000.00	18,097,854.52	9.22%
UNITED KINGDOM - DFID	GBP	0	19,900,000.00	31,456,848.60	16.03%
Sub-total				**196,226,384.27**	**100.00%**
Inv. Income				4,067,266.26	
Other receipts				1,112.64	
Total Receipts				**200,294,763.17**	
SWEDISH INTERNATIONAL DEVELOPMENT COOPERATION AGENCY (SIDA) - Refund	USD			- 463,500.37	

The objective of the LRTF is to provide a vehicle for donors to pool resources to support the Government of Liberia in improving its basic infrastructure, aiming at: (a) improving the enabling environment to increase economic growth; (b) allowing increased access to basic services; and (c) building government capacity to plan and manage development projects.

The LRTF will finance infrastructure projects to meet a reconstruction or development objective that will have been approved by the Oversight Committee (OC).

Such activities may include, amongst others:

a. A combination of rehabilitation and construction works in the following areas: roads, ports, the airport, water and sanitation, power, small infrastructure works, and civil works;
b. Program management, coordination and project supervision; and
c. IDA executions for start up activities where the Government lacks capacity, such as in the field of feasibility/engineering studies, policy development and donor coordination.

The three roads under evaluation are part of the following programs:

Lot 1 Red Light-Gbarnga LIBRAMP Program
Lot 2 Gbarnga-Ganta-Guinea Border LIBRAMP Program

The **Liberia Road Asset Management Program (LIBRAMP)**. This program consists of the following main elements:

Table 26 LIBRAMP Components as per 31-12-2016

Component	Allocation US$ (m)	Commitments US$ (m)	Planned Contracts US$ (m)
Component 1: Civil Works	240.4	237.0	13.0
Component 2: Consultancies and Capacity Building	21.0	20.4	1.5
Component 3: Contingencies	38.0	32.4*	
Total	**299.4**	**289.4**	**14.5**

* The now foreseen Commitments for the Contingencies include:
USD 9.9 million for Lot 1 late land handover;
USD 10.0 million XDR impact on the project;
USD 2.5 million for fuel and explosives claims;
USD 7.5 million for future Lot 1 Price Adjustments;
USD 2.5 million for Lot 1 Emergency works.

The following breakdown in the contribution to LIBRAMP is in use so far:

IDA	117,700,000	=	39.31%
LRTF	108,900,000	=	36.37%
GoL	72,800,000	=	24.32%
Total	299,400,000	=	100.00%

Based on the figures given above we can estimate the EU contribution to this Program:
EU share LRTF = 40.73% (US$ 79,921,378 out of US$ 196,226,384)
EU share in LIBRAMP = 14.81% (40.73% of 36.37%)

During the last OC meeting in December 2016 it was disclosed that the LIBRAMP Program faces the following financial challenges:

- The budgeted project contingency will be soon exhausted and this threatens the Program's sustainability;
- If planned contracts are to be realized:
  - Project budget will be exceeded by at least USD 5 million;
  - RAP (SD Cooper and ELWA Intersection) might cost another USD 3 million.
- The biggest threat of all is the missing GoL Counterpart funding. Out of the planned USD 72.8 million, USD 22.3 million is already past due. The following options for the Government of Liberia are under consideration;
- **GoL may lack fiscal space to fulfil its obligations in a timely and orderly manner:**
  - Loss due erosion in SDRs value (USD 10 million?);
  - Funds for remaining RAP (USD 3 million?);
  - Settle outstanding contractual claims (USD 3 million with interest);
  - Significant counterpart funding pending (USD 72.8million);
  - **Significant risk to the project to run out of funds before the end of the project (2021?).**
- **Three options** presented to the government are:

- Keep project components intact and secure additional financing to cover all claims and RAP (about US$8+ million);
- Drop one of the project components; namely rehabilitation of SD Cooper road to Coca Cola Factory;
- In addition to option (a) or (b), **secure additional financing to part cover the original counterpart funds from IDA or LRTF or both**.

The **Liberia Urban and Rural Infrastructure Reconstruction Program (URIRP)** consist of the following main elements:

Table 27 URIRP Components and contributions

Component	IDA US$ (m)	LRTF US$ (m)	Total US$ (m)
Component 1: Infrastructure Investments	40.45	9.20	49.65
Component 2: Program Management and Institutional Support	3.55		3.55
Additional Financing 1	20.00	27.00	47.00
Additional Financing 2	19.60	9.40	29.00
Total	**83.60**	**45.60**	**129.20**
Percentages	64.71%	35.29%	100.00

The total cost for the section from Compound 1 to Buchanan (56.54 km) was USD 33,759,227.94. Based on the figures above we estimate the EU contribution to this Program:
EU share LRTF = 40.73% (US$ 79,921,378 out of US$ 196,226,384)
EU share in URIRP = 14.37% (31.96% of 35.29%)

The financial figures of the whole LRTF up to the 31st if December 2016 are given below (Source: Unaudited Trust Funds Financial Report). In the previous LRTF Financial Reports it is mentioned that there will be a further Cash Contribution of € 10 million (approx. USD 11 million) by the German KfW as per Administration Agreement that was signed on the 18th of January 2016. Please note that this has not been paid yet.

WORLD BANK GROUP

Liberia Reconstruction Trust Fund (WORLD BANK REFERENCE 70859) - Multi Donor Fund

UNAUDITED TRUST FUNDS FINANCIAL REPORT

Expressed in United States Dollars

	07/01/2016 to 12/31/2016	12/03/2007 (date of inception) to 12/31/2016
Receipts (Note 1)		
Cash Contributions	11,081,000.00	196,226,384.27
Investment Income (Note 2)	282,645.15	4,067,266.26
Transfers within Hierarchy	3,315.73	78,206.48
Contributions via Transfers	-3,315.72	-78,206.48
Other Receipts	0.00	1,112.64
Total Receipts	11,363,645.16	200,294,763.17
Disbursements (Note 1)		
Project Disbursements		
Disbursements to Grantee	-25,606,432.91	-150,021,410.48
Direct costs Disbursed by WBG		
Staff costs (including benefits)	-9,894.15	-706,222.77
Consultant fees	0.00	-296,503.84
Travel expenses	0.00	-467,856.31
Airfare rebate	0.00	17,228.50
Media workshop	0.00	-2,987.60
Contractual services	0.00	-2,942.04
Other direct costs	0.00	-17,403.61
Total Direct costs Disbursed by WBG	-9,894.15	-1,476,687.67
Total Project Disbursements	-25,616,327.06	-151,498,098.15
Non-Project Disbursements		
Transfer to donor balance account	-463,500.37	-463,500.37
Administrative fees and expenses(Note 4)	-110,810.00	-2,775,611.84
Total Non-Project Disbursements	-574,310.37	-3,239,112.21
Total Disbursements	-26,190,637.43	-154,737,210.36
Excess of receipts over disbursements / (disbursements over receipts)	-14,826,992.28	45,557,552.81
Fund Balance		
Beginning of period	60,384,545.08	0.00
End of period	45,557,552.80	45,557,552.81
Fund Balance consists of		
Share in pooled cash and investments		45,557,552.81
Undisbursed Commitments as of 02/02/2017 (Note 5)		30,093,675.19

Notes:

1. This statement is prepared on the modified cash basis of accounting;
2. Investment income is not credited to any trust fund where the daily fund balance is less than USD equivalent $5,000;
3. Other costs (where applicable) represent all disbursements incurred prior to July 2000;
4. Administrative fees are generally collected from the trust fund in the same month in which contributions are received, however for administrative purposes, collection of fees may occur in the month following receipt of the contribution;
5. Amounts committed relate to the amounts yet to be disbursed for active and pending recipient executed grant agreements and the undisbursed balance of bank executed trust funds;
6. Where applicable, amounts displayed against "staff costs (including benefits)" and "consultant fees" include charges to cover the cost of benefits and general communication, facilities and IT costs unless otherwise specified in the Administration Agreement for the Trust Fund.

Table 28 LRTF Disbursement details by Grant

Disbursement details by Grant

Grant	Grant Name	Executed By	Curreny	Grant Amount	07/01/2016 to 12/31/2016	12/03/2007 (date of inception) to 12/31/2016	Balance
TF012429	Liberia Road Asset Management Project - Supervision Budget	Bank	USD	1,116.65	0	1,116.65	0.00
TF016065	Urban and Rural Infrastructure Rehabilitation Project	Recipient	USD	9,400,000.00	139,928.67	7,603,615.48	1,796,384.52
TF017803	EMUS Project Second Additional Financing	Recipient	USD	7,000,000.00	0	7,000,000.00	0.00
TF091742	LRTF ADMINISTRATION	Bank	USD	854,000.00	0	843,348.00	10,652.00
TF094060	Emergency Monrovia Urban Sanitation Project (EMUS)	Recipient	USD	18,400,000.00	0	17,959,054.63	440,945.37
TF094143	EMUS APPRAISAL AND SUPERVISION	Bank	USD	1,096,684.27	0	1,096,684.27	0.00
TF094353	Urban and Rural Infrastructure Rehabilitation Project	Recipient	USD	9,200,000.00	0	9,200,000.00	0.00
TF095343	LIBERIA - Urban and Rural Infrastructure Rehabilitation Project - Supervision Budget	Bank	USD	368,992.60	0	368,992.60	0.00
TF098040	Urban and Rural Infrastructure Rehabilitation Project	Recipient	USD	27,000,000.00	4,832,939.76	25,119,862.30	1,880,137.70
TF099588	Liberia Road Asset Management Project	Recipient	USD	108,900,000.00	20,633,564.48	83,138,878.07	25,761,121.93
TF0A3340	Spatial Analysis of Transport Connectivity and Growth	Bank	USD	300,000.00	9,894.15	9,894.15	290,105.85
				182,520,793.52	**25,616,327.06**	**152,341,446.15**	**30,179,347.37**

The Evaluators cannot explain the amount for Administrative fees and expenses withheld in the Unaudited Trust Fund Financial Report given above for the period ending on the 31st of December 2017.

According to the Administration Agreement (AA), Annex III, Clause 3.1 the Trust Fund may, following deposit of Contribution funds, deduct from such funds and retain for IDA's own account an **up-front** administrative cost recovery fee equal to one per cent (1%) of the Contribution. The total amount withheld is USD 2,775,611.84. Please note that this is an up-front deduction based on the **Contributions received** and not on the **Total Project Disbursement**.

Furthermore, under Clause 3.2 it is stated that actual costs can be charged according to the categories of Eligible Expenses, as detailed in Annex I of the AA. These costs are presented as Total Direct Cost Disbursed by the WBG, totalling USD 1,476,687.67 and are not part of the 1% administrative cost recovery fee.

Based on Clause 3.1 the calculation would result in:

Contributions as per 31/12/2016	1 %	Amount withheld	Difference
USD 196,226,384.27	USD 1,962,263,84	USD 2,775,611.84	USD 813,348.00

Furthermore the total amount of Table 28 of USD 152,341,446.15 does not fit with the Disbursements to Grantee (USD 150,021,410.48) or eventually the Total Project Disbursements (USD 151,498,098.15). An explanation from the WB should be sought.

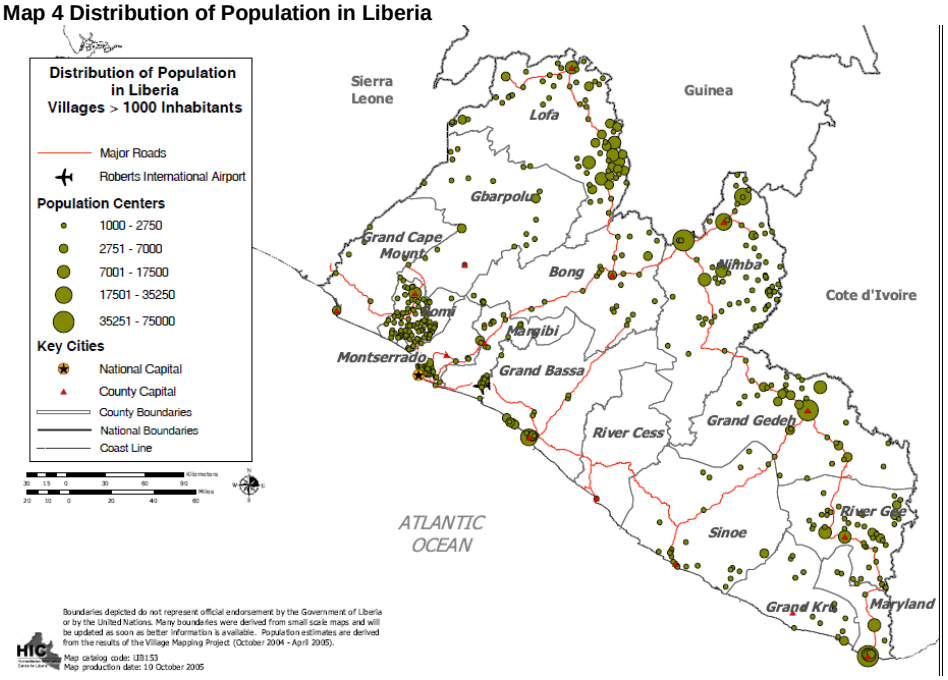
8 Effectiveness of the programme at generating benefits

8.1 Extent to Which Project Objectives Have Been Achieved

The overall objective, namely to foster national integration and economic recovery by improving transportation, has been fulfilled. The link between Monrovia and the important port city of Buchanan is now paved all the way and travel time much reduced. Monrovia to Ganta and the Guinea border is likewise much improved, especially the section, north of Gbarnga, which was in a very bad state prior to the project.

Monrovia-Ganta and Monrovia-Buchanan are primary economic corridors serving significant populations. Monrovia-Ganta also connects the well-populated areas of Bong, Nimba and Lofa to Monrovia. (See map.) This catchment area is agriculturally productive, supporting rubber plantations and having Liberia's highest intensity of rice and cassava production. Beyond Nimba the road continues through well-populated areas to Zwedru, Fish Town and Harper, formerly a prosperous port city. Improving Monrovia-Ganta is a significant improvement for road users making the arduous journey from Harper to Monrovia.[4]

Map 4 Distribution of Population in Liberia



The programme's stated purposes were largely served. Better connection to Monrovia Free Port and Buchanan Port, which handles dry bulk Liberia, better connects Liberia to the world economy. Regional integration is enhanced because the improved road extends to the Guinea border and benefits Cote d'Ivoire traffic entering Nimba and proceeding to Monrovia.

[4] Five years ago Harper was too remote to be served by fuel tankers. Fuel supply was left to local entrepreneurs who fetched fuel in cans and drums.

As detailed below, the project roads have improved the quality of life for those living near the road through better access to services. Those living further afield also benefit from faster and cheaper travel when using the project roads for parts of their journeys.

Whether the project has stimulated private-sector development is unknown. Whilst buses operate in a competitive market, trucks do not. Trucks are controlled by cartels, the so-called unions. Whereas bus fares have fallen, truck freight rates seem not to have responded proportionately.

The result sought from the project was for one main axis road to be rehabilitated. This was fulfilled twice over. The objectively verifiable indicator is: 306 km of major roads improved.

Red Light-Gbarnga	180.36 km
Gbarnga-Ganta-Guinea Border	68.61 km
Cotton Tree-Buchanan Harbour	56.54 km
	305.51 km

8.1.1 Baseline Surveys

Socio-economic baseline surveys were carried out in 2010 to facilitate before-and-after comparisons to identify the project's impacts.[5]

On the **Red Light-Ganta** corridor, consultations were held with local government officials; road transport union officials and members, and community members. They were briefed on the project and its expected benefits. Questionnaires were issued to 600 persons.

50	commercial drivers (taxis and buses)
250	passengers (male and female)
20	motorcycle riders
30	transport union officials
4	immigration officials
243	pedestrians (male and female)
3	police officers.

Traffic surveys were undertaken at four points along the route, yielding pedestrian counts, vehicle counts by type of vehicle, and load type in the case of trucks. Travel times, passenger fares and freight rates were collected.

The "before" road condition in 2010 is reflected in average speeds and bus fares:

Red Light-Gbarnga	66 km/h	LRD 1.27/km	LRD 83/h
Gbarnga-Ganta	26 km/h	LRD 4.81/km	LRD 125/h
Red Light-Ganta	50 km/h	LRD 2.01/km	LRD 100/h

The **Cotton Tree-Buchanan** baseline report has not been viewed but its relevant contents are contained in an ex-post evaluation report.

[5] Socio-economic Baseline Survey Report on The Red Light–Ganta–Guinea Border Road, Infrastructure Implementation Unit, Ministry of Public Works, December 2010. The Buchanan report has not been viewed but its relevant contents are reported in Ex-Post Evaluation Cotton Tree to Buchanan Road, GIZ, July 2014.

The “before” road condition in 2010 is reflected by the following:

Cotton Tree-Bokay Town	13.7 km	9 km/h
Bokay Town-Buchanan	67.2 km	27 km/h
Cotton Tree-Buchanan	80.9 km	20 km/h

8.1.2 Ex-post Surveys and Comparative Changes

It is too early for “after” surveys on Red Light-Ganta. The Lot 1 rehabilitation was completed in September 2016 and Lot 2 in March 2016.

An “after” survey for Cotton Tree-Buchanan was undertaken in mid-2014, a year after construction ended. It is reported in Ex-Post Evaluation- Cotton Tree to Buchanan Road, GIZ, July 2014. That report is quoted below.

In 2014 most of the road could be traversed comfortably at 100 km/h. Average speed was 89 km/h for a car and 69 km/h for a small bus— a very big improvement on 20km/h in 2010. Thus, travel time dropped from four hours to one hour.

Passenger fares declined by 14% by taxi and 17% by bus, but the goods tariff halved (49% by taxi and 53% by bus). Costs of carriage by truck were not collected.

These percentages do not fully reflect the effect of the road improvement. Costs had changed over the four years. The price of crude oil was much the same in 2014 as in 2010 but the currency weakened by 30%, making fuel more expensive. This is captured by the consumer price index, which rose 37% over those four years. The GDP deflator indicated a lesser cost inflation of just 22%. Allowing 30% for inflation magnifies the taxi fare saving to one-third and the tariff for goods carried by bus fell 60%. By removing cost inflation these figures measure the effect of road improvement.

Traffic volume is affected by population and by prosperity, (I.e. income per person, which are together reflected in GDP. After a precipitous -30% fall in 2003, GDP rebounded with almost double-digit growth in 2007 before easing back to 6.1% in 2010. The next three years saw growth of over 8%pa before falling to 0.7% in 2014.[6] IMF estimated zero growth in 2015 and foresees steadily rising prosperity to 6.6% growth in 2021. Traffic growth of 6%pa is reasonable expectation for the long term. For a few years after road improvement, an elevated growth of the local economy is expected, but this coincides with a period of underlying low growth. It is therefore reasonable to expect 6%pa traffic growth after completion of road improvement.

The table below shows traffic growth rates for period 2009-2014.[7] These were calculated from 2009 traffic counts collected for the National Transport Master Plan and 2014 counts collected for the ex-post evaluation. Growth rates excluding motorcycles[8] support a 6%pa traffic growth rate in the long term.

[6] Figures for Liberia form World Development Indicators, World Bank and IMF.

[7] Growth estimated for a 4.5-year period as the NTMP counts were November 2009 and the 2014 counts were April 2014.

[8] The inconsistent growth rates for motorcycles are ignored.

Table 29 Traffic growth 2009 - 2014

		Traffic count (12 hour)		Growth rate
		2009	2014	% pa
Farmington Bridge	Excluding motorcycles	775	968	5.1
	Motorcycles	575	1,382	21.5
	All vehicles	1,350	2,350	13.1
Hartford	Excluding motorcycles	512	702	7.3
	Motorcycles	443	416	-1.4
	All vehicles	955	1,118	3.6

8.1.3 Stakeholder Perceptions

The household surveys yielded insights into stakeholder perceptions of the project. Note that perceptions can be influenced by cost inflation.

For travel to health clinics over 90% of people reported time savings. For motorized travel the time fell by 70% and travel cost fell 16%.

Motorized travel to school was insignificant. Since walking to school may traverse side roads as well as the main road, only half the respondents reported reduced walk times, averaging 36% time saving.

Most people travelling to market by taxi/motorcycle reported time savings, which averaged over 60%. Travel cost saving was only 6%. Walk times to market also improved for just over half of the interviewees. A few people changed their travel mode from walk to taxi/motorcycle— perhaps because more distant markets had became accessible.

Views on road safety were mixed. A general perception of improved safety was offset by the new hazard of higher vehicle speeds. Many expressed a need for speed humps at settlements, especially near schools and hospitals.

The following additional points were raised by respondents:

- Safety is affected by lack of maintenance. Uncontrolled vegetation makes it difficult to walk on the shoulder or verge, resulting in closer proximity to fast-moving vehicles;
- Silting of roadside drains causes standing water at the road edge and surface runoff into the communities;
- Need for more road signs;
- Need for driver education.

8.2 Economic Re-evaluation of Lot 2

Rough roads increase fuel use and vehicle maintenance costs, and shorten vehicle life. Rough roads also increase travel time, which is a cost to travellers who have less time for productive work or other pursuits.

The impact of increased travel time on commercial vehicles can be very high. When edge break narrows the pavement and deep potholes appear, a fast two-lane road can become a tortuous single-lane obstacle course. Round-trip time can easily double. A transport task, such as

distributing fuel from a depot to refuelling stations, then requires twice as many trucks using twice as many drivers.

Since current traffic figures are available for Gbarnga-Ganta a re-evaluation of Lot 2 has been undertaken. The TNM study estimated a 30%pa economic internal rate of return (EIRR) for Lot 2.[9] The economic re-evaluations use the HDM4 vehicle operating cost (VOC) model to estimate savings arising from the programme. The tables on the next page show the input values used and give an example output table of VOCs.

[9] For Lot 1 the EIRR was 37%pa and 25%pa for Cotton Tree-Buchanan.

Table 30 Inputs to the HDM-4 vehicle operating cost model

	New Vehicle ($/veh)	New Tire ($/tire)	Fuel ($/liter)	Lube Oil ($/liter)	Maintenance Labor ($/hour)	Crew Wages ($/hour)	Annual Overhead ($/year)	Annual Interest (%)	Passenger Working Time ($/hour)	Passenger Non-Work Time ($/hour)	Cargo Time ($/hour)	Annual Distance Driven (km)	Annual Working Hours (hours)	Service Life (years)	Private Use (%)	Number of Passengers (#)	Work-related Passenger Trips (%)
Motorcycle	1177	29	0.89	3.00	2.00	0.50	0.00	12	1.00	0.25	0	10000	870	10	100	0.8	80
Car Medium	30000	55	0.89	3.00	2.00	0.50	476	12	1.00	0.25	0	12000	500	10	100	4.4	90
Delivery Vehicle	45000	114	0.89	3.00	2.00	0.50	476	12	1.00	0.25	0	18000	1100	10	100	3.0	75
Truck Light	25000	100	0.89	3.00	2.00	1.00	1430	12	1.00	0.25	0	60000	1800	10	0	0.0	0
Truck Medium	42000	130	0.89	3.00	2.50	1.50	3216	12	1.00	0.25	0	60000	1800	10	0	0.0	0
Truck Heavy	72000	224	0.89	3.00	2.50	1.50	2383	12	1.00	0.25	0	60000	1800	10	0	0.0	0
Truck Articulated	155000	273	0.89	3.00	2.50	1.50	2554	12	1.00	0.25	0	80000	2000	10	0	0.0	0
Bus Light	40000	55	0.89	3.00	2.00	1.00	1715	12	1.00	0.25	0	80000	2000	10	0	13.2	75
Bus Heavy	60000	224	0.89	3.00	2.50	1.50	1715	12	1.00	0.25	0	80000	2000	10	0	21.8	75

Table 31 Example vehicle operating cost output (US$/vehicle-km)

IRI = 3	Motor-cycle	Medium Car	Delivery Vehicle	Light Truck	Medium Truck	Heavy Truck	Articulated Truck	Small Bus	Large Bus
Road User Costs ($/vehicle-km)	**0.059**	**0.220**	**0.238**	**0.222**	**0.417**	**0.738**	**0.987**	**0.306**	**0.906**
Vehicle Operating Cost ($/vehicle-km)	0.052	0.178	0.213	0.211	0.398	0.703	0.941	0.198	0.482
Fuel ($/vehicle-km)	0.027	0.065	0.072	0.067	0.107	0.207	0.273	0.061	0.145
Lubricants ($/vehicle-km)	0.001	0.002	0.002	0.005	0.005	0.010	0.011	0.005	0.008
Tire ($/vehicle-km)	0.001	0.004	0.004	0.006	0.013	0.032	0.074	0.006	0.026
Maintenance Parts ($/vehicle-km)	0.002	0.031	0.046	0.032	0.086	0.207	0.298	0.034	0.095
Maintenance Labor ($/vehicle-km)	0.002	0.007	0.007	0.021	0.050	0.069	0.074	0.022	0.045
Crew Time ($/vehicle-km)	0.000	0.003	0.011	0.025	0.036	0.047	0.062	0.024	0.049
Depreciation ($/vehicle-km)	0.014	0.050	0.048	0.037	0.060	0.073	0.077	0.030	0.064
Interest ($/vehicle-km)	0.004	0.016	0.016	0.013	0.022	0.031	0.036	0.011	0.028
Overhead ($/vehicle-km)	0.000	0.000	0.007	0.006	0.019	0.026	0.036	0.005	0.023
Value of Time Cost ($/vehicle-km)	0.005	0.036	0.018	0.000	0.001	0.002	0.002	0.099	0.401
Passenger Time ($/vehicle-km)	0.005	0.036	0.018	0.000	0.000	0.000	0.000	0.099	0.401
Cargo Time ($/vehicle-km)	0.000	0.000	0.000	0.000	0.001	0.002	0.002	0.000	0.000
Emissions Cost ($/vehicle-km)	0.002	0.0066	0.007	0.011	0.017	0.033	0.043	0.010	0.023

The current level of traffic is shown in Table 32. As explained above, traffic is expected to grow at 6%pa.

Table 32 Annual average daily traffic, Gbarnga-Ganta 2016

Motor-cycle	Car Medium	Delivery Vehicle	Truck Light	Truck Medium	Truck Heavy	Truck Articulated	Bus Light	Bus Heavy	Total
1863	36	708	110	102	35	37	186	40	3117

The Lot 2 contract prices are as follows. They include an allowance of 15% for price escalation. The allowance for emergency works is in the figure for routine maintenance.

	USD million	
(1) Rehabilitation	36.17	
(2) Routine maintenance	21.16	
	2.64	annually
(3) Periodic maintenance	13.61	
	70.93	

After the end of the contract periodic maintenance is assumed to continue at the same level of expenditure. The economic benefit of the project is determined by the difference in VOC per vehicle-km, with and without the project. Multiplying by annual vehicle-km and summing over vehicle types yields the total annual benefit. The following table presents the results.

Table 33 Costs and benefits, USD 2016

Year	ADT veh/day	Unit: USD million Project Cost	Maint-enance	VOC without	VOC with	VOC saving	Net benefit
1	3117	18.09		21.04	12.74	8.30	-9.78
2	3304	18.09		22.31	13.51	8.80	-9.28
3	3502	2.64		23.64	14.32	9.33	6.68
4	3712	2.64		25.06	15.17	9.89	7.24
5	3935	2.64		26.57	16.08	10.48	7.84
6	4171	2.64		28.16	17.05	11.11	8.47
7	4422	2.64		29.85	18.07	11.78	9.13
8	4687	2.64		31.64	19.16	12.48	9.84
9	4968	9.45		33.54	20.31	13.23	3.78
10	5266	9.45		35.55	21.53	14.03	4.58
11	5582		2.64	37.69	22.82	14.87	12.22
12	5917		2.64	39.95	24.19	15.76	13.12
13	6272		2.64	42.34	25.64	16.71	14.06
14	6648		2.64	44.88	27.18	17.71	15.06
15	7047		2.64	47.58	28.81	18.77	16.13
16	7470		2.64	50.43	30.53	19.90	17.25
17	7918		2.64	53.46	32.37	21.09	18.45

Year	ADT veh/ day	Unit: USD million Project Cost	Maint-enance	VOC without	VOC with	VOC saving	Net benefit
18	8393		2.64	56.66	34.31	22.36	19.71
19	8897		2.64	60.06	36.37	23.70	21.05
20	9431		2.64	63.67	38.55	25.12	22.48
	(Growth 6%pa)			NPV @ 12%pa USD M			46.90
						EIRR pa	35%

The EIRR of 35%pa is very close to the TNM value of 30%pa, even though there are differences in assumptions. If a subjective allowance is made for a 20% drop in traffic during the six-month wet season the EIRR falls to 29%pa.

The re-evaluation supports TNM's findings. Confidence can be placed in the TNM economic analyses.

9 Impact of the programme in a wider context

The section on Effectiveness confirmed that the planned benefits listed in the section on Relevance were realised and that they benefitted the expected beneficiaries. 'Benefits' and 'beneficiaries' are sufficiently broadly defined as to encompass the likely benefits and beneficiaries. There is, however, an unplanned disbenefit: a marked increase in serious road accidents.

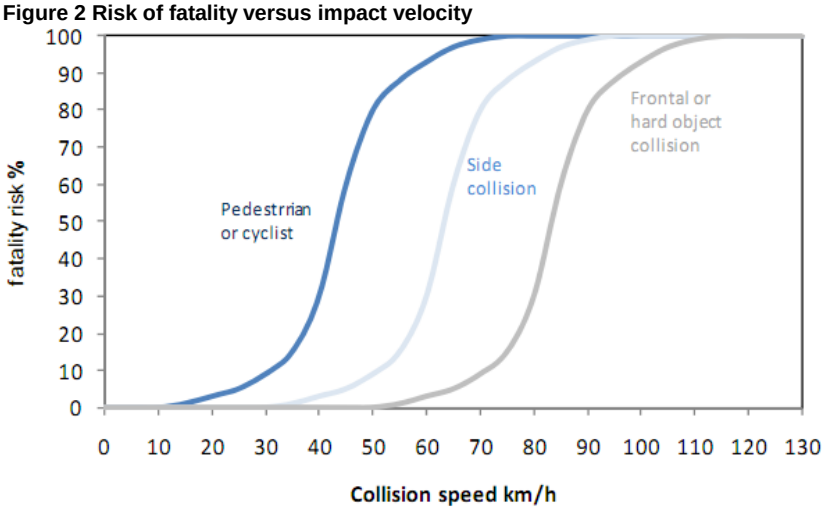
9.1 Road Safety

The TNM report noted that the economic evaluation model permitted calculation of benefits from reduced accidents but, due to an absence of data, these accident benefits were not tallied. Thus it was anticipated that the accident costs would fall. In fact the opposite occurred.

The December meeting of the oversight committee received a report[10] advising that, following completion of the rehabilitation phase on Lots 1 and 2, there have been more accidents on the corridor— 55 fatalities during January-November 2016. Speeding, lack of driving skills, driving under the influence of alcohol, fatigue and overloading were offered as causes.

Accidents are characterised by frequency and severity, which can move in opposite directions as a result of road improvements. A better road may cause frequency to fall. Higher speeds may cause severity to rise. Accidents between vehicles travelling at low speeds are usually minor. Accidents at high speed are more likely to be fatal.[11] (See the graph below.)

Figure 2 Risk of fatality versus impact velocity



Source: P Wramborg, A new approach to a safe and sustainable road structure and street design for urban areas, Swedish National Road & Transport Research Institute, 2005.

In a meeting with the Port Truckers Association concern about road safety was raised in relation to a section of road between Red Light and Kakata. It has a lower standard of horizontal alignment than the remainder of the route, with many bends, some sharp. It was explained that on these bends articulated trucks sweep a wider path, inferring a need for more widening on bends. This was offered as a reason for head-on collisions with oncoming vehicles. Another interpretation could be that trucks are travelling too fast on curves and encroach over the centre line.

[10] Summary Updates of Key Projects Financed By LRTF & GoL and Managed by the IIU, Updated Nov 30, 2016.

[11] This is not the case if a road is widened and becomes median-divided. Such roads become safer.

Advisory speed signs prior to curves and reflectors on the centre line were requested.

Proficient commercial drivers who ply the road regularly should be able to drive safely without such aids. But the structure of the industry — specifically the equitable sharing of work which is organised by the Association (or unions) — militates against gaining intimate familiarity with the road. It was explained that the Association's drivers tend to work in and around Monrovia with only infrequent excursions north to Gbarnga and beyond. Drivers do not get to specialise on long-distance haulage.

The safety problem results from inconsistency of horizontal alignment. The subject road section was not designed that way initially. In the first design, that section of road was realigned. But the estimated project cost exceeded the funds available and a redesign was prepared, mostly following the existing alignment. In retrospect the project should have anticipated the safety problems this would cause, and made compensatory adjustments.

A report is in preparation by the deputy team leader of Lot 1 who is a road safety specialist. This report will recommend what should be done. The transport unions have a predilection for driver training but making the driving task easier may be preferable, by use of warning signs, reflectorized centre line markers, edge delineation posts, rumble strips, and so on.

9.2 Dry Port

A proposed "dry port" in the vicinity of Ganta may provide unplanned benefits that could not have been anticipated at the time of project preparation.

Current transport costs are high due to an inefficient supply chain based on transport of small "break bulk" shipments. With a dry port, goods would be hauled in containers to and from the Monrovia Free Port under Customs bond. A consultant is currently working on the proposal.

GoL considering the dry port project as a BOT (build operate transfer) concession to a private sector operator for, say, 20 years. Part of the proposal is to operate a truck fleet between the dry port and Monrovia port. The favoured location is Kpoapa, 10 km from Ganta on the road to Tappita, Zwedru, Fish Town and Harper. It would be well-placed to attract business from Guinea and Cote d'Ivoire.

The dry port would not be viable without the road improvement from Red Light to Ganta.

10 Sustainability of the programme's benefits

10.1 Stakeholder 'Ownership'

To the extent that the concept of 'ownership' can apply in circumstances when stakeholders have only indirect influence, the fact that greatly reduced travel time is highly valued by road users and the catchment population is evidence of 'ownership' of the project.

10.2 Support

The project was formulated by GoL, LRTF donors agreed to its implementation and assisted with funding, thereby demonstrating the concurrence of donor and national policies.

GoL support is evidenced by road sector reforms being implemented. The National Road Fund Act 2016 was passed in December. Road user charges will be collected as from the financial year commencing July 2017. The Road Fund will support maintenance of the project roads when the contracts currently maintaining them expire in a few years.

The initial level of road user charges is insufficient to meet the needs of all roads, particularly since up to 40% of the revenues are permitted to be used for repayment of loans approved by the government for rehabilitation12 and improvement of roads deemed unmaintainable.[12]

There is a risk that maintenance of project roads will be deferred unless road user charges are increased sufficiently to cover the needs of the entire road network. But even if charges are not increased sufficiently, and there is a shortfall in funding, a Road Maintenance Management System that is being put in place can be expected to ensure preservation of the project roads, which pass through counties which together have 62% of the nation's population and support many more for whom these roads are vital transport arteries.

10.3 Capacity to Preserve the Roads

Funding is not the only problem facing road maintenance. Capability and capacity need improvement.

Hitherto, road maintenance has been ad hoc. Much of it was not really maintenance at all; it was reinstatement of roads, or undertaking works to reopen them after the wet season. United Nations forces helped in some places. Paid by MPW, the Liberian army rehabilitated some roads (but not well enough to survive the next wet season). Liberian contractors were used, for whom a large payments backlog remains to be paid by GoL.

The situation is better in Bong, Lofa, Nimba and Grand Bassa due to USAID and SIDA taking over feeder roads, and some secondary roads. In advance of routine maintenance, roads were rehabilitation where needed to bring them up to a maintainable standard. Community based organisations (CBOs) do the routine maintenance at around USD1,000 per km annually.

[12] "Rehabilitation" of and "unmaintainable" road means reconstruction. "Rehabilitation" is often used to describe a heavy form of periodic maintenance to return the road surface to its original shape and smoothness, and to restore pavement durability— which in Liberia is included in "periodic maintenance".

Plans to strengthen the road sector were delineated in the National Transport Policy and Strategy (NTPS) in 2009. Located in MPW, a semi-autonomous Special Implementation Unit (SIU) was responsible for technical and financial management of large donor-funded projects. The NTPS planned to restructure the SIU into a transitional Infrastructure Implementation Unit (IIU) which would evolve into a Liberia Road Authority, managing and developing the road network using private sector contractors for road maintenance, rehabilitation and construction. MPW would retain responsibility for policy-making and strategic planning.

Evolution of IIU into a Road Agency (as it is now called) has not yet occurred. The IIU may remain solely concerned with donor-funded projects. The Road Agency may be formed out of parts of MPW.

It is intended that a draft Act to reorganise MWD will be introduced to the legislature in the current session together with a Road Agency Act and a Roads Act. This conforms with the Public Sector Modernisation Program, which favours ministries being responsible for policy, monitoring and oversight. The Governance Commission favours a Road Agency, as does MPW.

The Road Fund now exists. Creation of the Road Agency is being pursued. Competent management of the road sector seems to be in sight, but the transformation is unlikely to be complete when maintenance of Cotton Tree-Buchanan reverts to the government.

To sum up, institutional capacity to take over the project roads is weak. To an extent this is a consequence of lack of funds for road maintenance. This lack of funding has recently been addressed by establishing the Road Fund and road user charges will be collected from July 2017.[13] The government will need to build on this positive start by progressively incrementing the road user charges so that the core road network is preserved.

Whether formed from the IIU or MPW, the Roads Agency is unlikely to be established and functional in time for the handover of the first of the three roads, Cotton Tree-Buchanan. Handover may be to MPW which, by that time, will have geared-up for maintenance paid for by the Road Fund. The Buchanan road will be in good condition at handover and its maintenance will be undemanding for a few years. Provided the government's resolve to form a Road Agency survives national elections in October there is good reason to expect a functioning Road Agency will be ready for handover of Lot 1 and Lot 2 of the Red Light-Ganta corridor.

10.4 Budget

The contracts were lump sum, subject to price adjustments according to prescribed indices for which there was provision of a15% price contingency. The project budget was sufficient to meet these costs.

There is a shortfall in funding, however. None of GoL's contribution of USD72.8 million has been forthcoming. Extenuating circumstances, namely the Ebola crisis and a fall in commodity prices, are blamed.

Ebola appeared in Guinea in December 2013. Soon after, the first Liberian cases were diagnosed in Lofa and Nimba counties and by October all 15 counties were affected. The Liberia emergency was declared over in January 2016. It had blighted all of 2014 and 2015.

[13] But not much more than half the revenue is likely to be used for routine and periodic maintenance, due to the provisions of the Act.

The economic effect of the Ebola crisis was magnified by a slump in prices of rubber, iron ore and palm oil:

- The price of rubber, which accounts for about 20% of Liberia's exports, spiked in January 2011 at $2.70 per pound, a 10-fold increase over the price a decade earlier. Over the next five years the price slid until it bottomed at $0.50 in January 2016. A rebound over the past year took the price to $1.15 in January 2017;[14]
- Up to 2002 the price of iron ore, which accounts for about 40% of exports, had struggled to remain above $10 per tonne. It then rose exponentially to $180 in January 2011 followed by an erratic fall to $130 in January 2014 (about the start of the Ebola crisis). By the time the Ebola emergency was over (January 2016) iron ore had fallen to almost $40 per tonne. Over the past year the price recovered to $80 per tonne, in January 2017;
- Palm oil price also suffered substantially. The price peaked at $1250 per tonne in January 2011, having fluctuated around $400 for several years (apart from a short-lived spike to $1100 in January 2008). Subsequently the price slid to $500 per tonne in late 2015. It has since edged back up to $720 in January 2017.

Thus, declining commodity prices compounded the effect of the Ebola crisis, adversely affecting GoL's revenues. The past 12 months saw a recovery in prices, but not (yet) to levels prior to the crisis.

The above analysis suggests there was good reason why GoL did not have funds to contribute to the LRTF but conditions have improved over the last year and GoL may now be in a position to commence making its contributions.

To date, payments to contractors have not been affected by GoL's lack of contributions. Donors' contributions will eventually be exhausted and without GoL contributing the contractors cannot be paid. The World Bank is seeking additional funding with a view to reducing the GoL liability to USD40-50 million.

GoL has not advised its intentions but there are indicators that the MFDP is minded to start contributing.

10.5 Axle load control

Sustainability of project benefits depends on preservation of the subject roads. Road preservation depends on road maintenance, discussed above, and on control of truck overloading. The box on the next page explains why it is imperative to control truck axle loads.

The European Union funded a study of truck overloading in 2012 and subsequently supported the drafting of an Act and Regulations governing axle weights and their testnforcement.

The Axle Load Law 2015 was approved by the President on 23 October 2015.[15] Heavy Duty Vehicle Axle Load Regulations 2015 followed in 2016.

As yet there is no enforcement of the axle load regulations by the Ministry of Transport, and nothing is planned. The Ministry's first problem is lack of equipment. Since permanent weigh stations are costly the Ministry, sensibly, would like to start by using portable weigh scales that can be carried on a pickup truck. The Ministry needs a few sets of scales costing no more than USD 10,000 a set.

[14] Source of prices: http://www.indexmundi.com.

[15] The text of the Act gives the short title as Axel Load Law 2014.

Donor dependence for funding would, ideally, have been broken by use of moneys from the Road Fund, but the National Road Fund Act does not allow its funds to be used for this purpose. The Act addresses road preservation in terms of road maintenance but not axle load enforcement.

A potential source of funds may well be forthcoming from the African Development Bank's support the Ministry of Transport. The Ministry needs to prepare an implementation plan then seek funding, from either GoL or donors.

As part of GIZ's transport sector advisory services to Liberia, a mission to support enforcement of the axle load regulations visited Liberia in the latter part of 2016.[16] The mission prepared terms of reference for six support personnel to strengthen the Ministry and help implement enforcement.

The critical need (once funding for enforcement is resolved) is for an experienced expert to help the Ministry select and procure suitable portable scales and, once they arrive, to train and supervise staff in their use for a period of a few months.

Axle load enforcement should be phased in. In the first phase only warning notices should be issued. Once the trucking industry understands what it means to be overweight the surveillance turns to enforcement, by imposition of fines. The expert would guide development of a system of imposing and collecting fines.

[16] Mission Report: Support Mission for enforcement of the axle load regulation in Liberia, led by Paul Dassi Hounhoui, October 2016.

BOX

WHY IS OVERLOADING SUCH A CONCERN?

Roads are built to wear out. Statements about “pavement damage” are usually misleading. It is true that massively overloaded vehicles can cause irreparable damage with only one pass over the pavement. In the main, however, pavements are “fatigue structures” that are designed and constructed to withstand a certain number of repetitions of loading and deflection.

The wear caused by an axle, or axle group, is commonly thought to be in proportion to the fourth power of the load. This is referred to as ”the fourth power rule”. In other words, if the load on an axle is doubled, the wear on the pavement increases by a factor of 2 to the power of 4 (i.e., 2x2x2x2) or 16-fold. This is not important if the axle is lightly loaded. Sixteen-fold a very small number is still a small number. But if we take an axle at its legal load limit and overload it by one-third, then the already considerable road wear increases three-fold. ($1.33^4 = 3.1$.) If all vehicles overload by one-third, a pavement with six years remaining life will last only two years. Few countries can afford such acceleration of pavement rehabilitation needs. And no developing country has the resources to maintain roads in the face of rampant overloading, which can be worse than the one-third in this example.

In the absence of sensible load limits, strictly enforced, the temptation to overload is irresistible. It takes only a few rogue truck operators who flout the law to compel law-abiding operators to follow suit. Due to the tare weight of the truck, overloading axles by one-third is achieved by increasing the payload by one-half. The higher payload increases revenues by 50%. Admittedly, costs of fuel and vehicle maintenance rise, but the capital cost of the truck and the wages of the driver remain the same. Overloading pays—handsomely. Virtuous operators who do not follow suit will likely go out of business. Effective enforcement is essential to protect law-abiding operators as well as pavements.

The measure of pavement life is the number of standard heavy axles that can pass over it before it needs rehabilitation. The standard heavy axle is the “equivalent standard axle load”, or ESAL, defined as 8.16 tonne on a single axle with twin tyres. (For other axles, or groups of axles, the load that produces one ESAL is different.)

Designing a pavement to last for 20 years before needing rehabilitation requires an estimate of the number of ESALs the pavement will carry in its lifetime. The ESALs built into a pavement are like money in the bank. Each heavy vehicle takes some ESALs out of the pavement. There are fewer ESALs left in the pavement.

Overloading rapidly uses up the ESALs in a pavement, advancing the need for costly rehabilitation of the pavement. When funds for road preservation are in short supply, the effect is a deteriorating road network.

Concerning the project roads, the Lot 1 and Lot 2 contracts have a provision for a compensation claim if the pavement sustains more than the anticipated axle loading. How the compensation should be calculated is not specified, but survey data of actual axle loads is essential. Bidders for Lot 1 enquired whether the contractor was expected to do the weighing with its own equipment. The response was ‘no’: on request, the government would do the weighing. Surveys of axle loads need

to be carried out annually but this cannot be done since there are no scales. This is an omission on the part of the government.

Since traffic levels are below the TNM forecasts, compensation for unforeseen pavement wear might not have been an issue since it would be logical to conclude that pavement loadings are less, not more, than expected: logical, but wrong.

In 2012 the EU commissioned a study of truck loading.[17] Trucks were weighed at several locations, the most representative being Somalia Drive in Monrovia. ESALs[18] per vehicle adopted by TNM and incorporated in the contract documents for Lot 1 are tabulated below, together with the observed ESALs in 2012.

Table 34 Comparison ESAL/truck surveys 2009 and 2012

ESAL				
	Lot 1 Contract	**Survey 2012**		**Traffic 2009**
Light truck	2.048	13.5	2 axles	71%
Medium truck	4.345	16.8	3 axles*	17%
Heavy truck 5 axles	4.4	26.7	5 axles	9%
Heavy truck 6 axles	5.6	15	6 axles	3%
MEAN^	**2.75**	**15.32**		**100%**
^ Weighted by traffic mix			* Very few 4 axle trucks	

For the traffic mix used by TNM in 2010, mean ESAL/truck is:

2.75 based on Lot 1 contract

15.32 based on Somalia Drive survey.

The discrepancy is 5.6-fold.

Even though the numbers of trucks are much less than was assumed for pavement design, the actual number of ESALs will far exceed the design ESALs, making it necessary to survey ESALs passing over the Lot 1 and Lot 2 roads.

This still leaves unresolved just what cost is to be compensated. The pavement is designed for 20 years and handed over at 10 years, with a fresh overlay. The pavement will likely be in good condition after 10 years. The ESAL/truck discrepancy will not impact the contractor. This risk is borne by the government, as owner of the roads.

[17] Axle Load Enforcement in Liberia, R Allan and S Elsabhy, November 2012.

[18] See Box for definition.

11 Coherence of the programme with other (EU) objectives and crosscutting issues

After the end of the civil war, Liberia was eligible for assistance under the so-called "**European Commission's Support to Conflict Prevention and Peace Building (CPPB)**" program. Under this program Liberia received between 2003 and 2010 assistance for projects in the following categories:

Table 35 Liberia CPPB receipts 2003 - 2010

		Amounts Contracted	Amounts Disbursed
Reconstruction & infrastructure	1 project	€ 60,000,000	€ 60,000,000
Rapid intervention	5 projects	€ 6,969,386	€ 5,846,615
Peace consolidation and prevention of future conflicts	84 projects	€ 52,578,623	€ 50,210,035
Population flows and human trafficking	75 projects	€ 18,323,932	€ 17,913,216
Environmental & natural resources	2 projects	€ 4,280,945	€ 1,632,793
Democracy, rule of law and civil society	5 projects	€ 9,283,947	€ 7,507,662
Health and communicable diseases	1 project	€ 399,600	€ 7,507,662
Security sector	2 projects	€ 1,981,534	€ 1,981,534
Total	**259 projects**	**€ 206,396,590**	**€ 195,701,490**

Support to the LRTF is the project under the category Reconstruction & infrastructure in the table above.

The Country Support Strategy (CSP 2008 - 2013) for Liberia embraced the post-conflict Poverty Reduction Strategy (PRS) process. The European Union (EU) Strategy for Africa provides a long-term, strategic framework for interaction between Europe and Africa at many levels.

In order to avoid duplication and secure good coordination with the initiatives of other EU countries, the decision was taken to pool all funds in the Liberian Reconstruction Trust Fund. Further reasons to opt for the LRTF were the absence of a functioning National Authorising Office (NAO) at the time and staff constraints at the EU Delegation.

The Liberia Reconstruction Trust Fund (LRTF) was established in 2007 to help rehabilitate Liberia's priority infrastructure and revitalize agriculture in support of the Pillar IV Infrastructure and Basic Service targets of its PRS. It is managed by the International Development Association (IDA) on behalf of GoL and enables multi-donor financing to be harmonized and projects to be implemented quickly.

The Overall Objective (OO) is: Fostering the LRTF's coordinated planning of infrastructure reconstruction in support to Liberia's Poverty Reduction Strategy (PRS). The Project Purpose (PP)

is: “(1): Improving the quality of life of people by providing greater access to markets, employment opportunities and social services and helping Liberia (GoL) achieve its Millennium Development Goal (MDG) 1,2,4 and 5 targets. (2): Supporting the use of OPRC contracts for the long-term maintenance of the primary road network.

There is one expected result: R1) the rehabilitation and maintenance of at least one section of the two primary roads prioritised by the Ministry of Public Works Special Implementation Unit (MPW/SIU), endorsed by the Liberia Reconstruction and Development Committee and accepted by LRTF in support of Pillar IV of GoL’s PRS.

The Liberia Rehabilitation Trust Fund administered by the World Bank addresses the needs of the population to have greater access to social and physical infrastructure in order to foster socio-economic development.

The Administration Agreement (AA) is an annex to the Financing Conditions and it outlines the roles and responsibilities of the Oversight Committee (OC), which was designed to meet on a quarterly basis and to be co-chaired by the Government of Liberia (GoL) and World Bank with voting membership for the contributing donors and others as observers.

Although the funds are not earmarked, the initial meetings of the OC decreed that the EU contributions would be vital for the two road projects being considered (the Urban and Rural Infrastructure Rehabilitation Programme (URIRP) and the Liberia Road Asset Management Project (LIBRAMP)) together with the Emergency Monrovia Urban Sanitation Project (EMUS).

The conclusion of the evaluators is that through the support to the LRTF:

- The results and impacts have mutually reinforced one another;
- The results and impacts have not been duplicated or conflicted with one another;
- The results have contributed to EC policies;
- The results are in line with evolving strategies of the EC and its partners.

The EC through its mandate as an LRTF OC member was supposed to address the issues of maximising local youth employment by encouraging the OPRC Contract Entities to sub contract routine maintenance to local contractors and of gender sensitive planning.

For both Lot 1 and Lot 2 the contract General Conditions state at section 19.2(a):

> The Contractor shall provide and employ on the Site for the execution of the Works and Services such skilled, semi-skilled and unskilled labour as is necessary for the proper and timely execution of the Contract. *The Contractor is encouraged to use local labour that has the necessary skills.* (Emphasis added.)

For Lot 1, the routine maintenance phase commenced 25 September 2016. The Monitoring Consultant’s December progress report notes that the contractor was struggling to adapt to the new work phase. Some experienced staff had not yet returned from China after completion of the rehabilitation phase. Also, the four local subcontractors to cut grass cutting, clean culverts and do other nontechnical tasks had not been appointed. Negotiations with bidders were still in progress.

For Lot 2, the routine maintenance phase commenced 8 March 2016. Work is being done to specification. (Non-compliance is remedied within the allowed period.) Of the seven management staff, three are Liberian. There are also 44 local staff, of whom 4 are women. Subcontractors are

not being used save that when grass cutting is needed the work is undertaken though a local agent who employs local labour.

The planning phase was mainly project preparation by TNM in 2009-10. TNM's reports make no mention of gender issues or pay special attention to involvement of women. Nor do the contract documents refer to gender or, indeed, women. The closest topic concerns HIV/AIDS, which is expressly covered in the contracts.

On the road Cotton Tree-Buchanan the maintenance for a period of 5 years is carried out by the local company BMC, funded by the EU and DFID.

12 EU value-added and synergy with initiatives of EU member states

The European Union and EU member states support a wide range of initiatives across several sectors in Liberia, with Germany, the United Kingdom and Sweden being prominent in the road sector.

To streamline various donor activities in the infrastructure sector, the LRTF was established as a World Bank-administered, multi-donor trust fund to support Liberian national priorities in infrastructure as defined in Liberia's Poverty Reduction Strategy Paper (PRSP). From 2008 to 2016, the Trust Fund has successfully overseen various projects, including:

- **Red Light-Gbarnga highway (LIBRAMP)**
  At almost USD166m, this 176 km highway is the largest investment by the LRTF (co-funded with the World Bank and the Government of Liberia). Rehabilitation is complete and routine maintenance has commenced. With the completion of this road, the LRTF has contributed significantly to the completion of a major primary road artery, linking Monrovia to the agricultural heart of the country as well as to Liberia's neighbour Guinea;
- **Gbarnga-Ganta-Guinea Border highway (LIBRAMP)**
  The rehabilitation phase of this 70 km stretch was declared completed on March 7, 2016 and is now in the routine maintenance phase. The total cost for this project, including the maintenance phase is estimated at USD 71m;
- **Cotton Tree-Buchanan Harbour (URIRP)**
  The 82 km stretch was declared completed on June 4, 2013. The total construction cost for this road was almost USD 56 million and completed in time and within the budget;
- **Various maintenance projects and studies**
  Through URIRP and LIBRAMP, the LRTF has contributed to various smaller road maintenance projects and feasibility studies, including the design of the Ganta-Saclepea-Tappita-Zwedru road.

Urban sanitation initiatives funded through the LRTF have been implemented by the Monrovia City Corporation (MCC). Between September 2014 and November 2015, the Emergency Monrovia Urban Sanitation Project (EMUS) has collected almost 190 thousand tons of solid waste, exceeding the targets set despite the on-going Ebola Virus Disease (EVD) crisis. Between January and May 2016, another 55 thousand tons have been collected. Overall, the project has been able to remove roughly 90% of the solid waste generated in Monrovia between September 2014 and December 2015.

The World Bank designed the URIRP, LIBRAMP and EMUS projects that were co-funded from the LRTF and the EU accepted the objectives, targeted beneficiaries and the timing, etc. as expressed in the various Appraisal Documents completely without modifications.

Since the World Bank prepared the Appraisal Documents, they did not coordinate the intervention specifically with the possible intervention of EU Member States in the country.

In the project preparation phase the World Bank did not look explicitly to the possibility of creating actual synergy (or duplication) with the intervention of EU Member States.

After the EC had signed the Administrative Agreement, it became a voting member of the LRTF Oversight Committee (OC), along with the World Bank, Germany, Sweden and Ireland and three voting GoL members, including the Minister of Public Works. This affords an opportunity to support the alignment of LRTF projects with the PRS and sector concerns as well as track OPRC implementation progress.

During the implementation of the various projects co-funded by the LRTF, quarterly coordination meetings chaired by the World Bank with all donors active in the same field to optimise synergies and avoid duplication.

The visibility of the European Union in this project has been discussed at various times and on various levels.

In the ROM Report of 2012 it was already mentioned that the EC visibility was extremely limited. On demand of the DEU the visibility on the Buchanan road was slightly improved. The MPW has made sure contractors put up road signs with donor logos etc.

In the ROM report of 2015 it was mentioned that visibility was still limited. Signboards noted on the LIBRAMP roads displayed the logos of the contributing donors. Signboards noted on the URIRP roads (and bridge plaque) mentioned the LRTF without explaining who the donors are (in any case many of these signs should now be removed) and the project reports make reference to the source of funds. The EMUS project uses the logos of the cooperating donors in all signs and appropriate acknowledgement is given in the project documents. Notwithstanding, there is no real visibility at the transfer stations or landfill sites.

The Financing Conditions made reference to the Administration Agreement making provision for the EC's Communication and Visibility Guidelines, but this is not clearly stated in the Administration Agreement. There are examples of projects, which are co-financed, that are required to have a communication and visibility plan but the LRTF is lacking in this respect. The general public have little awareness of the source of funds. The World Bank websites are a good source of information on the projects with implementation status and results reports being posted following supervision missions (with some exceptions).

The EU has engaged a consultant who evaluated the visibility actions taken in the LRTF and made recommendations for the remainder of the programme. The main conclusions were that - up to October 2015 - little had been done to improve the EU’s visibility in the country. Over the last months this has changed, drastically. During the next two years, a European consortium - awarded by tender - will overlook and direct all actions related to the visibility.

The evaluation indicated that the obstacles are (1) the lack of resources for communication that the Delegation can count on and (2) a general unawareness, in the country, about the nature and role of the EU. Additionally, the agreements with partnering donors and institutions do not generally contemplate any sort of hierarchy in favour certain actors. The proposal to enhance the EU’s visibility by providing the MPW with a brand identity (meant as a tool to deliver, for example, road-safety messages) was accepted by the Delegation but not by the Liberian counterparts, limiting the purpose and effectiveness of the planned actions.

The visibility of the billboards along the Cotton Tree-Buchanan road is poor: the font size is too small if one drives with a speed of 80 km/h.

13 Conclusions and Recommendations

13.1 Conclusions

Based on the documents studies, the people interviewed and site visits, the evaluators have drawn the following conclusions:

a. The relevance of the projects funded under the LRTF and subject to this evaluation was high;
b. The efficiency of the LRTF as a funding mechanism is rated good;
c. The execution of the RAP was very poor due to underfunding and resulted in high claims that will have to borne in the end by the Government itself;
d. The efficiency of the implementation of the three OPRC contracts was good; value for money was received;
e. The OPRC methodology in itself is good, but hampered severely by:
   - lack of understanding by most stakeholders of the Asset Management concept; and
   - contract documents that have to be modified considerably.
f. The OPRC projects were cheaper than comparable traditional FIDIC works contracts recently tendered in Liberia and the region;
g. The cost for Routine Maintenance + Emergency Works of Lot 1 and 2 are considerably higher than Buchanan road due to higher estimates for emergency works and the supervision costs.

13.2 Recommendations

The following recommendations are offered for consideration:

a. Preparation of the conceptual designs has to be improved. It should be less input driven and more in line with real Design, Build, Operate, Maintain and Transfer principles. The conceptual design should not be for procurement comparison only;
b. Funds for the RAP have to be secured before a contract is signed and should be left out of the project cycle. The costs of the RAP include transfer of land from Liberia (private owners) to Liberia (the Government). It is not appropriate for donors to “pay” for this transfer, but they can pay for the effort to accomplish this;
c. The quality of the tender documents should be improved. During the Lessons Learned session valuable suggestions were given and these should be introduced in new OPRC contracts (S.D. Cooper road);
d. The Employment creation through local contractors in maintenance phases has to be promoted, thereby making sure that the sub-contractors comply with the regulations of the Liberian Labour Law, including the payment of minimum wages. The main CE is still responsible for his sub-contractors compliance with the laws of the country;
e. The funding for the remaining part of the LIBRAMP project has to be secured, especially the possible defaulting of the GoL on their contribution of USD 72.8 million;
f. Look at the possibilities for the minimal intervention solution for sealing. This can be done in stages:
   - firstly: fix the notorious black spots in the country that block traffic every rainy season by paving them;
   - secondly: make a selection of the roads that qualify for the minimal intervention solution and prioritize them;
   - thirdly: seek funding, possibly from the 40% of funds for capital works from the Road Fund.
g. Traffic safety should be the top priority and recommendations made by the Road Safety advisor of Lot 1 should be implemented;

h. The future of the LRTF is given in Volume II-Annex 2. Given the fact that almost all resources of the LRTF are already disbursed/committed, it is unlikely that in the near future new road projects can be co-funded. Maybe the LRTF should develop an exit strategy, rather than embarking on costly new road projects;
i. The recommendations of the Report on Visibility should be implemented; Special attention should be given to the readability of signs.

Report Control Path

Project title: Mid-term Evaluation of the World Bank administered contracts: Red Light-Gbarnga, Gbarnga-Ganta and the Cotton Tree-Buchanan roads as part of the Liberia Reconstruction Trust Fund (LRTF)
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